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<tr>
<td>A$</td>
<td>Australian Dollar</td>
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<tr>
<td>ACA</td>
<td>Australian Communications Authority</td>
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<td>ACCC</td>
<td>Australian Competition Consumer Council</td>
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<tr>
<td>ACS</td>
<td>Average Cost of Supply</td>
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<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>ADF</td>
<td>Airport Development Fees</td>
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<td>ADRD</td>
<td>Alberta Department of Resource Development</td>
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<tr>
<td>AEC</td>
<td>Ahmedabad Electricity Company</td>
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<tr>
<td>AEE</td>
<td>Autorita per l’Energia Elettrica e il Gas</td>
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<tr>
<td>AERA</td>
<td>Aviation Economic Regulatory Authority</td>
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<td>AGCOM</td>
<td>The Communications Regulatory Authority</td>
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<td>AGR</td>
<td>Adjusted Gross Revenue</td>
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<td>AIM</td>
<td>Alternative Investment Market</td>
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<td>AIP</td>
<td>Administrative Incentive Pricing</td>
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<tr>
<td>AMC</td>
<td>Ahmedabad Municipal Corporation</td>
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<tr>
<td>AP</td>
<td>Andhra Pradesh</td>
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<tr>
<td>APDRP</td>
<td>Accelerated Power Development and Reform Programme</td>
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<tr>
<td>APERC</td>
<td>Andhra Pradesh Electricity Regulatory Commission</td>
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<tr>
<td>APL</td>
<td>Adaptable Programme Loan/Lending</td>
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<tr>
<td>APM</td>
<td>Administrative Price Mechanism</td>
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<tr>
<td>APPSRP</td>
<td>Andhra Pradesh Power Sector Restructuring Programme</td>
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<tr>
<td>APSEB</td>
<td>Andhra Pradesh State Electricity Board</td>
</tr>
<tr>
<td>ARR</td>
<td>Annual Revenue Requirement</td>
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<td>ARR</td>
<td>Average Revenue Realised</td>
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<tr>
<td>ASEAN</td>
<td>Association of Southeast Asian Nations</td>
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<tr>
<td>ASP</td>
<td>Activated Sludge Process</td>
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<tr>
<td>AT&amp;C</td>
<td>Aggregate Technical and Commercial</td>
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<tr>
<td>ATE</td>
<td>Appellate Tribunal for Electricity</td>
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<tr>
<td>ATF</td>
<td>Aviation Turbine Fuel</td>
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<tr>
<td>AUDA</td>
<td>Ahmedabad Urban Development Authority</td>
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<td>BBCD</td>
<td>Bare-Boat-Charter-cum-Demise</td>
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</table>
bbl Barrels
BCC Beneficiary Capital Contribution
BCC Base Construction Cost
bcm Billion Cubic Metres
BCM Book Consolidation Module
BEE Bureau of Energy Efficiency
BEST Brihan Mumbai (Bombay) Electric Supply and Transport Undertaking
BG Broad Gauge
BIAL Bengaluru International Airport Limited
BKCC B. K. Chaturvedi Committee
BLD Billion Litres per Day
BLT Build, Lease, Transfer
BOD Biological Oxygen Demand
BOLT Build, Operate, Lease, Transfer
BOO Build, Own, Operate
BOOM Build, Own, Operate, Maintain
BOOST Build, Own, Operate, Share, Transfer
BOOT Build, Own, Operate, Transfer
BOQ Bill of Quantities
BOT Build, Operate, Transfer
BP British Petroleum
BPCL Bharat Petroleum Corporation Limited
BRPL Bongaigaon Refinery and Petrochemicals Limited
BRTS Bus Rapid Transit System
BS Basic Service
BSES Bombay Suburban Electric Supply
BSF Bond Service Fund
BSNL Bharat Sanchar Nigam Limited
BTS Bangkok Mass Transit System
BUA Built-up Area
BWSSB Bangalore Water Supply and Sanitation Board
BYPL BSES Yamuna Power Limited
<table>
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<td>CA</td>
<td>Constitutional Amendment</td>
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<tr>
<td>CAA</td>
<td>Constitutional Amendment Act</td>
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<td>CAA</td>
<td>Civil Aviation Authority</td>
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<tr>
<td>CAA</td>
<td>Cost under the Annuity Approach</td>
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<tr>
<td>CAGR</td>
<td>Compound Annual Growth Rate</td>
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<tr>
<td>CAIDI</td>
<td>Consumer Average Interruption Duration Index</td>
</tr>
<tr>
<td>CAM</td>
<td>Common Area Maintenance</td>
</tr>
<tr>
<td>CAMMESA</td>
<td>Compañía Administradora del Mercado Mayorista Eléctrico</td>
</tr>
<tr>
<td>CAT</td>
<td>Consumer Analysis Tool</td>
</tr>
<tr>
<td>CBDT</td>
<td>Central Board of Direct Taxes</td>
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<td>CCA</td>
<td>Cost under the Conventional Approach</td>
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<td>CCI</td>
<td>Competition Commission of India</td>
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<td>CDB</td>
<td>China Development Bank</td>
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<td>CDMA</td>
<td>Code Division Multiple Access</td>
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<td>CDs</td>
<td>Certificates of Deposits</td>
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<td>CEA</td>
<td>Central Electricity Authority</td>
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<td>CEAT</td>
<td>Cavi Electrici Affini Torino</td>
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<td>CEPZ</td>
<td>Cochin Export Processing Zone</td>
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<tr>
<td>CERC</td>
<td>Central Electricity Regulatory Commission</td>
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<tr>
<td>CESC</td>
<td>Calcutta Electric Supply Company</td>
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<td>CESCO</td>
<td>Central Electricity Supply Company</td>
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<td>CFC</td>
<td>Consumer Facilitation Centres</td>
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<td>CFS</td>
<td>Centre for Sight</td>
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<td>CGD</td>
<td>City Gas Distribution</td>
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<td>Central Government Health Scheme</td>
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<td>Central Ground Water Board</td>
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<td>CIL</td>
<td>Coal India Limited</td>
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<td>CLF</td>
<td>Credit Local de France</td>
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<td>CMIE</td>
<td>Centre for Monitoring Indian Economy</td>
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<tr>
<td>CMS</td>
<td>Cellular Mobile Service</td>
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<tr>
<td>CMT</td>
<td>Comisión del Mercado de las Telecomunicaciones</td>
</tr>
<tr>
<td>CMTS</td>
<td>Cellular Mobile Telephony Service</td>
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<tr>
<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>CMW</td>
<td>Chennai Metro Water</td>
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<td>CNE</td>
<td>Comisión Nacional de Energía</td>
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<td>COAI</td>
<td>Cellular Operators Association of India</td>
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<td>CONCOR</td>
<td>Container Corporation of India</td>
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<td>CONEA</td>
<td>Coalition of North East Association</td>
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<td>CP</td>
<td>Commercial Paper</td>
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<td>CPCB</td>
<td>Central Pollution Control Board</td>
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<td>CPPs</td>
<td>Captive Power Plants</td>
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<td>CPSU</td>
<td>Central Public Sector Unit</td>
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<td>CPT</td>
<td>Chennai Port</td>
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<td>CPUC</td>
<td>California Public Utilities Commission</td>
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<td>CREF</td>
<td>Credit Rating Enhancement Fund</td>
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<td>CRG</td>
<td>Crisis Resolution Group</td>
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<td>CSE</td>
<td>Centre for Science and Environment</td>
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<td>CST</td>
<td>Concentrated Solar Thermal</td>
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<td>CSUs</td>
<td>Central Sector Undertakings</td>
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<td>CTC</td>
<td>Competitive Transition Charge</td>
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<tr>
<td>DALY</td>
<td>Disability Adjusted Life Years</td>
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<td>DBFO</td>
<td>Design Build Finance Operate</td>
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<tr>
<td>DELs</td>
<td>Direct Exchange Lines</td>
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<td>DEPB</td>
<td>Duty Entitlement Pass Book</td>
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<td>DERC</td>
<td>Delhi Electricity Regulatory Commission</td>
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<td>DESU</td>
<td>Delhi Electric Supply Undertaking</td>
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<td>DF</td>
<td>Distribution Franchisee</td>
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<td>DFID</td>
<td>Department for International Development</td>
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<td>DFIs</td>
<td>Development Finance Institutions</td>
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<td>DFRC</td>
<td>Duty Free Replenishment Certificate</td>
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<td>DGH</td>
<td>Directorate General of Hydrocarbons</td>
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<td>DIAL</td>
<td>Delhi International Airport Limited</td>
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<td>DIMTS</td>
<td>Delhi Integrated Multimodal Transit System</td>
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<tr>
<td>discom/distco</td>
<td>Distribution Company</td>
</tr>
<tr>
<td>DJB</td>
<td>Delhi Jal Board</td>
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<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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<tr>
<td>DM</td>
<td>De-mineralisation</td>
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<td>DMRC</td>
<td>Delhi Metro Rail Corporation</td>
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<td>DoT</td>
<td>Department of Telecommunications</td>
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<tr>
<td>DSCR</td>
<td>Debt-Service Coverage Ratio</td>
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<tr>
<td>DSM</td>
<td>Demand-Side Management</td>
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<td>DSR</td>
<td>Debt Service Requirement</td>
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<td>DT/DTR</td>
<td>Distribution Transformer</td>
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<td>DTA</td>
<td>Domestic Tariff Area</td>
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<td>DVA</td>
<td>Distribution Value Added</td>
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<td>DVB</td>
<td>Delhi Vidyut Board</td>
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<td>DVP</td>
<td>Delivery versus Payment</td>
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<td>DWT</td>
<td>Decentralised Wastewater Treatment</td>
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<td>EA 03</td>
<td>Electricity Act 2003</td>
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<td>EA</td>
<td>Energy Audit</td>
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<td>EC</td>
<td>European Commission</td>
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<tr>
<td>ECB</td>
<td>External Commercial Borrowings</td>
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<tr>
<td>ECBC</td>
<td>Energy Conservation Building Code</td>
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<td>EDENOR</td>
<td>Empresa Distribuidora y Comercializadora Norte S.A.</td>
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<tr>
<td>EDZ</td>
<td>Economic Development Zone</td>
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<tr>
<td>EIRP</td>
<td>Equivalent Isotropically Radiated Power</td>
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<tr>
<td>ENARGAS</td>
<td>Ente Nacional Regulator del Gas</td>
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<td>ENRE</td>
<td>Ente Nacional Regulator de la Electricidad</td>
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<tr>
<td>EoD</td>
<td>Event of Default</td>
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<td>EOU</td>
<td>Export Oriented Unit</td>
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<tr>
<td>EPC</td>
<td>Engineering, Procurement and Construction</td>
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<td>EPZ</td>
<td>Export Promotion Zone</td>
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<tr>
<td>ERC</td>
<td>Electricity Regulatory Commission</td>
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<tr>
<td>ESC</td>
<td>Essential Services Commission</td>
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<tr>
<td>ESIS</td>
<td>Employees State Insurance Scheme</td>
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<td>ETDMA</td>
<td>Extended Time Division Multiple Access</td>
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<tr>
<td>ETOSS</td>
<td>Ente Tripartito de Obras y Servicios Sanitarios</td>
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<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>---------</td>
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<tr>
<td>EUA</td>
<td>Electricity Utilities Act</td>
</tr>
<tr>
<td>EUB</td>
<td>Energy and Utilities Board</td>
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<tr>
<td>EWS</td>
<td>Economically Weaker Section</td>
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<td>Federal Aviation Administration</td>
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<td>FAR</td>
<td>Floor Area Ratio</td>
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<td>FCA</td>
<td>Fuel Cost Adjustment</td>
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<td>FCCC</td>
<td>Federal Communications Commission</td>
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<td>Foreign Direct Investment</td>
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<td>FERC</td>
<td>Federal Energy Regulatory Commission</td>
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<td>FIE</td>
<td>Foreign Invested Enterprises</td>
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<td>Foreign Investment Promotion Board</td>
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<td>Financial Institutions</td>
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<td>FiT</td>
<td>Feed-in Tariff</td>
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<td>FM</td>
<td>Frequency Modulation</td>
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<td>FO</td>
<td>Furnace Oil</td>
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<td>FOB</td>
<td>Free-on-Board</td>
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<tr>
<td>FOR</td>
<td>Forum of Regulators</td>
</tr>
<tr>
<td>FP</td>
<td>Future Plot</td>
</tr>
<tr>
<td>FPPPA</td>
<td>Fuel and Power Purchase Price Adjustment</td>
</tr>
<tr>
<td>FRP</td>
<td>Financial Restructuring Plan</td>
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<tr>
<td>FSA</td>
<td>Fuel Supply Agreement</td>
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<tr>
<td>FSA</td>
<td>Financial Services Authority</td>
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<td>FSI</td>
<td>Floor Space Index</td>
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<td>FTCs</td>
<td>Foreign Trade Companies</td>
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<td>FY</td>
<td>Fiscal Year</td>
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<tr>
<td>GACL</td>
<td>Gujarat Ambuja Cements Limited</td>
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<td>GAIL</td>
<td>Gas Authority of India Limited</td>
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<td>GARR</td>
<td>Guaranteed Average Revenue Realisation</td>
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<tr>
<td>GBI</td>
<td>Generation-based Incentives</td>
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<td>GBWASP</td>
<td>Greater Bangalore Water Supply and Sanitation Project</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GIC</td>
<td>General Insurance Corporation of India</td>
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</table>
GNCL  Gujarat NRE Coke Limited
GNCTD  Government of National Capital Territory of Delhi
GNIDA  Greater Noida Industrial Development Authority
GOG    Government of Gujarat
GOI    Government of India
GOK    Government of Karnataka
GOM    Government of Maharashtra
GQ     Golden Quadrilateral
GRIDCO Grid Corporation of Orissa
GRIHA  Green Rating for Integrated Habitat Assessment
GSDP   Gross State Domestic Product
G-Secc Government of India Securities
GSM    Global System for Mobile Communications
       (formerly, Groupe Spécial Mobile)
GSPC/GSPCL Gujarat State Petroleum Corporation (Limited)
GSPL   Gujarat State Petronet Limited
GTPUDA Gujarat Town Planning and Urban Development Act
GU     Geographic Unit
GUVNL  Gujarat Urja Vikas Nigam Limited
GWCL   Ghana Water Company Limited
ha     Hectare
HBEPL  Hanzer Biotech Energies Private Limited
HBJ Pipeline  Hazira-Bijaipur-Jagdishpur Pipeline
HCBS   High Capacity Bus System
HCCL   Hindustan Construction Company Limited
HERC   Haryana Electricity Regulatory Commission
HFCL   Himachal Futuristic Communications Limited
HIDRONOR Hidroeléctrica Norpatagónica Sociedad Anónima
HMRDCL Hassan Mangalore Rail Development Company Limited
HNIs   High Net-Worth Investors
HP     Himachal Pradesh
HPCL   Hindustan Petroleum Corporation Limited
HR Human Resources
HSD High Speed Diesel
HUDCO Housing and Urban Development Corporation
HVDS High Voltage Distribution System
IAAI International Airports Authority of India
IARR Implied Average Revenue Realisation
IAT Independent Assessment Team
ICICI Industrial Credit and Investment Corporation of India
ICRA (formerly) Investment Information and Credit Rating Agency of India Limited
ICTSL Indore City Transport Services Limited
IDBI Industrial Development Bank of India
iDeCK Infrastructure Development Corporation (Karnataka)
IDFC Infrastructure Development Finance Company Limited
IFCI Industrial Finance Corporation of India
IGBC Indian Green Building Council
IGIA Indira Gandhi International Airport
IGL Indraprastha Gas Limited
IIBI Industrial Investment Bank of India
IIFCL India Infrastructure Finance Company Limited
IL&FS Infrastructure Leasing and Financial Services
IOC Indian Oil Corporation
IPGCL Indraprastha Power Generation Company Limited
IPPs Independent Power Producers/Projects
IR/IRC Indian Railways (Corporation)
IRA Independent Regulatory Agency
IRBI Industrial Reconstruction Bank of India
IRDA Insurance Regulatory and Development Authority
IRR Internal Rate of Return
IRRA Indian Rail Regulatory Authority
IT Information technology
ITU International Telecommunications Union
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>IUP</td>
<td>Intended Use Plans</td>
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<tr>
<td>I-WIN</td>
<td>ICICI-West Bengal Infrastructure Development Corporation Limited</td>
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<tr>
<td>JCC</td>
<td>Japanese Cocktail Crude</td>
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<td>JICA</td>
<td>Japan International Cooperation Agency</td>
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<tr>
<td>JNNSM</td>
<td>Jawaharlal Nehru National Solar Mission</td>
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<tr>
<td>JNNURM</td>
<td>Jawaharlal Nehru National Urban Renewal Mission</td>
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<tr>
<td>JNPT</td>
<td>Jawaharlal Nehru Port Trust</td>
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<td>JV</td>
<td>Joint Venture</td>
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<td>KERC</td>
<td>Karnataka Electricity Regulatory Commission</td>
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<tr>
<td>KESCO</td>
<td>Kanpur Electricity Supply Company</td>
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<td>K-G Basin</td>
<td>Krishna-Godavari Basin</td>
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<td>KINFRA</td>
<td>Kerala Industrial Infrastructure Development Corporation</td>
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<td>K-RIDE</td>
<td>Karnataka Rail Infrastructure Development Corporation</td>
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<tr>
<td>KUIDFC</td>
<td>Karnataka Urban Infrastructure Development and Finance Corporation</td>
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<td>KUWASIP</td>
<td>Karnataka Urban Water Supply Improvement Project</td>
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<td>KUWSBD</td>
<td>Karnataka Urban Water Supply and Drainage Board</td>
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<tr>
<td>kVA</td>
<td>Kilo Volt Ampere</td>
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<td>KWSPF</td>
<td>Karnataka Water and Sanitation Pooled Fund</td>
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<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
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<td>LIBOR</td>
<td>London Interbank Offered Rate</td>
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<td>LIC</td>
<td>Life Insurance Corporation of India</td>
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<td>LNG</td>
<td>Liquefied Natural Gas</td>
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<td>LoI</td>
<td>Letter of Intent</td>
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<tr>
<td>LPCD</td>
<td>Litres per Capita per Day</td>
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<td>LPR</td>
<td>Land Pooling and Readjustment/Reconstitution</td>
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<td>LPVR</td>
<td>Least Present Value of Revenues</td>
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<td>LSHS</td>
<td>Low Sulphur Heavy Stock</td>
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<tr>
<td>M&amp;A</td>
<td>Mergers and Acquisitions</td>
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<td>MADP</td>
<td>Maximum Alternative Distribution Payment</td>
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<tr>
<td>MAGP</td>
<td>Maximum Alternative Generation Payment</td>
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<td>MASTS</td>
<td>Mobile Assignment Technical System</td>
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</table>
MATS  Monitoring and Tracking System
MBR  Membrane Bio Reactor
mBtu/mmBtu  Million British thermal units
MCA  Model Concession Agreement
MCB  Miniature Circuit Breaker
mcm  Million Cubic Metres
MCs  Municipal Corporations
MDF  Municipal Development Fund
MEPZ  Madras Export Processing Zone
MERC  Maharashtra Electricity Regulatory Commission
MFL  Madras Fertilizers Limited
MG  Metre Gauge
MLD  Million Litres per Day
MMC  Madurai Municipal Corporation
MMDR Act  Mines and Minerals (Development and Regulation) Act
MMRDA  Mumbai Metropolitan Regional Development Authority
mmscmd  Metric Million Standard Cubic Meters per Day
Mmt  Million Metric Tonnes
Mmtpa  Million Metric Tonnes per Annum
MNRE  Ministry of New and Renewable Energy
MoCA  Ministry of Civil Aviation
MoD  Ministry of Defence
MoP  Ministry of Power
MoPNG  Ministry of Petroleum and Natural Gas
MoR  Ministry of Railways
MoRTH  Ministry of Road Transport and Highways
MoST  Ministry of Surface Transport
MoU  Memorandum of Understanding
MoUD  Ministry of Urban Development
MP  Madhya Pradesh
MPE  Mumbai-Pune Expressway
MPSC  Model Production Sharing Contract
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>MRTS</td>
<td>Mass Rapid Transit System</td>
</tr>
<tr>
<td>MS</td>
<td>Motor Spirit</td>
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<tr>
<td>MSB</td>
<td>Minimum Subsidy Bidding</td>
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<td>MSEB</td>
<td>Maharashtra State Electricity Board</td>
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<td>MSEDCL</td>
<td>Maharashtra State Electricity Distribution Company Limited</td>
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<td>MSRDC</td>
<td>Maharashtra State Road Development Corporation</td>
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<tr>
<td>MT</td>
<td>Million Tons</td>
</tr>
<tr>
<td>mt</td>
<td>Metric Tonnes</td>
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<td>MTNL</td>
<td>Mahanagar Telephone Nigam Limited</td>
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<td>MYT</td>
<td>Multi-year Tariff</td>
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<td>NABARD</td>
<td>National Bank for Agriculture and Rural Development</td>
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<tr>
<td>NBFCs</td>
<td>Non-Bank Financial Companies</td>
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<tr>
<td>NBFI</td>
<td>Non-Bank Financial Institution</td>
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<td>NCR</td>
<td>National Capital Region</td>
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<tr>
<td>NDPL</td>
<td>North Delhi Power Limited</td>
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<tr>
<td>NDRC</td>
<td>National Development and Reform Commission</td>
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<tr>
<td>NELP</td>
<td>New Exploration Licensing Policy</td>
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<td>NEN</td>
<td>National Expressway Network</td>
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<td>NEPZ</td>
<td>Noida Export Processing Zone</td>
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<td>NESCO</td>
<td>Northern Electricity Supply Company</td>
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<td>NFAP</td>
<td>National Frequency Allocation Plan</td>
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<td>NHAI</td>
<td>National Highways Authority of India</td>
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<td>NHDP</td>
<td>National Highway Development Project</td>
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<tr>
<td>NHPC</td>
<td>National Hydroelectric Power Corporation</td>
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<td>NLD</td>
<td>National Long Distance</td>
</tr>
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<td>NMMC</td>
<td>Navi Mumbai Municipal Corporation</td>
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<td>NMP</td>
<td>National Mineral Policy</td>
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<td>NMPT</td>
<td>New Mangalore Port Trust</td>
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<td>NPAs</td>
<td>Non-performing Assets</td>
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<td>NPCL</td>
<td>Noida Power Company Limited</td>
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<td>NPV</td>
<td>Net Present Value</td>
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<tr>
<td>NSDL</td>
<td>National Securities Depository Limited</td>
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</table>
NSE National Stock Exchange
NS-EW North South-East West
NTHS National Trunk Highway System
NTPC National Thermal Power Corporation
NUIF National Urban Infrastructure Fund
NUTP National Urban Transport Policy
NWP National Water Policy
NWRC National Water Resources Council
NYSPSC New York State Public Service Commission
NZS New Zealand dollar
O&M Operation and Maintenance
OA Open Access
OCC Oil Coordination Committee
OECD Organisation for Economic Co-operation and Development
OECF Overseas Economic Cooperation Fund
OERC Orissa Electricity Regulatory Commission
OFAPs Operational and Financial Action Plans
OFCOM Office of Communications
OFGEM Office of Gas Electricity Markets
OHWAT Office of Water Services
OHPC Orissa Hydro Power Corporation
OIL Oil India Limited
OMT Operate, Maintain, Transfer
ONGC Oil and Natural Gas Corporation of India
OP Original Plot
OPEC Organization of Petroleum Exporting Countries
OPGC Orissa Power Generation Corporation
ORR Office of the Rail Regulator
OSEB Orissa State Electricity Board
OSN Obras Sanitarias de la Nación
OUR Office of Utilities Regulation
P&O Peninsular and Oriental Steam Navigation Company
PBOC People’s Bank of China
PBR Private Business Radio
PCS Personal Communications Services
PDCOR Project Development Company of Rajasthan
PE Private Equity
PFC Power Finance Corporation
PFDF Pooled Finance Development Fund
PFDS Pooled Finance Development Fund Scheme
PFI Private Finance Initiative
PP Payment for Performance
PFs Provident Funds
PGCIL Power Grid Corporation of India Limited
PIDB Punjab Infrastructure Development Board
PIL Petronet India Limited
PIL Public Interest Litigation
PLF Plant Load Factor
PMCs Project Management Consultants
PMT Panna Mukta Tapti
PNGRB Petroleum and Natural Gas Regulatory Board
POL Petroleum, Oil and Lubricants
PPA Power Purchase Agreement
PPCL Pragati Power Corporation Limited
PPFCA Power Purchase Fuel Cost Adjustment
PPIAF Public-Private Infrastructure Advisory Facility
PPP Public-Private Partnership
PSA Port of Singapore Authority
PSA Power Sale Agreement
PSC Production Sharing Contract
PSC Public Sector Comparator
PSEB Punjab State Electricity Board
PSP Private Sector Participation
PSU Public Sector Undertaking
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>PTC</td>
<td>Power Trading Company</td>
</tr>
<tr>
<td>PTIM</td>
<td>Pre-tax Investment Multiple</td>
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<td>PwC</td>
<td>PricewaterhouseCoopers</td>
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<td>PWLB</td>
<td>Public Works Loan Board</td>
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<tr>
<td>QoS</td>
<td>Quality of Service Parameters</td>
</tr>
<tr>
<td>QoSS</td>
<td>Quality of Supply and Service</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>Research and Development</td>
</tr>
<tr>
<td>RAPDRP</td>
<td>Restructured-Accelerated Power Development and Reforms Programme</td>
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<td>Regulation by Contract</td>
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<td>ROE</td>
<td>Return on Equity</td>
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<td>ROR</td>
<td>Rate of Return</td>
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<td>Rehabilitate, Operate, Transfer</td>
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<td>SAIFI</td>
<td>System Average Interruption Frequency Index</td>
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<td>SBR</td>
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<td>Shipping Corporation of India</td>
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<td>Full Form</td>
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<td>SHP</td>
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<td>SKO</td>
<td>Superior Kerosene Oil</td>
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<td>SLAUs</td>
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<td>SPD</td>
<td>Solar Power Developer</td>
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<td>Solar Photovoltaic</td>
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<td>Subscriber Trunk Dialing</td>
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<td>STP</td>
<td>Sewage Treatment Plant</td>
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<td>STU</td>
<td>Standard Trading Unit</td>
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<td>STW</td>
<td>Sewage Treated Water</td>
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<td>SWM</td>
<td>Solid Waste Management</td>
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<td>T&amp;D</td>
<td>Transmission and Distribution</td>
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<td>TA</td>
<td>Technical Assistance</td>
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TACID Tamil Nadu Corporation for Industrial Infrastructure Development
TAMP Tariff Authority for Major Ports
TAT Tourism Authority of Thailand
TBA To Be Announced
tcf Trillion Cubic Feet
tcm Thousand Cubic Metres
TDRs Transfer of Development Rights
TDSAT Telecom Disputes Settlement and Appellate Tribunal
TD-SCDMA Time Division Synchronous Code Division Multiple Access
TEA Tirupur Exporters Association
TERI The Energy and Resources Institute
TEU Twenty-foot Equivalent Unit
TFC Thirteenth Finance Commission
TIMS Transformer Information Management System
TN Tamil Nadu
TNEB Tamil Nadu Electricity Board
TNERC Tamil Nadu Electricity Regulatory Commission
TNUDF Tamil Nadu Urban Development Fund
TNUIFSL Tamil Nadu Urban Infrastructure Financial Services Ltd
TNWSPF Tamil Nadu Water and Sanitation Pooled Fund
TOU Time of Use
TPAs Third Party Administrators
TPC Total Project Cost
TPO Town Planning Officer
TRAI Telecom Regulatory Authority of India
Transco Transmission Company
TSS Total Suspended Solids
TTRO Tertiary Treatment and Reverse Osmosis Plant
TVEs Township and Village Enterprises
UASL Unified Access Services License
UDF User Development Fee
UI Unscheduled Interchange
<table>
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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<td>Ultra Mega Power Projects</td>
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<td>UMTS</td>
<td>Universal Mobile Telecom Service</td>
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<td>UPERC</td>
<td>Uttar Pradesh Electricity Regulatory Commission</td>
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<td>UPPCL</td>
<td>Uttar Pradesh Power Corporation Ltd</td>
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<td>UPRVUNL</td>
<td>Uttar Pradesh Rajya Vidyut Utpadan Nigam Limited</td>
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<td>UPSEB</td>
<td>Uttar Pradesh State Electricity Board</td>
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<td>US$</td>
<td>United States Dollar</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>USF</td>
<td>Universal Service Fund</td>
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<td>Universal Service Fund Administrator</td>
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<td>Value for Money</td>
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<td>Viability Gap Funding</td>
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<td>Village Public Telephone</td>
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<td>Videsh Sanchar Nigam Limited</td>
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<td>Western Electricity Supply Company</td>
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<td>WLL</td>
<td>Wireless Local Loop</td>
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<tr>
<td>WPC</td>
<td>Wireless Planning and Coordination Wing</td>
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<td>WPI</td>
<td>Wholesale Price Index</td>
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<td>WS&amp;S</td>
<td>Water Storage and Supply</td>
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<td>WSA</td>
<td>Water Service Agency</td>
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<td>WSP</td>
<td>Waste Stabilisation Pond</td>
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<td>WSPF</td>
<td>Water and Sanitation Pooled Fund</td>
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<tr>
<td>WSS</td>
<td>Water Supply and Sewerage</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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<tr>
<td>WUA</td>
<td>Water Users Association</td>
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<td>WWD</td>
<td>Water Works Department</td>
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1. **Introduction to India’s Seaborne Trade**

It is well recognised that in the first forty years after Independence our policy makers conducted an economic strategy that can broadly be described as import substitution. The foreign trade regime was highly restrictive and although exports were not officially discouraged, strict exchange controls were prevalent. Consequently, manufacturers did not undertake the effort required to export goods. This state of affairs was reflected in the trade passing through our ports. Imports were composed mainly of oil, for which no domestic substitute was available; fertiliser, which has been steadily declining since the peak of 1980–81; and essential foodstuff, imported in years of crises. Machinery imports were strictly licensed and only goods that could not be supplied domestically were permitted. Consumer goods were banned. Indian ports thus handled mainly bulk cargoes transported in full shiploads. For such goods there is normally a single importer for each cargo. Here, the State, through its various canalising agencies, purchased the goods and sold or distributed the commodities into local markets. Though high in value, piece goods and machinery imported by actual users were low in volume. They were therefore never a major item and were transported by conventional general cargo ships.

1.1 **Growth**

Today, our seaborne trade of over 250 million tons represents a twelve-fold increase since independence. As seen in Figure 20.1, volume increases were especially pronounced in the early period and between the mid 1980s and mid 1990s. Since 1995, the growth has progressed at a more moderate pace as the first flush of reforms has worn off.
1.2 Change in composition

The composition of trade has undergone a significant change over this period. The share of the once-dominant breakbulk cargo has steadily declined to less than 10 per cent. Apart from reclassification, much of this loss is attributable to containerisation, which came to India after it was imposed by overseas suppliers who no longer found it convenient to send goods in the old-fashioned way. After a modest beginning, cargo containerisation is now growing at a higher rate than most other cargo categories.

Figure 20.1: Trends in major ports throughput

Figure 20.2: Major ports—trends in proportional share of main cargo categories
1.3 The dominance of energy and containers

While the outlook for the country’s seaborne trade depends on several circumstances, two developments can be expected to exert especially large effects. First, as industrialisation expands, the demand for energy will grow rapidly. Already, the combined energy sources, i.e., POL, coal and LNG, constitute almost two-thirds of the country’s seaborne trade. Their volume is expected to double by 2010, and with the expansion of domestic refining capacity, the composition of POL is likely to become more homogeneous. Second, as we take decisive steps to increase our share in world trade, containers will grow in importance. Containers have become an integral part of transport systems in the developed world and their adoption is inevitable, if Indian exporters are to succeed in expanding their commercial relations. Even traditional goods like tea or jute, which have always been well packed in chests or in bales, are now exported in containers. At the same time, with the increasing globalisation of domestic production, import demand for semi-processed and industrial goods, which are shipped in containers by overseas suppliers, is also growing. A technical feature of container traffic is that the boxes need to be transported back to their origin. Consequently freight rates are very low; barely enough to cover even marginal handling costs. This provides a unique opportunity to Indian exporters that should not be lost by inefficient handling of these boxes. Consequently, the import of energy sources and the export and import of containerised cargo can be expected to dominate India’s seaborne trade. In this paper, we therefore concentrate on addressing energy and container traffic.

1.3.1 Projections of traffic growth

Our projections of overall traffic growth are given in Table 20.1. These are based on the growth rates given in the table, which in turn, have been derived broadly from trends in the world economy and our trade growth in the past. These projections show that in the medium term, by 2005–06, our total sea trade, assuming a high-growth scenario can be expected to rise to about 380 million tons and the containerised seaborne trade to about 3.6 million Twenty-Foot-Equivalent Units (TEUs). It is sobering to note that ports like Hong Kong and Singapore have throughputs of over 14 million TEUs each.

2. Global trends

Ports have changed from the simple modal interface they used to be into logistics and distribution platforms. They are now critical nodes in international supply chain networks that drive trade competitiveness and are subject to changes in logistics management and transport technology.
Table 20.1: Major ports throughput—actual and projections  
(all types of cargo; numbers in '000 tons)

<table>
<thead>
<tr>
<th>Actual Increases</th>
<th>1970–71</th>
<th>0</th>
<th>1975–76</th>
<th>16,500</th>
<th>1980–81</th>
<th>147,250</th>
<th>792.4%</th>
<th>1999–2000</th>
<th>6.0%</th>
<th>2,045,800</th>
<th>4.0%</th>
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<td>1950–51</td>
<td>20,013</td>
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<tr>
<td>1955–56</td>
<td>24,965</td>
<td>24.7%</td>
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<td>1960–61</td>
<td>41,252</td>
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<tr>
<td>1965–66</td>
<td>51,474</td>
<td>24.8%</td>
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<tr>
<td>1970–71</td>
<td>56,012</td>
<td>8.8%</td>
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<td>1975–76</td>
<td>66,341</td>
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<td>1980–81</td>
<td>80,510</td>
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<tr>
<td>1985–86</td>
<td>119,552</td>
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<td>1990–91</td>
<td>152,885</td>
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<td>1995–96</td>
<td>215,338</td>
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<td>1996–97</td>
<td>227,257</td>
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<tr>
<td>1997–98</td>
<td>251,507</td>
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<td>1998–99</td>
<td>251,420</td>
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**The container sector**  
(numbers in twenty-foot-equivalent units)

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<th>1970–71</th>
<th>0</th>
<th>1975–76</th>
<th>16,500</th>
<th>1980–81</th>
<th>396,000</th>
<th>168.9%</th>
<th>2000–01</th>
<th>7.5%</th>
<th>2,199,235</th>
<th>5.2%</th>
<th>2,111,574</th>
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<td>1980–81</td>
<td>147,250</td>
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<tr>
<td>1985–86</td>
<td>396,000</td>
<td>168.9%</td>
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<td>1990–91</td>
<td>680,000</td>
<td>71.7%</td>
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<td>1995–96</td>
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<td>1996–97</td>
<td>1,698,000</td>
<td>17.2%</td>
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<td>1997–98</td>
<td>1,892,000</td>
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<td>1998–99</td>
<td>1,930,000</td>
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<td>1999–2000</td>
<td>263,991</td>
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<td>2000–01</td>
<td>277,719</td>
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<tr>
<td>2005–06</td>
<td>380,457</td>
<td>7.5%</td>
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**Projections**

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<th>1999–2000</th>
<th>5.0%</th>
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<th>2005–06</th>
<th>7.5%</th>
<th>2005–06</th>
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<td>1999–2000</td>
<td>263,991</td>
<td>5.0%</td>
<td>277,719</td>
<td>5.2%</td>
<td>380,457</td>
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<tr>
<td>2000–01</td>
<td>277,937</td>
<td>4.0%</td>
<td>310,573</td>
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<td>330,760</td>
<td>6.5%</td>
<td>353,913</td>
<td>7.0%</td>
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<td>2005–06</td>
<td>316,037</td>
<td>5.0%</td>
<td>321,444</td>
<td>4.5%</td>
<td>304,967</td>
<td>5.0%</td>
<td>321,740</td>
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**Medium growth scenario**

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<th>1999–2000</th>
<th>20.9%</th>
<th>2000–01</th>
<th>4.0%</th>
<th>2005–06</th>
<th>6.0%</th>
<th>2005–06</th>
<th>6.0%</th>
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</thead>
<tbody>
<tr>
<td>1999–2000</td>
<td>260,295</td>
<td>2.0%</td>
<td>267,583</td>
<td>2.8%</td>
<td>316,037</td>
<td>5.0%</td>
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<tr>
<td>2000–01</td>
<td>267,583</td>
<td>2.8%</td>
<td>276,949</td>
<td>3.5%</td>
<td>300,988</td>
<td>4.5%</td>
<td>300,988</td>
</tr>
<tr>
<td>2005–06</td>
<td>300,988</td>
<td>4.5%</td>
<td>288,027</td>
<td>4.0%</td>
<td>276,949</td>
<td>3.5%</td>
<td>276,949</td>
</tr>
</tbody>
</table>

**Low growth scenario**

<table>
<thead>
<tr>
<th>1999–2000</th>
<th>20.9%</th>
<th>2000–01</th>
<th>4.0%</th>
<th>2005–06</th>
<th>6.0%</th>
<th>2005–06</th>
<th>6.0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999–2000</td>
<td>255,191</td>
<td>1.5%</td>
<td>260,295</td>
<td>2.0%</td>
<td>316,037</td>
<td>5.0%</td>
<td></td>
</tr>
<tr>
<td>2000–01</td>
<td>267,583</td>
<td>2.8%</td>
<td>276,949</td>
<td>3.5%</td>
<td>300,988</td>
<td>4.5%</td>
<td>300,988</td>
</tr>
<tr>
<td>2005–06</td>
<td>300,988</td>
<td>4.5%</td>
<td>288,027</td>
<td>4.0%</td>
<td>276,949</td>
<td>3.5%</td>
<td>276,949</td>
</tr>
</tbody>
</table>

Five-year increases
2.1 Logistics management

Manufacturing and trading practices in the outside world have gone through fundamental changes. The globalisation of manufacturing processes and the ever-increasing need to control inventories has made trade transactions very transport-intensive and time-dependent. The ability to handle cargo swiftly, without loss or damage, has become an essential determinant of competitive success. In all of this, the container is central. The reliable and on-time supply of goods has become the first determinant of competitiveness, often outweighing savings in the cost of transport. The uniformity of a container also permits the use of multiple modes of transport by a single transport carrier, and today’s user expects door-to-door service for both his imports and exports.

2.2 Key developments in the shipping industry

The rise in the size of container vessels, which have tripled over the last twenty years, and the increase in logistics efficiency has led to the development of a hub-and-spoke system for container lines, with fixed days of call at hub ports. This traffic concentration on large inter-modal platforms results in a larger share for fewer ports. The hub structure also necessitates transshipment by sea, to and from feeder ports. This benefits trade originating in feeder ports because they are served with increased frequency. The advantages of more connecting services and the lower cost of high-capacity vessels on the main route often outweigh the additional costs of transshipment over the longer routes, though it remains more expensive than shipping directly through a hub port. However, while ocean carriers retain a keen interest in carrying our trade, given the large volume, they have nevertheless penalised us for the inefficient services offered at local ports by not selecting any Indian port as a hub port.

3. Key issues in port reform

It is obvious that Indian ports are not yet ready for this environment with large-scale bulk operations, the growing containerisation of general cargo traffic and global shipping lines that respond to port efficiency. They must be reformed if we are to provide a level playing field for our producers in the global market. This reform must be characterised by a stable policy outlook, which defines a pro-competitive framework and changes in the existing organisational structure.

3.1 Policy

3.1.1 Clarity with respect to objective

At the outset, a clear objective for port reform must be reflected in a well-articulated port policy and a concerted national approach to port development and managing
port related services. This must go well beyond existing initiatives such as guidelines to attract private investment into the sector. In previous efforts at reform in other sectors, the government has been overly concerned about the process and less about the objective. In power, for example, the emphasis was on adding new generation capacity, without stopping to think whether the system would be able to deliver sufficient commercially viable demand. In telecom, the emphasis was on revenue from license fees, without consideration of its impact on the growth of the market and consequent demands for renegotiation. It is therefore imperative that the government is absolutely clear about its objective for port reform. For the user, there can only be one goal: efficient service. The government can do no better than to adopt the same goal for itself.

3.1.1 Need for privatisation

Over the past years numerous ad-hoc public committees and studies by consultants have repeatedly addressed issues of reform without resulting in a coherent plan and follow-up within the administration. Primarily, we perceive this to be the result of a lack of clarity about the motivation and need for port reform. A coherent approach to port reform must distinguish between a desire to improve the delivery of port services and a desire to attract private capital to remedy a lack of public funds. The latter approach, which retains the investment decisions within the public sector, and merely seeks to access the private purse, is unlikely to deliver what the port user needs, as the decisions are not driven by market incentives. Consequently, there is almost no accountability for the actions of the Trusts. Problems of public sector accountability and autonomy have a long history in this country. The only complete solution is to privatise the activities of these organisations. Unfortunately, even today, if the following question was posed: ‘If the government had sufficient funds, would it invite private participation into ports?’ the answer would most probably be a distressing ‘No!’ The first task of port reform must therefore be to transfer decisions about service provision to the private sector, whose incentives to cater to the consumer are much stronger. At the same time, it is important to remember that the private sector delivers the goods only when it is faced with competition.

3.1.2 Competition issues

There is little competition among ports in India today. This situation exists almost by design because of the earlier government concept of associating a specified hinterland and thus cargo base to each major port. In addition, at a given port, there is only one entity that provides port services. In the absence of competitive pressure, the management of the ports has remained complacent since they have no incentive for improving performance. In addition, this has resulted in excessive
rent seeking by different agents associated with a port. In this situation, mere corporatisation or even privatisation, without the introduction of competition, would not be sufficient. Without competition, the private sector would be as loath to perform as the public sector. It is therefore essential to promote both inter-port and intra-port competition, along with the introduction of privatisation.

3.1.3 Approach to ‘minor’ ports

At present, there are numerous ‘minor’ ports, the majority of which are of limited importance for the country’s seaborne trade. An important distinction here is that the major ports are by law under the jurisdiction of the Union Government, whereas the state governments administer all other ports. There is, however, increasing interest in port development in the littoral states and several of these ports are currently being developed under relatively liberal policy regimes. Their importance is therefore growing, which is exemplified by the fact that their collective cargo throughput has grown by over 200 per cent over the last eight years. The increased user interest in these ports comes from the more liberal options available for private participation, either through private ports such as Pipavav or via captive terminals. These provide an opportunity to bypass the problem-ridden major ports, much in the same manner as captive power generation becomes attractive when the state-owned electricity board cannot supply electricity reliably. In response to this development, the central government has constituted a Maritime States Development Council, comprising of the Minister for Surface Transport and the ministers-in-charge of ports in the maritime states. They have, however, met only twice since its formation two years ago.

Of late there have been proposals to establish joint ventures between major and ‘minor’ ports, ostensibly with the intention of sharing expertise. However, in the environment we propose, where port services are no longer provided by public entities, such a joint venture between a port trust and a ‘minor’ port would be anachronistic. It is however possible to visualise a situation where the same operator provides services in adjacent ports, one an existing major port trust, which has concessioned its facilities to the private sector and the other a newly developed facility at a ‘minor’ port site. On occasion, though, such arrangements may be subject to rules of anti-competitive behaviour. In addition to apprehensions about the expertise of ‘minor’ ports, these initiatives are driven by concern about over-investment in ‘minor’ ports, given the spate of port projects under discussion. It is necessary to evolve a consistent market-oriented approach to this issue without going back to the old approach of directing investment to specific projects.
3.1.4 Connectivity

Ports are a link in the logistics chain. A major aggravating factor is the increasing constraint in the ports’ interface with the rest of the transport system. It makes little sense to have an efficient port if cargo cannot get to the port or get out of the port smoothly. Users are often constrained in their choice of port by the availability of good connections to the rail and road systems. Integration of ports with the transport system helps in increasing competition to the benefit of the final user. This is even more important when the extent of intra-port competition is limited, either by the scale of operations or by the extent of area available for the development of additional facilities. Putting different ports on an even footing would therefore require supporting action in road and rail development.

3.2 Organisation

The key issue in the organisational set-up of major ports is the lack of accountability. Of the major ports, six existed in 1947, while the other six were subsequently established, mainly during the 1970s. As international practices and technologies applied in seaborne trading and cargo handling underwent fundamental changes problems arose in India’s waterfront industry, just as they did elsewhere in the world. The proximate agency that should have driven the needed change at the port level was the Port Trust. Unfortunately, the nature and composition of the port trusts divorced them from commercial incentives and desensitised them to the concerns of port users. Since the trusts were also the sole service providers, this left the user with no option. This has resulted in a state where the physical layouts of the country’s ports and the installed equipment, designed for now obsolete shipping and cargo-handling arrangements have become significant bottlenecks. In addition, problems with the original design, limited drafts in harbour basins and access to channels exacerbate this situation.

There are two other issues that deserve separate consideration. The first of these relates to labour practices and the second concerns administrative arrangements, which affects equipment utilisation and management, Management Information Systems (MIS) and accounting practices, and coordination among different agencies within the ports.

3.2.1 Labour and work rules

There are currently over 100,000 staff on the payroll of the major ports and dock labour boards, of whom less than 40 per cent are cargo handling workers. There is also considerable variation across ports. The three oldest ports, Mumbai, Kolkata and Chennai, alone account for about 60 per cent of the non-cargo handling workers and cargo handling labour while Mumbai alone has 30 per cent of the non-cargo handling workers. Changes in cargo handling techniques have made many of these
workers redundant. Today, a 600,000 TEU capacity terminal can function with less than 600 workers. The sheer size of the gap between the amount of labour needed and the current payroll deters investment from flowing into existing facilities, especially when current policy requires private operators to take on the labour attached to a berth. In addition to the amount of labour, the other deterrent to increase in productivity is the lack of flexibility in deployment of the existing labour both in terms of quantity, which are determined by fixed gang sizes and manning scales and their interchangeability across different operations. Apart from low levels of productivity during operations, this also leads to delay in commencement and completion of operations, and longer berthing times. The modernisation of labour practices is therefore a critical issue in port reform.

3.2.2 Administrative practices

3.2.2.1 MIS and accounting practices

Technological developments in telecommunication and software technology now make it possible to track shipments in real time. Ships are able to inform upcoming ports about the arrangement of their cargo, so that they can prepare their equipment accordingly and reduce their stay in port. Through compatible Electronic Data Interchange (EDI) systems, ports can also arrange to link up with customs databases to process and clear cargo even before the ships touch shore. Cargo can be tracked throughout their journey and during their stay in the port in order to reduce the time taken to clear and evacuate cargo from the port area. This is important for both shipping companies and shippers since predictability of transportation time is critical in a just-in-time world. A good Management Information System (MIS) also permits port management to identify different activities within the port and segregate their cost implications. This enables benchmarking of performance over time and across ports and operators.

3.2.2.2 Equipment utilisation and management

Current arrangements for cargo handling for ports are anything but conducive to fast handling and turn-around. These shortcomings are especially critical for the container trade, as the waiting cost of large capital-intensive container vessels is high. Coupled with the impact of delay, this results in substantial and intrinsically avoidable costs, with detrimental effects on the international competitiveness of India’s exports, and on the domestic cost of imported inputs. As seen in Table 20.2, even though the turn-around times and output per berth day for container vessels has improved in the recent past, there exists considerable scope for improvement, even after accounting for Indian conditions, as can be seen from the variations in productivity. Equipment utilisation rates are extremely low, even though availability rates are comparatively high. This reflects mismatch of equipment and cargo; owing to the vintage of the equipment (reflected partly in the large variation
in availability), which makes available equipment unsuitable for the task at hand. Another reason is the inefficiency of labour practices, which result in high levels of non-working time thereby affecting the use of equipment. The efficiency of port operations today depends on the use of modern equipment. Any serious attempt at port reform must therefore address the manner by which cargo-handling operations can be modernised.

### Table 20.2: Key performance parameters of major ports

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<thead>
<tr>
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<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Spread</td>
</tr>
<tr>
<td></td>
<td>(all ports)</td>
<td>(best and worst performer)</td>
</tr>
<tr>
<td><strong>Average turnaround time (days)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container vessels</td>
<td>3.7</td>
<td>0.6–8.0</td>
</tr>
<tr>
<td>Conventional liners</td>
<td>9.6</td>
<td>1.3–14.6</td>
</tr>
<tr>
<td>Tankers</td>
<td>3.7</td>
<td>1.6–5.6</td>
</tr>
<tr>
<td>Dry bulk carriers</td>
<td>13.0</td>
<td>7.2–22.0</td>
</tr>
<tr>
<td><strong>Average output per berth-day (tons)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Containerised cargo</td>
<td>1,567</td>
<td>610–2,890</td>
</tr>
<tr>
<td>Break bulk</td>
<td>802</td>
<td>421–1,679</td>
</tr>
<tr>
<td>Liquid bulk</td>
<td>10,925</td>
<td>2,771–15,256</td>
</tr>
<tr>
<td>Dry bulk</td>
<td>4,459</td>
<td>581–11,754</td>
</tr>
<tr>
<td><strong>Non-working time to total time at berth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Container vessels</td>
<td>39.2%</td>
<td>18.7%–58.8%</td>
</tr>
<tr>
<td>Conventional liners</td>
<td>44.6%</td>
<td>19.7%–58.4%</td>
</tr>
<tr>
<td>Tankers</td>
<td>42.3%</td>
<td>6.9%–50.6%</td>
</tr>
<tr>
<td>Dry bulk carriers</td>
<td>38.4%</td>
<td>13.0%–50.9%</td>
</tr>
<tr>
<td><strong>Performance of cargo handling equipment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wharf cranes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>85.9%</td>
<td>68%–96%</td>
</tr>
<tr>
<td>Utilisation</td>
<td>23.1%</td>
<td>7%–38%</td>
</tr>
<tr>
<td>Yard equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability</td>
<td>80.5%</td>
<td>67%–91%</td>
</tr>
<tr>
<td>Utilisation</td>
<td>19.5%</td>
<td>7%–30%</td>
</tr>
</tbody>
</table>

*Source:* Indian Ports Association, various Annual Reports
3.2.2.3 Coordination among different agencies in ports

Port services should be integrated within a system that is optimised to deliver cost-effective services. Coordination between the various agencies in the port ensures that the vessel turns around in the quickest possible time and the dwell time of cargo within the port area is reduced. In our ports, even if the cargo is unloaded efficiently, the lack of an efficient interface with the land transport system, insufficient coordination with customs authorities, and sharp practices by importers, who utilise the port areas as inexpensive warehouses, tend to increase dwell time of cargo and the need for extra land area for cargo storage. A state-of-the-art MIS system would permit better management of cargo and help in identifying areas that are most likely to benefit from improved coordination among agencies. Service provision by private operators, who respond to user needs, will add urgency to this need for coordination.

4. Initiatives

4.1 Growing role for state ports

Gujarat has 40 of the 139 ‘minor’ ports in the country and handles almost three-fourths of the traffic going through these ‘minor’ ports. Recently, in its Vision 2010, it has announced that it would pursue a ‘port-led development’ strategy. Other maritime states, such as Tamil Nadu, are also trying to pursue an aggressive development strategy for ‘minor’ ports and have announced special policies to promote investments in minor ports. An examination of the ports in Gujarat reveals two facts. First, these ports currently cater to dedicated cargo such as iron ore and clinkers, other common user bulk cargo such as coal, foodgrain, rock phosphate, fertiliser, etc. and items such as cement, oil cakes and phosphoric acid. Alang port catered to the specialised activity of ship breaking. Second, the activity is concentrated in a few ports with two ports accounting for over half the traffic and the top 20 per cent, i.e., eight ports accounting for over 90 per cent of the traffic. This does not imply that these ports would not be able to develop into large common user general cargo ports, as Pipavav is attempting to do. However, as we have indicated earlier, such ports need efficient interfaces with the remaining transport system, which may involve public investment. While road and rail links have other alternative uses, independent of the port, the worrying factor is the extent of public investment that would be diverted to the development of specific assets related to these ports, in terms of breakwaters, dredging, rail yards, etc. Such public investment implicitly subsidises private investment, which could lead to overinvestment in the development of ‘minor’ ports.

4.2 Private sector participation in major ports

The process of private sector participation in major ports started with the award of a container terminal at JNPT to a P&O consortium for 30 years on a BOT basis,
after a competitive bid. The initial proposal, in 1992, was to concession the existing container facility in JNPT for 10 years. Later, in 1995, it was proposed to give a concession for a new private terminal and retain the existing facility under government ownership, reportedly so as to avoid jeopardising the future of the labour force, which incidentally is the smallest among all the major ports. Similar initiatives in other ports have also been delayed. This, we feel, is because the objectives for introduction of private participation are often not clearly understood and agreed upon, and therefore administrators are apprehensive about having to justify decisions to subsequent governments with different interests and points of view. A wider consultation process, on issues such as the need for additional investment and the nature of the bidding process would increase transparency and insulate decision-makers from subsequent accusations of mala fide intention. A similar situation plagues the numerous studies that have been conducted on the Indian port sector. Since these studies are not discussed and debated in public their ability to withstand criticism, if and when used to support the reform process, remains indeterminate, and as such they do not inspire confidence in the decision-makers.

4.3 Tariff authority for major ports

 Pending the advent of competition, the government decided to set up a Tariff Authority for Major Ports (TAMP) to ensure that the major port trusts do not take advantage of their monopoly position. TAMP has issued a number of orders since its inception directed towards increasing the efficiency of port operations and has understandably created resentment among the trusts, so much so that there is now pressure to disband TAMP and replace it with an appellate tribunal. Part of this confusion flows from the incomplete nature of authority that has been given to TAMP, which gives it the position of a ‘price-fixer’ and not that of a regulator, with powers to promote competition and restrict anti-competitive behaviour. These pressures to abolish a price-setting authority are inevitable, and can only be resolved by encouraging private sector competition, which would eventually remove the need for such a function.

5. Approach to reforms

5.1 Decentralisation

The logistics industry, like all other industries, is undergoing rapid technological and organisational change. Ports, as a link in this logistics chain, need to keep up with these changes. However, even though the port trust is in principle an empowered local authority, incorporating a variety of agents associated with a specific port, they tend to act as extended arms of government. On the other hand, while the Union Government does influence port activities and decisions, especially investment decisions, the ports are difficult to modernise purely by administrative action, being
statutory by nature, even though their constitutions, accounting procedures, and management information systems are all in obvious need of reform. More to the point, this oversight of the Central Government does not always make for good decisions since the ultimate decision-maker typically acts without full knowledge of local conditions, and is faced with options developed by the Port Trust, which is a body divorced from commercial incentives. There are therefore two issues that need to be addressed. First, decision-making needs to take place at the level where information is generated, i.e., at the port level, and second, the decision-makers need to be driven by commercial incentives, to respond to the needs of the user.

5.1.1 Private sector participation

Efficiency in operations is critical in the new dispensation. This cannot be achieved in an environment where state-owned operators provide port services because there is no incentive for them to improve efficiency in the same manner as private operators driven by profit. This is why 88 of the top 100 container ports use the ‘Landlord Port’ model. However, so far, the government does not appear to recognise this fact and seems to look upon private participation as an opportunity to support its own previous investments. The only solution is to extricate the Union Government from port-level decisions, devolve authority to the port level and simultaneously, to privatise the service provision activities of the port. Decisions that affect service provision would then be taken by private service providers at the port level, who would be driven by commercial incentives and respond to information emanating from the marketplace.

5.1.2 Corporatisation

Does devolution of authority imply corporatisation of the Port Trust? Not necessarily. This was thought of as a route to put the service provision activities of the trust on a commercial footing. Corporatisation is no longer necessary, if the port trusts divest themselves of all commercial service provision activities by concessioning them to private service providers. If the Trust feels it would nevertheless benefit from the apparently greater flexibility provided by corporate status, it should be possible to evolve acceptable via media. For example, the Trust could convert itself into a lessor of port assets, including land and equipment, which would be leased to a fully owned commercial subsidiary company, with authority to sub-lease these assets. This company can then enter into long term (or short term, as, for example, in the case of dredging) concession agreements with private service providers to perform various functions such as berth expansion and cargo handling, pilotage, towage, dredging, etc. This approach would permit operational flexibility and retain the tax benefits of trust status. All existing port equipment should be either sold or leased out to the private service providers. The cleanest way to do this is to fix a predetermined sale or lease price for the equipment and hand it over along with the concession for the terminal. In this way, the bid for the terminal concession would internalise the
market value of the equipment. If the equipment was over-valued, this would reduce the bid for the concession, while it would raise the bid, if otherwise.

5.1.2.1 Property and other taxes
A major and perhaps the primary attraction for the continuance of trust status for a major port is the avoidance of property taxes. Most ports occupy substantial land area, which would be subject to local property taxes if the trust status were to be given up. In principle, this would not be a reason to continue the trust status. However, since the land area used by the port is not managed in a commercial manner, i.e., put to its most profitable use, it does not generate the kind of revenue needed to pay these taxes. Loss of preferred tax status would therefore result in an adverse impact on the cash flows of the port. Eventually, as the activities of the port are privatised and the land is commercially managed, it should be possible for the port to meet its tax commitments. It should be emphasised that this argument does not extend to the issue of taxability of port income, which can be on the same footing as that of other commercial activities.

5.2 Additions to capacity

5.2.1 Let users handle bulk cargo
The government should move away from additional public investment in port infrastructure. As discussed at the outset, the need is primarily to cater to energy-related bulk cargo and container traffic. Liquid bulk continues to occupy a substantial portion of the capacity of our major ports. This provides ports with revenue but may not be socially desirable. There are always dangers of an oil spill that could prove environmentally disastrous. Current technologies permit the evacuation of liquid cargo through SBM systems. This has the additional benefit of avoiding draft limitations. Similarly, specialised handling systems and berths enable efficient handling of bulk cargo such as coal and iron ore. Worldwide, large users often undertake these cargo-handling operations. In India, the users in the energy sector are either large public or private corporations like Indian Oil and Reliance or power producers like NTPC and Enron, who are eminently capable of commissioning their own facilities. It is undesirable to overly burden our common user port facilities with this function.

5.2.2 Focus on container capacity
Instead, investment in common-user facilities should be concentrated in building container capacity. Subject to some additional balancing investment, there is enough container capacity, with JNPT and Chennai as the number one and two ports respectively, to handle container traffic for the next five years. Kandla, Pipavav, Kochi and Tuticorin could meet even the need for regional feeder container traffic.
Existing general cargo berths at these ports can be converted to handle container traffic with relatively low investment. Admittedly, they would not be the most efficient but it could be a worthwhile trade-off. Here, it is useful to remember that substantial improvement in container handling capacity and infrastructure can be obtained simply through better equipment and work practices.

5.2.3 **New facilities in existing major ports**

This interim period, when capacity would be added by converting existing facilities, would reveal information on the quality and viability of alternative port operations that would then attract additional private investment, which should be responsible for all new capacity. However private investment will depend on the market structure that is allowed to operate. As container terminals operated by private operators come on stream, traffic will flow based on the relative efficiency of service provided by them. This would create demands for additional capacity at specific locations. Government would need to play a part in this process by ensuring that no location is handicapped by lack of access to the inland transport network. To the extent possible, the terminal operator will no doubt expand capacity within the existing physical infrastructure, by altering or expanding equipment used in the terminal. Only when it is not possible to extend the physical infrastructure, due to the limitations of the harbour, can new sites be expected to become attractive.

5.2.3.1 **The importance of land valuation**

With properly funded modern transport connectivity, little purpose is served by locating ports in some of the most highly valued land in the world. All major ports, particularly Mumbai, are now expensively situated if a proper valuation is put on the price of land. There may well be a case for realising this land value and using the proceeds to meet the liabilities of the port trusts, especially with respect to labour reorganisation. A proper valuation of land would also ensure that new ports develop in a manner that take all costs into account and provide a disincentive for expanding capacity at existing ports. In addition, it would help in partially internalising the negative externalities of urban congestion and environmental damage.

5.2.3.2 **Port financing and cost recovery**

The investment in port infrastructure is comparable to small to medium-sized power projects, with much more creditworthy customers. In addition, subject to regulatory rulings, it is also possible to have a natural foreign exchange hedge through dollar-denominated tariffs. A 210,000 TEU capacity container terminal costs about US$40 million to build and equip. Payroll and other non-interest operating costs need another US$6 million per annum. As a result, a terminal is able to obtain a reasonable
return on capital employed at about 100,000 TEU per annum.\textsuperscript{17} This magnitude of investment, i.e., Rs 180 crore of initial investment and around Rs 27 crore of annual operating cost is well within the capacity of the Indian private sector.

5.2.3.3 Domestic capability

The development of a new class of domestic port operators could well be an ancillary benefit of this approach to capacity addition. Most of the conversion operations will not even require investments of the magnitude mentioned above, which is for a new container terminal.\textsuperscript{18} It is a fallacy to believe that internationally only a handful of companies can successfully manage port terminals. It is quite possible to visualise well-qualified consortia of Indian construction and cargo-handling firms, who would undertake the necessary civil works to convert the existing berth and equip and operate it to provide the required container handling capability. Unfortunately, most of the tenders of consequence brought out till date by different port authorities set qualification norms in a manner that preclude involvement of Indian companies. To exploit this latent resource, it is essential to avoid needless overspecification of pre-qualification conditions for such conversion operations and align them with the requirements of the task at hand. This will also lead to increased competition since it would increase the number of potential bidders.

5.2.4 New port development

The proper valuation of land would strengthen the impulse towards development of port capacity at new locations. There should be a market-oriented policy to the development of new ports, which would necessarily be at the level of the states. Authority regarding port functions should be devolved to the port level, from the existing government departments and maritime boards, and only private operators should provide port services. The decision as to the extent of support that would be provided for infrastructure should be left to the states but it should be limited to the inescapable necessity of providing common facilities. Ideally, an efficient port should be able to finance such infrastructure, with the help of long-term finance. If new capacity is added only through private investment, it will be added at the most efficient location, subject to the limitations imposed by negative externalities. To take proper account of such environmental and congestion externalities, the government should facilitate the transparency of the process to enable an informed decision.

5.2.4.1 Competitive concessions and the choice of location

The exact choice of these locations would be decided in a manner similar to that which drives industrial investment today, i.e., a mix of economic determinants and
state concessions. Green field terminals are most likely at the sites of current ‘minor’ ports, which are locations under the jurisdiction of the state. The greater the tendency for competitive concessions provided by different state governments in the running, the greater the likelihood of over-investment in port capacity, just as a number of industrial estates built on promises of tax benefits and subsidised land languish due to the absence of a viable market. The due diligence process of investors and lenders can be relied upon to control this process only if the market risk for the port falls squarely on the service providers. There should be no fudging of these propositions. It is sound economic theory and sensible practical economics that all subsidies should be explicit, not hidden. In a competitive economy there is no such concept as over-building or under-building, which can only occur if public investment implicitly subsidises private investment. Otherwise, competition and incentives will ensure that imbalances will be corrected. This proposition is the essence of the new reforms. In developing these new ports, special care should also be given to the avoidance of explicit or implicit collusion between major ports and the proposed new ports, which will not only save resources but also ensure efficiency by increasing inter-port competition.

5.2.5  Feasibility of a hub port

Even though we do not have a hub port, not all our cargo is transshipped. The trade to and from Europe and our western coast is carried directly in mid-size container vessels, and only cargo from the eastern coast and that destined for the United States is transshipped in foreign ports such as Colombo, Dubai and Singapore. While this is partly due to the lack of facilities and low efficiency at our ports, it is primarily driven by the nature of the container business. Transshipment need not be viewed as necessarily a bad outcome unless it adds significantly to the costs of shipment, either in terms of increased freight rates or in terms of increased delay. Fortunately, neither of these seems significant in India. Nor is the growth of trade necessarily hampered by the lack of a domestic hub port. The growth of trade in China does not appear to have been restricted by the absence of one. This may, however, be misleading as it was helped by the presence of a major hub port, Hong Kong, geographically located on the Chinese mainland.

The alternative is to develop a main line hub port in India. Prima facie, India does satisfy the basic requirements of large cargo and proximity to the main trade routes. The issue, therefore, is one of relative efficiency. However, it should be recognised that, even if we had a hub port, container traffic originating from the other Indian feeder ports would incur costs similar to those incurred while transshipping via foreign ports. Indian trade might still choose to leverage the presence of ports like Singapore, which is closer in distance to Eastern India than Mumbai for example. If
on the other hand, Chennai or Kochi were developed as hub ports, many Western Indian ports could choose Dubai. It is important to stress that the development of a hub port is an endogenous development, subject to the basic facilities available for catering to high capacity vessels. The decision to hub out of a specific port is based upon the needs of liners, the efficiency of the port, the originating traffic, proximity to main routes, etc. It is also important to note that a hub-port is a high-risk investment. In a region with a number of competitors for hub-port status such as Colombo, Dubai and Singapore, liners can stop hub activities at a port almost at whim, leaving the discarded port to carry the burden of stranded investments. Until such time as an Indian hub port emerges, India could continue to be a feeder country, without a port that caters for large mother vessels.

5.3 Competition

5.3.1 Inter-port competition
As more ports become well connected to the rail and road transport network, the costs related to transport to and from the port tend to converge and their effect in defining the ports’ hinterland is diminished. Since users are concerned about the total cost of shipping through a particular port, a port that can offer lower costs of usage through greater efficiency can compete effectively with a less efficient port that may be closer to the user. Port operators occasionally attempt to make defensive strategic investments to forestall such competition. Regulators need to be alert to these developments (see Box 20.1) and immediately foster competition from other private sector operators. In these matters information, publicity and data are of great value.

5.3.2 Intra-port competition
Since the development of inter-port competition depends on access to land transport linkages, apart from privatisation of service provision activities in the competing ports, it is expected to take time to develop. It is equally important and perhaps faster to ensure that intra-port competition is encouraged wherever possible. This is of special importance in the design of concession agreements when existing facilities are being concessioned and construction of new facilities is being bid. To the extent permitted by the existing port infrastructure, such as the length of the quayside, new facilities should be concessioned to multiple service providers, rather than to a single operator.

5.3.2.1 The JNPT case
While JNPT did introduce private participation, it did not focus on introducing sufficient competition. This was understandable since the primary intention was to
attract additional investment. The concession document therefore protects the concessionaire from competition until the traffic reaches 90 per cent of the terminal capacity.

Box 20.1: Impact of ownership on inter-port competition

Northern Europe has often been held up as an example of efficient transportation logistics, which permits users in a broad hinterland to choose between multiple ports in the area. It is natural therefore to expect this to be among the earliest markets for testing the limits of regulatory acceptance for inter-port competition. Recent decisions of the European Commission’s Competition Directorate seem to suggest that they take a serious view in this matter.

On 10 March 1999, Hutchison Port Holdings Ltd. (‘Hutchison’) and Rotterdam Municipal Port Management (‘RMPM’) notified to the European Commission their intention to acquire joint control of European Combined Terminals BV (‘ECT’). A number of shipping lines and container terminal operators in other ports in the Northern European range expressed concern about the merger, which affected not only the overall market for stevedoring services for deep sea container vessels, but possibly also narrower-defined markets, such as for the transshipment of containers from deep sea ships to smaller vessels for transport to other (smaller) ports in Europe, or for specialised services to particular categories of very large deep-sea vessels.

The European Commission opened an in-depth investigation into the acquisition based on the concern that combining Hutchison’s control over the Felixstowe and Thamesport container terminals with ECT in Rotterdam will lead to a situation where the 1st, 4th and 9th largest container terminal operations in Northern Europe will be brought under the joint control of Hutchison. The in-depth investigation showed that the merger would have created a dominant position for ECT/Hutchison by affecting the market for stevedoring services to deep-sea container vessels in Northern Europe. The concentration would have combined the number one operator on the continent and the number one operator in the UK. As a result of the merger, ECT/Hutchison would have had a market share of 36% on the Northern European market for deep-sea traffic with the nearest competitors having less than half of the joint market share of the parties. Indeed, ECT/Hutchison’s combined market position could have been much stronger than that reflected by their market share, given their strong joint position in transshipment, their leading position for Far East cargo and the fact that their terminals are particularly suited for serving larger deep-sea vessels.

Both ECT and Hutchison expressed their disagreement with the analysis of the effects of the proposed concentration. However, on 30 July 1999, they decided to abandon the proposed concentration.
This limits intra-port competition to P&O and the Port Trust. Similar protection is now being seen in other concession agreements also. However, ideally, the government should not on any account provide exclusivity. All it should agree to is that public sector funds will not be deployed in competition. If it has to be provided as part of the negotiation process, a better method is to provide a certain specified period of exclusivity, which will incentivise the operator accordingly. Furthermore, the bid parameter in JNPT was a royalty per TEU, which could simply be passed through to the user, and thus raise the cost of port services. Though tariffs are today de-facto capped at the level of JNPT, which is presently set by TAMP; without proper competition, such a cap on tariffs is administratively tedious and can often be meaningless.

5.4 Regulation of port functions

Regulation and subsidies must both be explicit and temporary. Like the Marxist state, they should in principle, be created to ‘wither away’. Three types of regulation can be identified at the port level, viz., conservancy and safety, environmental and economic.

5.4.1 Conservancy and safety

The regulation and provision of port functions, which are provided on a common use basis, such as conservancy, dredging, pilotage and towing need to be decentralised and done at the port level. Each harbour has its own idiosyncrasies, which are best handled locally rather than centrally. In order to ensure the adequate provision of port level functions, it is necessary to empower the local authorities adequately. Here, it is imperative for the central government to withdraw immediately from involvement in the management of port functions. This should be accompanied by the concomitant withdrawal of the flow of funds from budgetary sources.

5.4.2 Environmental

As part of the wider separation of bulk and container cargo, and in particular due to the nature of dangers posed by POL, we have already advocated the segregation of such cargo and its evacuation through SBMs. In addition, it is important to recognise that waterfronts are by nature relatively fragile ecosystems. One also needs to avoid urban congestion. This argues for intensive use of existing port area rather than its unbridled expansion. The proper valuation of land, alluded to earlier, would provide strong economic incentives for such intensive use.

5.4.3 Economic regulation

Economic regulation is necessitated by the lack of adequate competition in the market. Regulation is at best an imperfect substitute for the market and must be
directed towards fostering competition, so as to bring about its own demise. For purposes of exposition, it can be usefully separated into two areas, viz., tariff regulation and entry determination.

5.4.3.1 Tariff regulation

Ways and means must be devised to achieve a free and competitive port system so that we can actively recommend and advocate the abolition of tariff regulation as exemplified by TAMP. TAMP itself, in its guidelines, has recognised the need to foster competition in the market and withdraw from regulation as the market develops. To ensure that regulation is driven by the need to bring about competition, there should be a time-bound sunset clause for the cessation of tariff regulation. However, this also requires that the regulator or the government take active steps to foster competition. As of today, TAMP does not have this authority. As long as tariff regulation is practised, it should, in contrast to conservancy and safety regulation, be common across ports. Once the common-user ports begin to focus on general cargo and container operations, they would become much more comparable than at present. This would permit the generation of sufficient comparable information and enable a common regulator to benchmark performance across ports and implement a performance-based regulation regime, e.g., a price-cap-based regulation regime, as is being attempted, for example, in Victoria, Australia. This provides pricing flexibility for private operators. As distinct from major ports, it may be desirable to have complete pricing freedom for ‘minor’ ports since they do not enjoy any market power at present. This flexibility will also enable them to engage in more aggressive inter-port competition with the major ports, who are the incumbent service providers. It is sometimes argued that even if there is no economic reason, regulation may be needed in a semi-judicial capacity to ensure fairness between various economic agents. However, India has suffered enough from a limited understanding of economics that has steadily eroded incentives for infrastructure projects on grounds of ‘fairness’. Of course self-evident exploitation will always be damaging, but regulatory authorities are not a solution. Competition, encouraging competition and freedom of entry are far superior solutions.

5.4.3.2 Regulation of entry

With regard to entry, since the potential for additional operators in major ports is finite, it is necessary to have a concessioning authority to determine entry. This could remain with the central government, subject to pro-competitive consultations with the regulator, with the express objective of having multiple operators in each port and increasing competition. However, the entry of more players into this sector through ‘minor’ ports should be free and open, subject only to the qualifications of
environmental impact and protection against anti-competitive behaviour. Table 20.3 summarises the position on regulation.

### Table 20.3: Proposed regulatory framework

<table>
<thead>
<tr>
<th></th>
<th>Existing major ports</th>
<th>Existing ‘minor’ ports and new ports</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tariff</strong></td>
<td>Central regulator to benchmark performance and set performance-based price-caps (efficiency-linked tariff). Sunset clause to be specified.</td>
<td>Free</td>
</tr>
<tr>
<td><strong>Entry</strong></td>
<td>Decided by government in consultation with the regulator, with the express objective of having multiple operators in each port and increasing competition</td>
<td>Free entry, subject to restrictions imposed by environmental impact and avoidance of anti-competitive situations</td>
</tr>
</tbody>
</table>

#### 5.5 Connectivity

There is a need to ensure sufficient rail and road connectivity to the ports. It should be possible to develop such connections, or at least defray a portion of such costs through user fees. The proposed National Highway Development Project is a welcome development because the alignment of the Golden Quadrangle, on which most of the traffic flows, is reasonably close to the coastline. This would permit most of the major ports to be connected with high capacity road linkages to the Golden Quadrangle for relatively little additional cost. Indeed, NHAI is already in the process of evolving options to connect the major ports. The railways, coming as it does under a separate ministry, would require more coordination. Even here, private ports in Gujarat have managed to evolve schemes, which have convinced Indian Railways to provide them with connectivity. As private investment increases in the major ports, one can expect that more such arrangements would be developed and implemented by the private service providers. The Railways must also appreciate the market provided by container traffic, which could replace the loss of the existing traffic from transportation of coal and POL, as electricity transmission lines and pipelines make the use of rail redundant for such cargo.

#### 5.6 Labour

**5.6.1 Need to buy-out existing labour**

The change in cargo handling technology has had the greatest effect on labour. Though the new practices have increased employment in a number of other cargo
processing activities, including higher-skill tasks, it has undoubtedly reduced the need for manpower in ports. Given the age and experience of port labour, it is usually difficult for them to relocate and avail of the newer job opportunities, which are closer to the cargo generation sites rather than the ports. Port labour is often well organised and this enables them to delay reform programs substantially. As a consequence, the usual solution in port reform strategies across the globe has been to ‘buy-out’ the labour in view of the benefits of the expected increases in productivity from the change in work practices.

5.6.1.1 Indicative cost

It is useful to calculate indicative levels of compensation that may be required in India to implement a buy-out programme. Let us assume a one-time retirement package of approximately Rs 4.5 lakh per worker. This works out to approximately US$10,000 a worker or a million dollars per 100 workers. Even if we assume that all the port labour has to be provided with the package, this implies an expenditure of US$1 billion or Rs 4,500 crore. This is approximately equivalent to an annual expense of Rs 600 crore over 15 years, discounted at 10 per cent. This may appear excessive at first sight but it has to be compared against appropriate indicators to appreciate its relative magnitude. We have already suggested the use of revenue from land sales by major ports to defray the labour liability. It is also useful to remember that the annual operating surplus of major ports is over Rs 1,000 crore. The RITES Report estimated an annual cost of Rs 900 crore in 1995–96 due to pre-berthing delays, excluding liquid cargo, which is estimated to cost another Rs 1,200 crore. Compared to the value of cargo, the anticipated annual expenditure is about 1 per cent of the value of non-petroleum imports. Contrasted with these figures, the cost of labour separation, even under the extreme assumption where all labour is bought out, does not appear excessive.

Box 20.2: Chilean experience with labour reform

The recent Chilean agreement concluded in August 1999 included monthly pensions for older labour, and a choice between guaranteed employment for 45 months or a business development grant for workers aged more than 40 years with more than 15 years of service. In addition, the government set aside about US$3 million to provide compensation to workers who did not qualify under the above norms. The agreement also provided for tripartite negotiations between the unions, government and concessionaire to minimise actual job losses. If the figure of US$3 million appears low, it is useful to remind oneself that this in addition to the earlier Chilean port reform program, which liberalised the rules of employment for dock labour. That was estimated to have cost about US$70 million.
6. **CONCLUSION**

In conclusion, the government should focus on organisational reform through privatisation, reform of the port labour system, facilitation of connectivity and the institution of appropriate regulatory procedures. In this, its primary focus should be on privatising the provision of all port services. New capacity addition should come entirely through the private sector. A transparent sharing of information and avoidance of state subsidies can best achieve the needed coordination between the expansion plans of existing ports and the growth of new ports. If the private sector is made to face the consequence of its commercial judgement, one can also rely upon the due diligence of investors and lenders to avoid over-investment in the sector. Next, the port labour system should be reformed with the help of generous severance payments for existing labour coupled with increased flexibility in employment conditions. The linkage to the land transport network should be improved to foster inter-port competition by permitting users to decide upon a port of their choice based on service efficiency rather than access limitations. Finally, a stable and pro-competitive regulatory framework should be put in place to guarantee that there is sufficient competition in the market, which alone can ensure that the benefits will flow to the users.

**NOTES**

1. As a result of the hub structure the share of the top 10 container ports has risen from around 30 per cent in 1980 to almost 40 per cent today and transshipment is estimated to be as much as a fifth of the total container traffic.

2. See the section on inter-port competition later in this paper.

3. This situation is especially severe in the older ports that are surrounded by densely populated urban areas. As a result, in part due to such conditions, traffic in the older ports grows at rates below the national average. With respect to connectivity, there are significant lapses, evidenced by the rail congestion that affects the container evacuation capacity at JNPT and the delay in improving its connection to NH 4. Tuticorin is still connected with a single lane NH 7A, while traffic for Mormugao remains held up on a congested NH 17A. The development of Vallarpadam Island in Kochi remains affected by the lack of good connection to the mainland. The state of rail connections is similar. A single line serves Paradip from Cuttack, while there is only a metre gauge connection from Viramgam to Mehsana on the Kandla to Delhi route.

4. It is interesting that a recent review of the remaining trust ports in UK (there are a few that escaped Ms Thatcher) identifies exactly this problem as being crucial in determining the (lack of) performance in these ports.
5. Four broad categories of employees are considered, viz., officers, non-cargo handling workers, cargo-handling staff and cargo-handling labour.

6. This is not to say that the other ports do not have a problem, but that the concentration is in the metropolitan ports.

7. This is based on estimates provided by Drewry Shipping Consultants. A 600,000 TEU terminal would have a payroll of about US$9 million for 531 staff, with equipment costs of another US$60.8 million.

8. Apart from the exigencies of just-in-time manufacturing, this increasing need to shorten ship stays is also driven by the rising ratio of fixed to total costs for the new generation of large vessels. Customs processing by the Virginia Port Authority has reached a level whereby clearance is often obtained even before the vessel docks at the port.

9. This information could also be important for regulators. As a matter of fact, TAMP has already requested ports to evolve systems by which performance can be objectively measured.

10. Even after accounting for the fact that productivity depends on various factors such as percentage of cargo exchanged in the case of containers, the range of output per berth day leads one to question the actual capacity of the Indian port system, if it were to be operated efficiently. Unfortunately, this improvement is not consistent across all types of cargo. As seen in Table 20.2, turnaround time has deteriorated for liquid bulk cargo, while output per berth day has fallen for dry bulk cargo.

11. The accumulation of cargo in back-up areas affects cargo-handling capacity and provides an excuse not to improve the productivity of stevedoring activity. In such cases, it should be possible to explore interim off-site solutions to warehousing, rather than hold up increases in crane productivity and increase demands on scarce waterfront land.

12. The law, as it now stands, does not permit the Port Trust to charge prices that are different (either higher or lower) than that fixed by TAMP and thereby considerably restricts their operational flexibility.

13. An example of such a decision is the iron ore berth at New Mangalore Port, which is limited to vessels of 60,000 DWT since this was the capacity of the Iranian port expected to receive the cargo. As it happened, the Iranian deal ultimately did not materialise and the port remains unable to cater to larger vessels, which can service other ports. The fertiliser facility at JNPT is another such example.

14. Land use and port development is inextricably linked. See the section on importance of land valuation.

15. This is based on the following rough estimation and would need to be substantiated by closer study. To begin with, JNPT can handle about 1.6 m. TEUs, given current quayside, cranes, back-up area and connectivity at a productivity of 20 moves/hr, are contractually set for P&O. The other main port, Chennai, can handle almost 800,000 TEUs, based on a quay length of 1000 metres, if coal was moved away from Chennai, e.g. to Ennore. The evacuation of cargo may pose a hurdle, but if coal moves away, this too may not be
a problem. As it stands, Kochi can handle about 200,000 TEUs, if connectivity is spruced up. Additional capacity can be developed at Vallarpadam. Tuticorin is choked now, but that is also because Chennai is blocked up with coal and POL traffic. However, it too could also be converted to handle between 150,000–200,000 TEUs. A major advantage is that the port is on the main liner route and ships do not need to deviate. However, it is critical to improve connectivity at both these places, if they are to be developed as major terminals. Elsewhere, Kandla with the new P&O concession can handle around 100,000 TEUs, while one can expect another 100,000 TEUs from Pipavav over the next five years. This leaves Mumbai. Even assuming a large portion of the traffic will move away, it is safe to assume that at least 300,000 TEUs would remain in Mumbai, down by half from the current level of 600,000 TEUs. There is limited potential for container ports on the East Coast from Chennai upwards. Paradip is a good harbour but connectivity is bad, and moving Calcutta/Haldia traffic to Paradip is perhaps the same as taking it to the West Coast. Even so, it may be possible to move 200,000 TEUs from the East Cost ports. If you add up the above capacity we have almost 3.5 m. TEU, which is about the expected level of capacity required, as projected in Table 20.1.

16. These externalities could also be internalised through civil action. If the social costs being imposed do not justify the benefits to the people in terms of increased income and employment, it will generate sufficient social opposition to compel investors to explore other sites and alternatives.

17. The numbers are based on estimates provided by Drewry Shipping Consultants. Equipment costs are about US$19 million, which include 2 quay cranes (US$12.4 million), 2 reach stackers and six forklifts, apart from spreaders, trailers, generators, radio equipment and computer hardware and software (US$1.2 million). Civil works at 250 metre of quay length (US$13.5 million) and 8 hectares of terminal area (US$5 million) is estimated to cost another US$21 million. Payroll expenses are estimated at US$4 million per annum for a total of 232 staff (12 management, 7 finance, 53 engineering and 160 operations staff). A 600,000 TEU terminal would cost about US$108 million in civil (US$47.5 million) and equipment costs (US$60.8 million), with a payroll of about US$9 million for 531 staff.

18. Green field projects such as Dhamra, or for that matter, JNPT, may have sizes which are in the range of Rs 600 crore to Rs 700 crore but the majority of projects will be in existing ports where investment is not likely to exceed between Rs 50 crore to Rs 150 crore.

19. Apart from the Hutchison ECT case discussed in this box, the Commission allowed another merger between two Dutch transportation companies, Pakhoed and Van Ommern to go through only after they agreed to divest part of their capacity in liquid storage terminals in Rotterdam and Antwerp.

20. In the case where exclusivity is based on capacity utilisation, it is possible that the operator will try and limit traffic to just under the barrier, until such as time as significant gains in traffic are possible or it cannot divert traffic to a sister port. This is separate from the problems with measurement of capacity at a container terminal.

21. In 1996–97, the major ports handled over Rs 68,000 crore of non-petroleum imports.
INTEGRATING COASTAL SHIPPING WITH THE NATIONAL TRANSPORT NETWORK

November 2000

INTRODUCTION

This chapter investigates the scope for integrating coastal shipping with the national transport network. Coastal shipping is more environment-friendly, less expensive and has the potential of relieving congestion on land transport in a number of situations. However, the current perception of coastal shipping is that of a somewhat old-fashioned, slow and complex mode of transport. Coastal shipping should offer—and it should be perceived to offer—speed, reliability, flexibility, regularity, frequency and cargo safety to the highest degree to enable it to become a modern, dynamic element in the logistic door-to-door transport chain.

The rest of this chapter is divided into three sections. First, it reviews the current state of coastal shipping. Second, it explores its potential, and finally, it offers policy prescriptions for the full realisation of the possibilities of coastal shipping. To anticipate the conclusion, the principal recommendation made here is for a greater role for the private sector. This is essential since the core requirements of speed, reliability, flexibility, regularity, frequency and safety are achievable only in a service-oriented mode, which cannot be expected under public ownership. Furthermore, the critical bottleneck identified is port inefficiency, where pre-berthing and turnaround times are high, affecting the attractiveness of coastal shipping. The provision of dedicated and privately operated berths and specialized coastal ports, to address this problem, is well within the capacity of private investors.

CURRENT STATE OF COASTAL SHIPPING

Who handles coastal shipping?

Coastal shipping is currently an activity concentrated mostly in major ports and in Gujarat. Furthermore, as seen in Table 21.1, not only is most of the coastal shipping...
activities concentrated in major ports, it is also the case, as seen in Table 21.2, that a significant portion of the traffic at major ports is coastal, and has been so for some time. In 1998–99, coastal traffic was estimated to be around 88 million tonnes out of a total traffic of around 288 million tonnes. After declining in the sixties and the seventies, it has again regained its share of about a third of the traffic. This is largely due to the increase in coastal movement of bulk commodities such as coal, POL—both crude and product—and iron ore. Moreover, the share of coastal traffic varies from port to port. In addition, some ports cater to outgoing cargo while others focus on incoming cargo. Appendix 1 shows the share of coastal traffic at all the major ports. This is an important point to note since the extent of attention given to coastal traffic at each port can be expected to vary with the importance of the traffic in the ports’ operations.

Table 21.1: Distribution of coastal traffic across different ports 1998–99

<table>
<thead>
<tr>
<th>Port</th>
<th>Coastal traffic (million tonnes)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major ports</td>
<td>75.8</td>
<td>87.7</td>
</tr>
<tr>
<td>Gujarat maritime board ports</td>
<td>6.4</td>
<td>7.4</td>
</tr>
<tr>
<td>Other minor/intermediate ports</td>
<td>4.2</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Table 21.2: Share of coastal traffic at major ports

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of coastal traffic</td>
<td>27.4</td>
<td>13.5</td>
<td>15.8</td>
<td>32.3</td>
<td>30.1</td>
</tr>
</tbody>
</table>

What is shipped?
The two major commodities moved using coastal shipping are about 14.2 mt of coal, which is unloaded almost entirely at Chennai and Tuticorin, and 17 mt of POL product and crude (8.4 mt of product and 8.6 mt of crude). Other important commodities are iron ore and pellets (2.9 mt), 0.8 mt of cement and 0.7 mt of clinker. The major coastal cargo flows are:

- POL products move between major ports, with sources being Mumbai, New Mangalore, Kochi and Haldia, where the refineries are situated. Jamnagar can be expected to become a key source from this year. The key destinations are Calcutta (Kolkata) and Mormugao.²

- POL crude moves from Mumbai—Bombay High—to Chennai and Kochi. The petroleum companies, i.e., IOC, BPCL, HPCL and Reliance, drive this traffic.
- Thermal coal moves from Haldia, Paradip and Visakhapatnam to Chennai and Tuticorin, which is driven by Tamil Nadu Electricity Board (TNEB).
- Iron ore and pellets move from Visakhapatnam and New Mangalore to Magdalla. Essar drives this traffic.

From the minor and intermediate ports:
- Cement, largely driven by Gujarat Ambuja Cements Ltd. (GACL), moves from Mul-Dwarka to Magdalla and minor ports in Maharashtra.
- Clinker, largely driven by GNCL, moves from Jafrabad to Magdalla and minor ports in Maharashtra.

As is apparent, large corporations, who view coastal movement as part of their efficient logistics management, drive much of the traffic. The six commodities mentioned above, which are all largely driven by specific users and can be considered ‘captive traffic’ add up to 35.6 mt of traffic, which is nearly 95 per cent of the measured loaded traffic.3 As seen in the table below, the shipment of common-user general and containerised cargo through the coastal route is almost non-existent.

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Commodity (million tonnes)</th>
<th>Quantity (percentage)</th>
<th>Share share</th>
<th>Cumulative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Thermal coal</td>
<td>14.2</td>
<td>37.8</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>POL crude</td>
<td>8.6</td>
<td>22.9</td>
<td>60.7</td>
</tr>
<tr>
<td>3</td>
<td>POL product</td>
<td>8.4</td>
<td>22.3</td>
<td>83.0</td>
</tr>
<tr>
<td>4</td>
<td>Iron ore and pellets</td>
<td>2.9</td>
<td>7.7</td>
<td>90.7</td>
</tr>
<tr>
<td>5</td>
<td>Cement</td>
<td>0.8</td>
<td>2.1</td>
<td>92.8</td>
</tr>
<tr>
<td>6</td>
<td>Clinker</td>
<td>0.7</td>
<td>1.9</td>
<td>94.7</td>
</tr>
<tr>
<td>7</td>
<td>Others</td>
<td>2.0</td>
<td>5.3</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>37.6</strong></td>
<td><strong>100</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This was the case not only in India, but also abroad, though not to such a large extent. However, over the period 1993–97, statistics provided by 15 European ports clearly show that the fastest growing segment of coastal shipping was containerised cargo, which rose in tonnes by 44 per cent. That growth was considerably more than the general growth of 16 per cent observed in the volume of coastal shipping in the same ports. The main factor has probably been the growth in sea-to-sea feeder traffic because deep-sea container traffic has grown considerably throughout the 1990s. Nevertheless, the trend looks promising also for more cargo being carried by coastal shipping instead of land transport.
Status of supporting infrastructure

For the existing traffic, the users themselves have built the infrastructure. These companies have invested in the necessary multi-modal evacuation of infrastructure and in some places even the port infrastructure, such as GACL at Mul-Dwarka and Essar at Magdalla. Similarly, Reliance has invested in its own port infrastructure at Jamnagar for receiving POL crude and loading POL products. In most cases, the shipping capacity is provided as a kind of ‘alliance’, with traffic guarantees—e.g., SCI, Great Eastern, etc., for POL transport by the oil companies, and Poompuhar Shipping for thermal coal used by TNEB. For these bulk commodities, apart from the transport logistics investments, often even the plant location has been strategically determined to take advantage of coastal movement, such as the thermal power stations at Chennai and Tuticorin, the pelletisation plant at Visakhapatnam, the sponge iron manufacturing plant near Magdalla, and the cement plants near Mul-Dwarka and Jafrabad, in addition to port based refineries. In the case of thermal coal, the traffic moves from the collieries in Orissa, West Bengal and Bihar by rail to Haldia, Paradip and Visakhapatnam, where specific berths and loading facilities are provided for. At Chennai and Tuticorin, similar unloading facilities are provided.6 At Chennai, the coal moves by rail to two thermal power stations, one located just north of Chennai and the other at Mettur, about 250 km southwest of Chennai. At Tuticorin, the coal is unloaded and moves directly to the thermal power station by conveyor belt. For POL, appropriate investments in railway sidings, tank farms, pump installations, jetties and/or SBMs are in place for integration with the land transport infrastructure.6 For iron ore, pellets, cement and clinker, dedicated investments in storage and handling equipment—such as pelletization plants and even a slurry pipeline from Kudremukh to New Mangalore, grinding and bagging plants for clinker and trucks for short lead closed system operations e.g., from Kodinar to Mul-Dwarka for cement—are also in place. However, this presence of supporting infrastructure for existing traffic flows is only to be expected since the traffic is limited to captive traffic for large corporate users who invest in the entire transportation chain.

Evaluating the impediments to coastal shipping

The savings from switching to the coastal route could be considerable. The rail and road freight costs for GACL from Kodinar to Surat are estimated to be approximately Rs 600 and Rs 560 per tonne respectively. In contrast, the transportation cost using the coastal route from Mul-Dwarka to Surat, including the land leads, may not exceed Rs 150 per tonne. Similarly, for sponge iron, where the total logistics cost forms almost 70 per cent of the total controllable cost, the savings through coastal shipping could be of considerable value (see Appendix 2).
In spite of such cost advantages, why is it that coastal shipping is not used more extensively? Part of the answer can be found in the expressed requirements of users. As seen in Appendix 3, the major requirement of users of non-bulk items is door-to-door service. This would require coastal shipping to be integrated into the rest of the transport system. The other priority is on-time service. For shipment sizes that are less than shiploads, which is almost the entire non-bulk traffic, this needs well-functioning common-user facilities for coastal traffic.

The development of common-user coastal shipping services would require the concomitant development of supporting infrastructure and services such as port facilities, inter-modal transfer points and reliable ground transportation services from port to final consumer. The development of each of these depends on the other, pointing to the need for coordinated development, which may be achievable through market mechanisms, but could need additional support. Such supporting infrastructure and facilities need not, in all instances, imply new facilities, but simply increase in the efficiency of existing facilities, which would permit service providers to offer time-specific door-to-door services. The key initiatives in this area are listed below.

**Turnaround times at ports**

One of the key, if not the most important concerns, of coastal movement is turnaround times at ports. Given that coastal movements would by definition be of short duration (in Europe, similar services are called ‘short sea shipping’), the port turnaround time should also be short. With a speed of 10 knots/hour (25 km per hour), distances of 1,000, 2,000 and 3,000 km would be completed in 40 (1.66), 80 (2.33) and 120 (5) hours (days) respectively. However, as per Appendix 4, the average turnaround time ranges from 3 to 5 days in most ports and up to 8 days in Chennai and Visakhapatnam for the coastal cargo. At Magdalla, due to lighterage operations, the turnaround time for iron ore and pellets could be as high as 15 days. The pre-berthing detentions range from 0.5 to 2 days in most ports and up to 6 days in Chennai. A major portion of the time spent in delivering the goods to the customer is therefore spent either waiting for a berth or in loading and unloading operations. Ports are not stakeholders in this process, even if the share of coastal business is significant. A key requirement is to reduce pre-berthing detention and turnaround time.

**Customs**

This is viewed as a significant bottleneck, leading to extra paperwork, consequential delays and corruption. The Working Group on Coastal Shipping (1993) recommended that coastal traffic should be removed from the purview of strict
day-to-day control of the Customs Act (Appendix 5). Shipowners have also pointed out that definitions of ‘overseas’ and ‘coastal’ vary between customs and ports, causing extra documentation and complexity. This need for focus on the ‘software side’ of logistics is often neglected and requires detailed attention to ensure that these avoidable bottlenecks, which can be quickly done away with, are actually removed.

Development of new facilities

It is important to think ‘small’, e.g. in terms of parcel sizes of 3,000 to 5,000 tonnes, while considering infrastructure for common-user coastal movement, especially in terms of handling equipment, jetties and shipping capacity. The draft requirement for jetties or ports handling such parcel sizes would be about 4 metres. The development of such facilities is eminently possible entirely in the private domain. The provision of rail and road access to the port site could, however, need the support of and coordination with the state. As long as the Railways continues to be publicly owned, the provision of rail access would be dependent on state investment. The provision of road access would require the state government to make available the requisite right of way and provide an environment that is conducive for investment by the private sector for providing such connections. In most cases, this could involve the upgradation of existing road linkages to bring them up to the standards required for efficient inter-modal transport.

Even though the proposed ports do not require deep drafts in view of the small parcel sizes, the ports need to have the necessary equipment to permit quick loading and unloading. The emphasis on port-based equipment is all the more critical since small ports are usually not well equipped and vessels with low draft and small parcel sizes would be more economical without shipboard equipment. In addition to being well equipped, the ports also need to operate round the clock and round the year. Only then would the desired flexibility and service level be available for the market to accept the port and ensure viability. However, given that these ports would be private, any given private port operator and his financiers could very well adopt a strategy of catering to geared ships, i.e., vessels with on-board equipment, if they feel that there would be sufficient demand for such services.

Box 21.1: Construction and equipment cost for a coastal port

A coastal port with the ability to cater to seven 5,000 dwt. ships would need its berth to be 350 m long (at 50 metres a ship). With a 30 metre backup area, the total berth area would be 10,500 sq m. The cost for a 4 m draft jetty is estimated be Rs 40,000 per sq m, amounting to a total of Rs 42 crore for the berth and backup area. Seven cranes with 60-tonne capacity would be required to ensure unloading/loading within 24 hours at
100 per cent berth occupancy. Each such crane would cost Rs 2 crore. Thus the total crane cost would be Rs 14 crore. Warehousing and rail/road access would cost an additional Rs 4 crore. The total cost, excluding the cost of land and any navigation dredging would be Rs 60 crore.

Source: Private communication with the Gujarat Maritime Board

Integration with inland waterways

In Europe and the US, coastal shipping is also integrated well with the inland water transportation for through movement and evacuation. Inland container river ports in China also feed traffic into Hong Kong port. Unfortunately, our potential inland waterways have not been properly maintained and thus cannot, in their present state, be really integrated with the coastal system. Currently, it would be difficult to even consider parcel sizes of 300 tonnes to move in a reliable manner. If at all, the options are the three national waterways—Hooghly–Ganga, Brahmaputra and Kerala coastal waterway, and the Godavari—all of which have the potential to be developed as inland waterway systems.

Shipping and the cabotage law

The cabotage rules in India are relatively liberal compared to many other countries like the US and the EC. All that is required is 75 per cent Indian ownership in a company providing coastal shipping services. Appendix 6 gives an overview of the application of cabotage law in India with an international comparison. Shipping capacity as such is therefore not a problem, since, given the existing cabotage law, the vessels required for coastal operations can either be manufactured in India or sourced in through a bare boat charter, i.e. chartering a vessel without the operating crew. If needed, a foreign flag vessel, i.e. with the crew, can also be chartered. Furthermore, depending on the dynamics of the market, Indian owners can change the registration of vessels between coastal to overseas and vice-versa.

Manning requirements

The specified manning requirements of coastal vessels are less than those of overseas vessels, thereby offering scope for economy. Some of the shipowners state that there is further room for reducing these manning requirements. However, the crucial issue in manning is the quality of manpower, since better take-home salaries are available in overseas shipping. There does not seem to be any solution to this other than being able to pay higher salaries, which would automatically happen with better market conditions and utilization of vessels.

Recommendations

As noted above, there is currently almost no common-user non-bulk coastal traffic. Most of this traffic is carried by road and to a limited extent, by rail. Moving this
traffic on to coastal ships will therefore result in significant environmental benefits. In a number of instances, a well-developed and integrated coastal shipping system can also offer a more cost-effective alternative. However, in order for this to happen voluntarily, users must perceive that they will receive at least similar levels of service in terms of door-to-door handling, delivery time and reliability, as presently provided by road transport. The key requirements for fostering a change in mode are, therefore, improvement in service and communication of the availability of such service levels to potential users. This section discusses the actions that would need to be taken in order to create an environment for such improvement in service.

**Private coastal shipping services**

It is unlikely that such service levels can be achieved under public ownership. Nor can one expect the public sector to effectively market the advantages of the coastal routes. Fortunately, given our legal environment, private shipping companies are well-positioned to step in to offer the service, if the supporting infrastructure is available. It is conceivable that they will also exploit the potential of inter-modal integration through alliances with road transport companies though presently it is difficult to hope for similar linkages with rail.\(^{10}\) It is therefore important to ensure that coastal shipping is not discriminated against as compared to other forms of transportation in terms of depreciation provisions and tax benefits.

**Manning scales**

Except for safety considerations, there is no particular reason to specify manning levels. Freedom to choose their staff complements would also permit higher remuneration for a rationalised work force and attract better quality of personnel, which is required in order to provide a higher level of service.

**Private coastal ports**

Even in the provision of supporting infrastructure, it is eminently feasible for the private sector to build and operate coastal ports, given the level of investment. Since coastal ports can be built on sites with limited draft, state governments should make available for this purpose sites that are not suitable for ‘hub-port’ projects. However, there remains a coordination problem in that ports would not be viable without sufficient traffic and this, in turn, would not emerge in the absence of suitable ports.

**Privatisation of existing facilities at major ports**

The existing major ports, which also handle almost all the bulk coastal cargo, need to be made friendlier for coastal traffic. A significant portion of this lack of friendliness emanates from the lack of incentives to provide better service. At a minimum, priority for coastal vessels including dedicated jetties,\(^{11}\) direct berthing and better loading,
unloading and evacuation systems would be essential. These dedicated berths would also help to improve monitoring by customs personnel, so that separate procedures can be evolved for coastal traffic. Ideally, these berths should be privatised through a competitively bid long-term concession to further reduce turnaround and pre-berthing times.

**Changes in customs practices**

The default mode for customs needs to change from a presumption of guilt where the ship operator has to show that he is not at fault to a system of random inspections and heavy penalties. To ease inspections and to streamline the coastal cargo flow, apart from earmarking specific ports or jetties for coastal traffic, Coast Guard monitoring needs to be improved. Furthermore, interpretations of ‘overseas’ and ‘coastal’ cargo also need to be standardized among different customs and ports.

**Box 21.2: Indicative port locations**

To facilitate coastal movement and reduce land leads, ports would need to be spaced all along the coastline, with a gap of no more than, say, 300 km. This would require about 20 port locations along India’s 6400 km coastline. Locations should be easily accessible from the sea and have good land evacuation facilities. Since the draft required is only 4 to 5 metres, a number of suitable locations are possible.

About half of these locations would serve the purpose of decongesting existing major ports, both in terms of berthing capacity and evacuation access. Chennai and Kolkata need to be bypassed for both the criteria, Visakhapatnam for the former and Mumbai for the latter. Haldia could be an alternative for Kolkata and Ennore for Chennai. Alternative sites near Visakhapatnam and, say, both north and south of Mumbai, need to be considered. Some of the other locations could be anchored to a large user. Ports that are presently captive could also be allowed to develop themselves as common-user facilities.

Appendix 7 shows a map with possible indicative port sites along with the major ports for coastal movement. Many of these sites have been proposed in earlier reports (see Appendix 5) concerning coastal shipping and/or port development.

**Continuation of current policy on cabotage**

It is important for coastal shipping that the cabotage regulations stay at the current liberal level. This helps bring in the most appropriate shipping capacity and commercial management for coastal shipping. A small but important step, however, would be to relax the requirement for Indian ownership from the present minimum of 75 per cent to at least 74 per cent and, if possible, even lower, in order to permit a foreign partner to participate more effectively in the management of the company.
CONCLUSION

To conclude, the principal recommendation is for a greater role for the private sector. This is essential since the core requirements of speed, reliability, flexibility, regularity, frequency and safety are only achievable in a service-oriented mode, which cannot be expected under public ownership. Furthermore, the critical bottleneck for the growth of coastal shipping is port inefficiency, where high pre-berthing and turnaround times are affecting the attractiveness of coastal shipping by increasing the time-to-market. The solution to this problem is privatisation of selected existing berths at major ports and setting them aside for coastal traffic, which will increase their service orientation, as well as the development of specialized coastal ports. Both these initiatives are well within the capacity of even domestic private investors. In addition, in order to limit the impact of the coordination problem referred to earlier, it is important to ensure that coastal shipping is not discriminated against with respect to other forms of transport in terms of depreciation and tax benefits, relax restrictions relating to manning scales, standardise and streamline customs procedures and further liberalise the existing policy on cabotage. Taken together, these measures should free private entrepreneurial forces sufficiently to provide the kind of efficient, reliable, flexible, regular, frequent and safe services that would attract transporters to this mode.

Urjit R. Patel
### Table 21.4: Total coastal cargo handled and share of coastal to total in various ports

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Port</th>
<th>Cargo ('000 tonnes)</th>
<th>Share of coastal</th>
<th>Major ports</th>
<th>U</th>
<th>L</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Major ports</td>
<td>U</td>
<td>L</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Paradip</td>
<td>7,826</td>
<td>12.6</td>
<td>84.4</td>
<td>59.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Chennai</td>
<td>17,986</td>
<td>67.9</td>
<td>7.6</td>
<td>51.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Tuticorin</td>
<td>5,180</td>
<td>60.6</td>
<td>2.2</td>
<td>51.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Kochi</td>
<td>5,339</td>
<td>36.7</td>
<td>66.7</td>
<td>42.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Visakhapatnam</td>
<td>13,140</td>
<td>19.1</td>
<td>52.7</td>
<td>36.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Haldia</td>
<td>6,335</td>
<td>3.2</td>
<td>89.0</td>
<td>31.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Mumbai</td>
<td>8,352</td>
<td>8.5</td>
<td>57.1</td>
<td>27.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Kolkata</td>
<td>2,358</td>
<td>47.1</td>
<td>19.4</td>
<td>25.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>New Mangalore</td>
<td>2,519</td>
<td>5.0</td>
<td>29.7</td>
<td>17.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Kandla</td>
<td>4,988</td>
<td>14.3</td>
<td>3.8</td>
<td>12.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>JNPT</td>
<td>913</td>
<td>11.4</td>
<td>1.1</td>
<td>7.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Mormugao</td>
<td>906</td>
<td>30.8</td>
<td>0.8</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total major ports</td>
<td>75,842</td>
<td>26.5</td>
<td>37.1</td>
<td>30.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>GMB ports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Mul-Dwarka</td>
<td>1,217</td>
<td>58.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Magdalla</td>
<td>3,783</td>
<td>42.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Jafrabad</td>
<td>601</td>
<td>20.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Other GMB ports</td>
<td>760</td>
<td>6.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total GMB ports</td>
<td>6,361</td>
<td>25.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other minor/intermediate ports</td>
<td>4,860</td>
<td>5.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All-India traffic</td>
<td>87,400</td>
<td>30.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** U and L refer to share of unloaded coastal traffic and loaded coastal traffic in total unloaded and loaded traffic respectively at each of the major ports. As can be seen, some ports like Chennai, Tuticorin and Kolkata cater to incoming cargo, while others, such as Paradip, Kochi, Visakhapatnam, Haldia and Mumbai cater to outgoing cargo.
APPENDIX 2

Mode choice analysis for sponge iron

This analysis is for an east-to-west coastal movement of lump iron ore, from Daitari via Paradip to a sponge iron plant on the west coast, as part of a mode choice analysis. This analysis does not take into consideration the investment cost at the plant end for dealing with the sea cargo. This was partly due to the fact that some investments in a jetty had already been made for importing the plant machinery during the project stage. The additional investments in the jetty were less than the investments required for constructing a railway siding from the nearest rail access point.

The advantage in total logistics cost—which formed nearly 40 per cent of the cost of delivered product—for coastal shipping was over Rs 1 crore for the raw material from Daitari, as compared to rail, whose total cost was Rs 3.25 crore. Similar advantages would accrue for the other raw material sources. Another interesting dimension for this company was the choice of market based on logistic competitive advantage. The finished product, i.e. sponge iron, could use the returning empty vessels to the east coast at an additional transportation cost of Rs 140 per tonne (the inbound full cost of transportation including the empty return of the vessel was Rs 260/tonne), while rail would cost anywhere between Rs 382 to Rs 544 per tonne.

In this instance, for coastal shipping, the costs due to inventory, handling and losses would be significant since the inherent value of sponge iron was Rs 4,000 per tonne (as opposed to Rs 250 per tonne for iron ore). However, the total costs were still in favour of using the coastal route and servicing a market with competitive advantage over other suppliers who were located closer to the eastern markets. The same was true for markets near Mangalore.

Table 21.5: The share of logistics cost in the value chain

<table>
<thead>
<tr>
<th>Raw material cost at source</th>
<th>Inbound logistics cost</th>
<th>Raw material cost at plant</th>
<th>Cost of conversion</th>
<th>Finished goods cost at plant</th>
<th>Outbound logistics cost</th>
<th>Cost of delivered product</th>
<th>Profits and taxes</th>
<th>Selling price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1575</td>
<td>435</td>
<td>2010</td>
<td>580</td>
<td>2590</td>
<td>935</td>
<td>3525</td>
<td>750</td>
<td>4275</td>
</tr>
<tr>
<td>45%</td>
<td>12%</td>
<td>57%</td>
<td>16%</td>
<td>73%</td>
<td>27%</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 21.6: Desired services and modal choice along the west coast

(south to north)

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Organisation</th>
<th>Product</th>
<th>Market/customer</th>
<th>Volume</th>
<th>Current mode mix</th>
<th>Key services desired</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Bulk items</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FACT</td>
<td>Caprolactum, fertilisers</td>
<td>Mumbai, TN, Kerala</td>
<td>36500 tonnes p.a.</td>
<td>Road for rail for caprolactum fertilisers</td>
<td>Low prices, low freight charge</td>
</tr>
<tr>
<td>2</td>
<td>IPL</td>
<td>Fertilisers</td>
<td>Entire eastern India</td>
<td>Significant</td>
<td>Road/rail</td>
<td>Low freight charge</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-bulk items</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Rubber board</td>
<td>Rubber</td>
<td>Kochi, Mumbai, Rajasthan</td>
<td>5 lakh tonnes p.a.</td>
<td>Road</td>
<td>Door-to-door delivery, insurance, safety, quick transit time</td>
</tr>
<tr>
<td>4</td>
<td>Rubber mark</td>
<td>Rubber</td>
<td>North &amp; east India</td>
<td>1.5 lakh tonnes p.a.</td>
<td>Road</td>
<td>Door-to-door delivery, insurance, safety, price, quick transit time</td>
</tr>
<tr>
<td>5</td>
<td>TTPL</td>
<td>Titanium dioxide</td>
<td>Mumbai, Gujarat</td>
<td>5760 tonnes p.a.</td>
<td>Road</td>
<td>Door-to-door delivery, reliability, price</td>
</tr>
<tr>
<td>6</td>
<td>EICL</td>
<td>Kaolin</td>
<td>North, west &amp; south (for north and west)</td>
<td>42000 tonnes p.a.</td>
<td>Road/rail</td>
<td>Cost, door-to-door delivery, better tracking, single window</td>
</tr>
</tbody>
</table>
**Table 21.6: Desired services and modal choice along the west coast**

* (contd...) (north to south)

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Organisation/Product</th>
<th>Market/customer</th>
<th>Volume</th>
<th>Current mode mix</th>
<th>Key services desired</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bulk items</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>FCI Foodgrains</td>
<td>Palghat</td>
<td>Significant Rail</td>
<td>Price</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>DCW Salt and flour</td>
<td>All-India for Gandhidham plant</td>
<td>1.5 lakh tonnes p.a. Road</td>
<td>Rake, single window</td>
<td></td>
</tr>
<tr>
<td><strong>Non-bulk items</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Godrej GE White goods</td>
<td>South Indian market</td>
<td>Significant plus subsequent advantages in the form of other sister concerns using rail Own containers road/rail Containment, safety, speed, cost</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>CEAT Tyres</td>
<td>Kochi for raw materials and all-India for finished products</td>
<td>36,000 tonnes p.a. Road</td>
<td>Cost, door-to-door service</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gujarat Ambuja Cement</td>
<td>Gujarat, Maharashtra &amp; Kerala</td>
<td>60–72 rakes p.a. Coastal vessels</td>
<td>Damages in monsoon will be saved</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Mahindra &amp; Mahindra Utility vehicles</td>
<td>All-India</td>
<td>30% of the total production Rail &amp; road</td>
<td>Bulk: economies of scale</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Asian Paints Paint besides raw materials including titanium dioxide</td>
<td>All-India</td>
<td>Significant Road</td>
<td>Door-to-door delivery, quick transit, insurance, etc.</td>
<td></td>
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### Table 21.7: Port productivity parameters for coastal traffic at major ports

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Loaded coastal (mt)</th>
<th>Percentage of loaded</th>
<th>Cumulative %</th>
<th>Average turnaround time (days)</th>
<th>Average pre-berthing time (days)</th>
<th>Average parcel size (tonnes)</th>
</tr>
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<tbody>
<tr>
<td><strong>Haldia</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Coal/coke</td>
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<td>68.3</td>
<td>68.3</td>
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<td>POL (product)</td>
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<tr>
<td>Coal/coke</td>
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<td>85.9</td>
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<td>7.1</td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>POL (product)</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
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<td></td>
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<td></td>
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<tr>
<td>POL (crude)</td>
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<td>2.5</td>
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<td>2.5</td>
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<td>100.0</td>
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<tr>
<td><strong>Total</strong></td>
<td>7.6</td>
<td></td>
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<tr>
<td><strong>Visakhapatnam</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Iron ore</td>
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<td>25.7</td>
<td>25.7</td>
<td>7.0</td>
<td>2.4</td>
<td>68220</td>
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<tr>
<td>Coal/coke</td>
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Table 21.7: Port productivity parameters for coastal traffic at major ports (contd...)

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Unloaded coastal (mt)</th>
<th>Percentage of unloaded</th>
<th>Cumulative %</th>
<th>Average turnaround time (days)</th>
<th>Average pre-berthing time (days)</th>
<th>Average parcel size (tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tuticorin (unloaded coastal to total unloaded cargo is 66.3%)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Coal/coke</td>
<td>5.2</td>
<td>92.9</td>
<td>92.9</td>
<td>5.1</td>
<td>1.1</td>
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<tr>
<td>Total</td>
<td>5.6</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Kolkata (unloaded coastal to total unloaded cargo is 47.7%)</td>
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<td>POL (product)</td>
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<td>2.2</td>
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<tr>
<td>Chennai (unloaded coastal to total unloaded cargo is 46.5%)</td>
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</tr>
<tr>
<td>Coal/coke</td>
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<td>76.8</td>
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<td>100.0</td>
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<td>Total</td>
<td>11.2</td>
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</tr>
<tr>
<td>Kochi (unloaded coastal to total unloaded cargo is 41.8%)</td>
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<td></td>
</tr>
<tr>
<td>POL (crude)</td>
<td>4.1</td>
<td>97.6</td>
<td>97.6</td>
<td>4.3</td>
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<tr>
<td>Other cargo</td>
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<td>Total</td>
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<tr>
<td>Visakhapatnam (unloaded coastal to total unloaded cargo is 38.6%)</td>
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<tr>
<td>POL (crude)</td>
<td>3.3</td>
<td>55.9</td>
<td>55.9</td>
<td>2.3</td>
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<tr>
<td>POL (product)</td>
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<td>37.3</td>
<td>93.2</td>
<td>2.3</td>
<td>0.6</td>
<td>23320</td>
</tr>
<tr>
<td>Iron ore (raw/pellets)</td>
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<td>6.8</td>
<td>100.0</td>
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<td>68220</td>
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<tr>
<td>Other cargo</td>
<td>*</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>5.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mormugao (unloaded coastal to total unloaded cargo is 33.8%)</td>
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<tr>
<td>POL (product)</td>
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</table>
APPENDIX 5

Important recommendations of the working group on coastal shipping, 1993

(a committee constituted by the Government of India)

Procedural

1. Coastal shipping should be removed from the purview of strict day-to-day control of Customs Act, 1962 and should not be subject to any customs control like any other mode of domestic transport though customs authorities should have the full right to board any coastal ship, at any time, if they have reason to suspect smuggling activity.

2. Till recommendation no.1 is accepted, the bill of coastal goods which is analogous to railway receipt/road receipt, that gives only a description of goods should serve the purpose as already provided in regulation 2/section 92 of the Customs Act, 1962 at loading and unloading ports.

3. A manifest in the nature of a single document serving all the consignees should ultimately replace the bill of coastal goods. This is as mutually decided between shipowners/operators and customs.

4. A periodic port clearance should be given to coastal ships serving on dedicated coastal routes extending up to one year by the customs.

5. The single-addressee format as devised by the working group should be brought into force that will satisfy the requirements of all authorities concerned on whose behalf the customs insist upon a multiplicity of documents at present before issuing port clearance.

6. The port officer of the loading port, instead of the customs, should be the last agency on behalf of the various statutory authorities involved in the issue of port clearance, who should be responsible for receiving the single-addressee condensed format.

7. All the port and other dues payable by the coastal shipping should be collected by the port officer concerned as the last clearing agency on behalf of other departments.

Manning

8. The manning scales applicable to the coastal shipping at present should be brought down considering that for a pure coastal ship, port state control and safety aspect are not applicable as they are in the case of foreign-going ships.
Infrastructure

9. The Pamban channel south of Tamil Nadu should be widened and deepened so as to facilitate movement of coastal vessels of the size of about 3000 tonnes avoiding circumnavigation around Sri Lanka. This should result in saving in terms of fuel costs and standing charges associated with extra period of voyages, making coastal shipping more competitive.

10. Private entrepreneurs/parties should be allowed to participate in the development of minor ports and invest funds, which could be allowed to be recovered through appropriate levies in a reasonable way.

11. The central government should provide funds for the development of minor ports unto a threshold level, which can further give impetus to coastal shipping. The minimum level of development should include provision of sheds, deepening of berth area and navigational channels by dredging, handling equipment, etc. To start with, Gopalpur, Krishnapatnam, Cuddalore, Nagapattinam, Karwar and Old Mangalore could be allotted funds. (It is interesting that the committee did not recommend any ports in Gujarat or Maharashtra, presumably because these states have already made plans to develop their minor port infrastructure.)

Fiscal

12. Coastal shipping should be given following concessions to make them financially viable:

(a) Increase depreciation rates from the present 20 per cent to 33.33 per cent under the Income Tax Act.

(b) Tax holidays for coastal shipping specially the Ro-Ro vessels, as these were highly environmental-friendly.

(c) Exemptions from customs duty on import of spares for coastal ships.

(d) Concession in bunker supply to coastal ships/Ro-Ro vessels.
APPENDIX 6

Cabotage law in India—an international comparison

Cabotage has been derived from the French word *cabot* meaning ‘small vessel’ and refers to the set of rules and regulations that govern coastal shipping in a country. It usually takes shape in the form of exclusive reservation by the state of commercial operations between ports in that country for their own national flag vessels. The broad purposes cited by all countries as the basis for such laws are to assure reliable domestic shipping services and the existence of maritime capability that is completely subject to national control in times of war and national emergency.

Cabotage laws are based on the following four parameters:

- Reservation of the trade for vessels registered and flagged in the same country
- Vessel ownership by a company incorporated in the same state and whose shareholders are citizens of the state
- Vessel manned by crew of the same nationality
- Vessel built and repaired in yards belonging to the same state

Additionally, these laws could place re-flagging restrictions where a vessel that had been flagged in a different registry in the past might not enjoy domestic trading privileges (as in the US and Brazil) even after it is re-flagged in the domestic registry. Subsidies could be extended to the shipowners in various direct and indirect forms to encourage participation in the domestic coastal trade.

1. Cabotage laws in India

The issues in Indian context are:

- How stringent are Indian cabotage laws vis-à-vis other countries?
- Should Bare Boat Charter-cum-Demise (BBCD) vessels be allowed domestic trade privileges?
- How much do the cabotage laws cost to the shippers in the form of higher cost?
- Cabotage laws are dredging

2. Indian cabotage laws vis-à-vis other countries

Cabotage laws in India are governed by section 407 and 408 of the Merchant Shipping Act, 1958. These regulations place restrictions on vessel flag and crew. While ownership restrictions were there till a few months back, recent decision by government to allow foreign direct investment of up to 74 per cent under the automatic route and even 100 per cent on a case-to-case basis has led to annulment of this clause.
No restrictions are placed on the place where the vessels are built, in contrast to cabotage laws in some countries like the US where only vessels built in the US yards are eligible for domestic trade. A US-built vessel that is rebuilt overseas also loses its domestic trading privileges. Further, no direct or indirect subsidies are granted to shipowners involved in coastal trade.

Implementation of these laws is also lackadaisical. The S. N. Kakar Committee on Draft Coastal Shipping Act has observed that ‘… deployment of foreign vessels in our coasting trade is a regular occurrence and some quarters have alleged that this is taking place even when adequate numbers of Indian ships are available. This is perceived to deprive Indian vessels of opportunities of rightful participation in the coastal operations…’

The committee called for laying down of clear-cut guidelines for prohibiting employment of foreign flag vessels in India’s coastal trade when Indian ships are available and for ensuring that foreign flag vessels are permitted to operate in coastal trade on case basis.

International comparison highlights that cabotage laws in India are in fact not very stringent compared to such countries as the US, Brazil, Greece and Japan. Even in case of other European Union countries like the UK, national cabotage laws have given way to ones that encompass the EU region.

3. **BBCD vessels and domestic coastal trade**

The cabotage laws in India are presently ambiguous, with a large number of grey areas. The recent controversy relating to domestic trading provisions for BBCD vessels highlighted this. The BBCD route was adopted a few years back to help domestic shipping companies acquire vessels through an easier method of financing.

From the nation’s perspective, exchange outgo, instead of being outright, is through multiple instalments spread over a period of time. While this does not seem pertinent today, during the foreign exchange crisis in the early 1990s, this method was invaluable in achieving the twin objectives of tonnage enhancement and lower foreign exchange outgo.

Subsequent to this, a few foreign companies established operators in India and acquired vessels through the BBCD route taking advantage of the clause that allowed such vessels to be treated at par with Indian flag vessels for all purposes including preference in the shipment of government cargo and cabotage cargo on the Indian coast.

The matter came to a boil last year when Indian Oil Corporation invited tenders from domestic shipping companies for transporting petroleum products along the
Indian coast. In this, such companies offered competitive tenders. This was opposed by domestic shipowners.

Vessels were acquired through the BBCD route not only by Pratibha Shipping (Norwegian Shareholding and Bahamas flagged vessels) and Amar Shipping but also by Essar and Varun. The beneficial ownership of the vessels lies with their subsidiaries in foreign countries and vessels flagged abroad (for example, Vanutu in case of Essar).

**Should BBCD vessels be allowed domestic trade?**

No, as far as the recent decision by the Ministry of Surface Transport (MoST) is concerned, the arguments against BBCD vessels being they were foreign-flagged and hence did not have to satisfy the stringent norms under the Indian flag. As a result, they are in a position to offer more competitive quotations than Indian-flagged vessels. As a compromise with MoST, Pratibha Shipping would convert all their vessels to Indian flag to qualify for coastal shipping.

The M.P. Pinto-led National Shipping Policy Committee has recommended that BBCD vessels in companies where foreign shareholding is more than 51 per cent should not be eligible for cabotage.

**Have cabotage laws led to complacency on the part of Indian shipowners and hence would deployment of BBCD vessels provide the much-needed competition to rejuvenate the sector?**

The Indian coastal fleet has stagnated at 0.7 million tonnes GRT over the last one decade. The average age of the fleet in India is almost 20 years. The sector is unable to compete with railways and roads despite having a large number of inherent advantages.

Two years ago, Poompuhar Shipping Corporation, owned by Tamil Nadu government, which is responsible for transportation of coal for power plants under Tamil Nadu Electricity Board, filed a request with the Director General of Shipping for hiring of foreign vessels alleging that Indian shipping lines act as a cartel to jack up charter rates.

Further, vessels are unable to meet the target discharge rates and thus are operating below desired efficiency levels.

**4. Higher costs to shippers**

A study done in 1991 by the US International Trade Commission found that cabotage laws in the US cost the consumers around US$3 billion in the form of higher prices.
Coastal trade in India is to the extent of around 45 million tonnes and thus shipping costs incurred are upward of US$600 million. Certain sections of the market feel that this cost could be reduced to the extent of at least US$50 million.

Efficiency gains would have multiplier effects on the economy as a whole. Thus reduction in, say, transportation costs of coal to power plants in Tamil Nadu would lead to lower cost of electricity generated, leading to savings to residents of Tamil Nadu. Increased savings would lead to higher consumption and hence greater industrial activity in the region. Consumption would also receive a boost from the lower cost of goods facilitated by the lower cost of production due to lower electricity charges. Thus, savings in ocean freight would have a multiplier effect on the economy as a whole.

However, supporters of cabotage law point out that savings are possible only at the expense of sacrificing national security and greater environmental risks. Tax on profits earned by domestic shipowners goes to the Government of India while in cases where foreign vessels are hired, tax income for the government is forfeited.

Presently, vessels in coastal trade are regulated under the Merchant Shipping Act, 1958 and are subjected to the same rules and regulations set for overseas vessels. The Kakar Committee on coastal shipping has recommended relaxation of several of these norms in such areas as manning, survey, etc., to reduce operating costs on running such vessels. It also recommended removal of custom duties on stores, spares and bunker. Implementation of such recommendations could lead to rectification of the present problem of higher cost to shippers even while only domestic ships are allowed to ply.

5. **Dredging industry**

The dredging industry also comes under the purview of cabotage laws. Removal of various restrictions on employment of foreign dredgers in India in 1992 has led to large multinationals like HAM, Boskali, Great Lakes, etc., setting up operators in the country. Foreign dredging companies handle around 30 per cent of the total dredging of 55 million cubic meters carried out in major ports in India.

It has been observed by the Indian National Shipowner’s Association in their annual report 1998–99 that ‘... a number of foreign flag dredgers were being employed by the Indian ports without obtaining any permission or license from D G Shipping in disregard of the provisions of the M S Act, thus depriving opportunity for employment to Indian dredgers.’

Cabotage laws have always been highly controversial in any country. Recent attempts to modify them in the United States have faced severe opposition. In India, there are numerous grey areas in cabotage laws and the Ministry of Surface Transport should attempt to plug the loopholes.
### Table 21.8: Comparison of cabotage laws in various countries

<table>
<thead>
<tr>
<th></th>
<th>India</th>
<th>USA</th>
<th>Norway</th>
<th>Japan</th>
<th>Greece</th>
<th>Brazil</th>
<th>UK</th>
<th>China</th>
<th>France</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabotage</td>
<td>Yes</td>
<td>Yes</td>
<td>Some</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Some</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Crewing requirements</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Ownership requirements</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Domestic construction provisions</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Re-flagging restrictions</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>Yes</td>
<td>NA</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>NA</td>
</tr>
<tr>
<td>Fleet subsidies</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>indirect</td>
<td>Yes</td>
<td>indirect</td>
</tr>
</tbody>
</table>

Figure 21.1: Major ports in India
NOTES

1. This chapter draws upon a study titled ‘Coastal Shipping: Scope of Integrating with the National Transport Network’, done under the aegis of the 3i Network.

2. Chennai and Visakhapatnam, which also have refineries, appear to distribute their output by land. Imported crude obviously moves directly to the refinery ports.

3. Measured loaded coastal traffic is 37.6 mt, while measured unloaded traffic is much higher. This is one of the discrepancies that need to be addressed with better data.

4. Under this system, bulk users enter into a contract with shipping companies to provide a guaranteed level of usage, in return for contracted rates of carriage and assured availability of shipping capacity. It is not necessary for the shipping company to own the required capacity; it may lease it from other service providers.

5. Currently, a new port called Ennore port is being constructed, just north of Chennai, both to serve the thermal power station located close by and to remove the congestion and pollution in the city of Chennai due to coal handling. Ennore port will supply coal to the neighbouring thermal power station by conveyor belt and to Mettur by rail. This project is partly funded by the ADB and takes care of necessary integration with the rail and conveyor belt system for proper evacuation.

6. In future, there is a possibility that this traffic might come down due to investments in pipeline, though the main target of this investment is the road and rail movement. Almost all the pipelines including those proposed are hinterland pipelines from the ports, leading away from the sea. The only ‘coastal’ pipeline is the one from Visakhapatnam to Vijayawada, whose lead is too small for coastal shipping to be an alternative. If a common carrier pipeline network of reasonable length and density comes into place, then some of the port-based refineries may be in a position to service hinterland areas directly by pipeline, rather than coastal shipping and rail/road. Similarly coal traffic could be impacted by the development of a reliable national electricity transmission grid.

7. Coastal shipping by captive users could think of parcel sizes most economical to their operations, e.g. TNEB for coal, oil companies for POL, Essar for iron ore, etc., just as they already do.

8. Even in a situation where private participation in providing access is permitted, as for example in two recent Gujarat ports, access to the remaining rail network will continue to be an issue.

9. To establish the economies of gearing at ports rather than ships, consider the following: A given level of non-bulk originating coastal traffic (say 50 million tonnes per annum) would need 667 ships of 3,000 dwt. and 140 jetties. For the same loading/unloading effectiveness, a crane on a ship is more expensive not only for investment, but also for operating costs. On top of this, the number of shipboard gearing requirement would be more than four times the port-based equipment. Thus, port-based gearing is likely to be more economical than ship-based gearing, and also easier to implement since the private sector shipowners would want to keep their investment costs low.
10. There are signs of improvement in their consumer-orientation, e.g., the launching of scheduled container services.

11. Indonesia is an example of a country with significant coastal shipping where separate ports/jetties are earmarked for coastal movement.


13. Source: Based on Raghuram G and Mathew Dilip, ‘Laxmi Transformers: A Case Study,’ Logistics and Supply Chain Management: Cases and Concepts, Macmillan India Limited, New Delhi, 2000. The analysis was done for the mid-nineties. However, the relative costs would still be valid.


BACKGROUND

India has an extensive network of roads, the aggregate length of which is a little over 3.3 million kilometres (km). These comprise national highways, state highways, major district roads and rural roads, and a short length of expressways. It is estimated that 85 per cent of the passenger traffic and 65 per cent of the freight traffic is carried by roads. The national highways, which account for just two per cent of the total road network, carry around 40 per cent of the total traffic handled by roads, and so constitute the most important part of the road network.

Table 22.1: Road network in India

<table>
<thead>
<tr>
<th>Road category</th>
<th>Length (km)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expressways</td>
<td>200</td>
<td>—</td>
</tr>
<tr>
<td>National highways (NHs)</td>
<td>66,590</td>
<td>2%</td>
</tr>
<tr>
<td>State highways (SHs)</td>
<td>1,31,899</td>
<td>4%</td>
</tr>
<tr>
<td>Major district roads (MDRs)</td>
<td>4,67,763</td>
<td>14%</td>
</tr>
<tr>
<td>Rural roads</td>
<td>26,50,000</td>
<td>80%</td>
</tr>
<tr>
<td>Total</td>
<td>33,16,452</td>
<td>100%</td>
</tr>
</tbody>
</table>

The growth in the road network has not kept in step with traffic growth. It has been estimated that while freight traffic grew 120 times and passenger traffic 100 times in the six decades since Independence, road length has increased by only eight times. A few years ago, a report of the World Bank described India’s network of roads as a ‘very large network of low standard roads’. In fact, at the beginning of the
millennium there were few high-capacity highways and only 15 per cent of the national highways had four lanes.\textsuperscript{5}

Till 1999, road construction and maintenance activities were largely financed through budgetary resources and sometimes through borrowings from multilateral agencies such as the World Bank and the Asian Development Bank. The financial resources for the sector were inadequate, as a result of which capacity addition was minimal and low maintenance budgets resulted in poor quality of roads. The charge structure for roads was linked to vehicle ownership and little to usage, through levy of a motor vehicle tax, only a small portion of which was made available for road maintenance. Poor maintenance also resulted in adverse safety conditions with fatalities on national highways exceeding 100,000 per year. The role of the private sector was limited to that of being contractors under construction and maintenance contracts. Given the high growth potential of the economy (targeted GDP growth rates of 6–8 per cent per annum) and recognizing the critical role that roads have as an economic multiplier, the Government of India (GOI) took various initiatives for the rapid development of this sector.

**INITIAL INITIATIVES**

To begin with, the National Highways Authority of India (NHAI) was set up to develop and manage the national highway network. Recognising the role that the private sector played, various legislative amendments\textsuperscript{6} were made enabling the levy of fees/tolls for use of roads, granting land acquisition powers to NHAI and enabling private sector involvement in the development and management of roads. Other legislations enacted from the mid-nineties onwards also had a beneficial impact on the roads sector.\textsuperscript{7} In 1998, a Taskforce on Infrastructure\textsuperscript{8} was constituted by the prime minister\textsuperscript{9} under which a national road development programme called the ‘National Highway Development Project (NHDP)’ was launched at an estimated investment of Rs 540 billion (US$12 billion).

The project involved four-laning of a 13,000-km stretch of national highways to be implemented in two phases. The first phase covered expansion of 6000 km of highways to four lanes on the ‘Golden Quadrilateral’—national highways connecting the major cities of Delhi, Mumbai, Chennai and Kolkata and the second phase—four-laning 7000 km of national highways on the North–South (Srinagar to Kanyakumari) and East–West (Porbandar to Silichar) axes (called the NSEW Project). Ambitious timelines were set for their completion and NHAI, as the implementing agency, was given the responsibility for execution of the project.

Since it was the first time that an infrastructure project of such a scale and magnitude was conceived in India, there were anxieties over how the NHDP would be financed.
An innovative mechanism was evolved by the Task Force—which involved levy of a cess on fuel, which would go into a special purpose fund (Central Road Fund) created for this purpose and used exclusively to finance roads. To make the plan politically acceptable across the spectrum of interest groups, 50 per cent of the cess collected (on diesel) was earmarked for the development of village roads under a separate programme. The NHAI, in addition, raised funds from the domestic capital markets through a bond issuance programme and through borrowings from multilateral institutions to part finance the programme.

**Use of Public–Private Partnerships**

A few stretches of highways on the Golden Quadrilateral (about 10 per cent of the length) were initially implemented under build, operate, transfer (BOT) concessions—some involving direct tolling (levy of user fees) and others under a half-yearly availability payment structure (commonly referred to as annuity payment-based structure). A transparent selection process through international competitive bidding and objective bidding parameters was put in place. Model concession agreements (MCAs) were developed for these public–private partnership (PPP) structures and, in order to enhance viability and bankability of projects, direct tolling projects were made eligible for a capital grant (which then became the sole bidding parameter). The initial results with PPP were encouraging; in particular, the eight annuity projects implemented on the Golden Quadrilateral were all completed well ahead of schedule. A few more projects were then proposed for implementation under PPP structures in Phase 2 of the NHDP. Subsequently, an additional 10,000 km were identified—to be implemented through PPP structures, both as direct toll and annuity payment-based concessions.

**Redefining the NHDP**

After the new government was formed in 2004, a committee on infrastructure headed by the prime minister was constituted. The committee has since redefined the contours of the programme to cover additional stretches of national highways to be implemented in seven phases at an aggregate cost of Rs 2200 billion (US$49 billion). The subsequent phases of the NHDP envisage a major role for the private sector with the bulk of the projects to be implemented under direct toll-based BOT concessions. Procurement would be through a competitive bidding process and awarded to the bidder quoting the lowest capital grant or highest premium (for direct toll projects), lowest annuity payment or the lowest EPC contract price. The MCA for direct toll concessions has also been revised with the objective of addressing issues such as further capacity augmentation and uncertainty in traffic. A brief summary of the redefined NHDP is set out in Table 22.2.
Table 22.2: Redefined NHDP13

<table>
<thead>
<tr>
<th>NHDP phase (completion date)</th>
<th>Particulars</th>
<th>Length (in km)</th>
<th>Indicative cost (Rs billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHDP I &amp; II (Dec 2009)</td>
<td>Balance work of GQ and ES-NS</td>
<td>8,474</td>
<td>524.34</td>
</tr>
<tr>
<td>NHDP III (Dec 2012)</td>
<td>4-laning (direct toll)</td>
<td>10,000</td>
<td>651.96</td>
</tr>
<tr>
<td>NHDP IV (Dec 2015)</td>
<td>2-laning (direct toll/annuity)</td>
<td>20,000</td>
<td>278.00</td>
</tr>
<tr>
<td>NHDP V (Dec 2012)</td>
<td>6-laning of selected stretches (direct toll)</td>
<td>6,500</td>
<td>412.10</td>
</tr>
<tr>
<td>NHDP VI (Dec 2015)</td>
<td>Development of expressways (direct toll)</td>
<td>1,000</td>
<td>166.80</td>
</tr>
<tr>
<td>NHDP VII (Dec 2014)</td>
<td>Ring roads, bypasses, grade separators, service roads, etc.</td>
<td>NA</td>
<td>166.80</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>45,974</td>
<td>2,200.00</td>
</tr>
</tbody>
</table>

FINANCING THE NHDP

A financing plan for the NHDP has been prepared for the period up to the fiscal year (FY) 2031, as summarised in Table 22.3. PPPs are now the option of choice for implementation of the bulk of identified projects in the NHDP with a preference for direct tolling, followed by annuity-based contracts or hybrids of these two types. This would make private finance the biggest component of financing and would offer opportunities for banks, financial institutions and other debt investors that would include insurance companies and mutual funds.

The cess collected would continue to be a significant source for payment of the capital grant for the direct toll projects, annuity payments and construction payments under construction contracts. The cess inflows would be leveraged to the extent necessary by NHAI through local capital market borrowings from time to time. There is a low dependence both on external funding (by way of multilateral borrowings, syndicated loans or capital market issuances) and government budgetary sources. India is indeed becoming the champion of PPPs in the region.

Table 22.3: Financing plan for NHDP14

<table>
<thead>
<tr>
<th>Description (Amounts in Rs billion)</th>
<th>FY 06 to FY 16</th>
<th>FY 17 to FY 31</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Towards projects</td>
<td>2200</td>
<td>—</td>
<td>2200</td>
</tr>
</tbody>
</table>
ENABLING PRIVATE INVESTMENT

Various steps taken over the last decade have resulted in a growing confidence that implementation of a programme of the envisaged magnitude would be possible. A dedicated source of funding through cess receipts and its ring-fencing within the Central Road would give investors the needed confidence that a sustainable financing mechanism for making the capital grant (viability gap) and annuity payments is available. MCAs, widely discussed with various stakeholders, are in place. Foreign direct investment up to 100 per cent of the equity is permitted and concession periods up to 30 years may be offered. Fiscal incentives such as duty-free import of high capacity and modern construction equipment and 100 per cent tax exemption for a period of ten years in a block of twenty years, would serve to improve returns on investment and achieve greater cost efficiency in implementing projects.

One of the comforts available to investors is NHAI’s obligation to acquire land and deliver the site free of encumbrances to the investor. In addition, preliminary clearances from environment and forest authorities are procured by NHAI under the concession contract. This would take away a lot of uncertainty in project implementation and help the private investor focus on timely execution of the project—a risk that the private sector can manage best. Depending on individual risk appetites, the private sector would have opportunities for investment in direct toll or annuity payments-based projects or as contractors, equipment suppliers, financial investors or lessors of equipment.

Table 22.3: Financing plan for NHDP (contd...)

<table>
<thead>
<tr>
<th>Description</th>
<th>FY 06 to FY 16</th>
<th>FY 17 to FY 31</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOT direct toll</td>
<td>1485</td>
<td>0</td>
<td>1485</td>
</tr>
<tr>
<td>BOT annuity</td>
<td>315</td>
<td>0</td>
<td>315</td>
</tr>
<tr>
<td>EPC/land/project development</td>
<td>400</td>
<td>0</td>
<td>400</td>
</tr>
<tr>
<td>Annuity/debt servicing</td>
<td>525</td>
<td>1675</td>
<td>2200</td>
</tr>
<tr>
<td>Total utilisation</td>
<td>2725</td>
<td>1675</td>
<td>4400</td>
</tr>
<tr>
<td>Private finance</td>
<td>1270</td>
<td>0</td>
<td>1270</td>
</tr>
<tr>
<td>Cess (up to 2030)</td>
<td>800</td>
<td>1540</td>
<td>2340</td>
</tr>
<tr>
<td>External funding</td>
<td>95</td>
<td>0</td>
<td>95</td>
</tr>
<tr>
<td>Internal/budget resources</td>
<td>90</td>
<td>120</td>
<td>210</td>
</tr>
<tr>
<td>Market borrowings</td>
<td>470</td>
<td>15</td>
<td>485</td>
</tr>
<tr>
<td>Total sources</td>
<td>2725</td>
<td>1675</td>
<td>4400</td>
</tr>
</tbody>
</table>
To date, of the more than 200 projects that have been identified by NHAI, it is estimated that over 75 projects (both direct tolling and annuity) have been awarded. The typical investment requirements (total project cost) fall in the range of Rs 2 billion to Rs 5 billion (US$44 million to US$110 million) per project, the length of stretches range from 25 to 130 km and the estimated EPC costs of the four-laning projects range from Rs 50 million to Rs 90 million per km (US$1.1 million to US$2 million).

**PPPs in state highways**

The public works departments of state governments manage the large network of state and district roads. In some states, dedicated state-owned road companies have been set up to develop and manage a part of these networks. So far, 103 projects of a total value of Rs 110 billion (US$2.5 billion) have been reported as being implemented under PPP frameworks, the bulk of the projects being in the states of Andhra Pradesh, Madhya Pradesh, Rajasthan, Maharashtra, Punjab and Karnataka. A model concession agreement for state highways has been developed and direct based-BOT projects on state roads would be eligible for viability gap support from the Central Government. Especially noteworthy is the development of an urban road development project under an annuity payment-based BOT structure in Thiruvananthapuram city in the southern state of Kerala; unfortunately delays in land acquisition have affected the implementation of this project.

**Managing traffic risks**

Estimating future traffic posed the single most important challenge for direct toll-based BOT projects. When BOT projects were initially offered to private investors, the response was limited since traffic risk was perceived to be high; there was a lack of authentic historical data on traffic on which to base projections and the risk of a competing facility coming up in the vicinity. Some of the initial projects also reported traffic below estimates and the refusal by users to pay tolls in one or two cases were causes for concern. A few projects also needed debt restructuring due to the inadequacy of cash flows. An exercise undertaken on a sample of projects financed by the IDFC, with an operating history of over three years shows the variance of actual traffic from the initial estimates made by investors.

**Table 22.4: Variance in traffic**

<table>
<thead>
<tr>
<th>Location of project</th>
<th>No. of years</th>
<th>Cars (%)</th>
<th>LCVs (%)</th>
<th>Trucks (%)</th>
<th>MAVs (%)</th>
<th>PCUs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project in NW India</td>
<td>3</td>
<td>23.20%</td>
<td>16.97%</td>
<td>-5.61%</td>
<td>12.35%</td>
<td>5.20%</td>
</tr>
<tr>
<td>Project in W India</td>
<td>5</td>
<td>16.40%</td>
<td>5.50%</td>
<td>3.00%</td>
<td>4.00%</td>
<td></td>
</tr>
<tr>
<td>State project in W India</td>
<td>5</td>
<td>6.74%</td>
<td>0.15%</td>
<td>5.90%</td>
<td></td>
<td>5.80%</td>
</tr>
</tbody>
</table>
Typically, traffic studies are based on multiple regression models where the key independent variables and their elasticities are based on historical data. The model so developed is validated on the basis of current traffic counts and projected into the future. In addition to the projections made by the government authority and the project sponsors, financial investors get independent traffic counts and traffic studies done by their own consultants. Past traffic data and actual growth rates witnessed in BOT projects on the same road or in close proximity are useful inputs. In addition, willing-to-pay studies which serve as a useful indicator of the ability and propensity of users to pay toll are usually undertaken. Based on these inputs, the projected cash flow model is subjected to sensitivity analyses for various scenarios of traffic which help set out the boundary conditions for financing the project. With more and more projects getting implemented, the availability of reliable information has increased, and this will enhance our understanding of the sector.

The MCA seeks to address the traffic risks and offers comforts to investors in a variety of ways. Apart from payment of capital grant up to 40 per cent of project cost, it provides for indexation of tolls (linked to the inflation index), treats widespread non-payment of tolls as a non-political force majeure event (with consequent liability on government in case of termination), adjusts to concession period for variation in traffic and to encourage payment of tolls provides concessions in user fees for local traffic. A state support agreement as well as a substitution agreement with lenders would also be signed. In the event of termination due to a concessionaire event of default (EoD), the MCA protects debt to the extent of 90 per cent, which is a significant comfort to lenders. As a result, local bank financing is easily available for toll road projects. Recent innovations also include refinancing of debt through securitisation of toll and annuity receivables.

FUTURE OUTLOOK

As the pace of the programme intensifies, there will be several challenges for all stakeholders involved in the process. NHAI would need to prepare and manage bidding processes (for up to 5000 km each year) and administer contracts in a
sustainable manner. Managing the processes of acquiring land and getting the needed environment clearances for the entire length of highways would pose a huge challenge. This would mean quickly putting in place an organizational structure geared to handle these requirements while at the same time ensuring that the quality of project preparation was not sacrificed in the interest of speed.

As more stretches get tolled, direct costs to road users will increase which, in turn, could have an inflationary impact on transportation costs. Coupled with the increases in fuel prices this may reduce margins for road transporters and make road transport less competitive vis-a-vis rail transport. Road transporters have been protesting at NHAI stakeholder meetings over both direct and indirect user charges (cess on fuel) being levied; however, the protests have so far been muted since the benefits of improved highway quality outweigh the costs and may remain so for some time. There would be pressure on getting timely deliveries of the envisaged quantum of materials—cement, steel, bitumen and aggregates of the required order as well as the equipment required for construction. Given the overall pace of growth in the economy, it is reasonable to expect that adequate capacities would be created in the economy to meet these needs.

There would be challenges of creating capacity across the spectrum of activities. The initial projects have thrown up a new class of local BOT entrepreneurs. While some of these are infrastructure project developers, the majority are construction contractors who have made a transition to becoming investors in projects. Very few international investors (mainly from Malaysia) have won BOT projects and so it remains to be seen if the pace of the programme could be sustained by local investors. Consulting capacity for technical services such as project preparation, contract management (independent engineers/lenders’ engineers) and project supervision, financial and legal services certainly needs enhancement as the NHDP rolls out.

Another challenge would be in finding the level of private financing for these projects as exposure limits and liquidity of the banking system get fully utilized. It is expected that insurance companies and the domestic capital markets would have a much larger role to play as the NHDP gets going over the next few years.

**Returns for Equity Investors**

Toll road projects present opportunities for equity investors looking for high upsides from traffic growth. These could be attractive for private equity investors since construction risks can be reasonably managed. For investors looking for more stable returns, such as project equity funds or insurance companies, annuity projects could provide the steady cash flows that are needed. While investors seek to maximize the quantum of debt in projects to enhance equity returns, this has rarely exceeded
80 per cent of the project cost. It is common for investors to bid for projects in a consortium in order to spread risks across a portfolio. Consequently, sponsor groups have made public offerings of the equity shares of holding companies (for a stable of projects), which have found attractive valuations. As a result, several new equity funds are being set up or contemplated, which could provide the needed risk capital for the NHDP.

Equity investors have not been very happy with the protection afforded in the MCA for equity investment—no compensation is provided in case the concession is terminated due to a concessionaire EoD and is inadequate in case of an NHAI EoD or upon the occurrence of a political force majeure event. However, the attractiveness of the individual projects offered and the overall confidence in the robustness of the programme have seen all projects get bids; we expect this confidence to continue in the near future.

**IDFC AND ROAD PROJECTS**

IDFC, itself set up as a PPP with a mandate to lead private capital to infrastructure projects, has invested across the energy, telecom, transportation and urban infrastructure sectors. While its focus so far had been project financing—largely senior debt, it is increasingly investing in mezzanine capital and equity. Its wholly-owned asset management company, IDFC Private Equity, manages two private equity funds exclusively focused on infrastructure, aggregating US$630 million. IDFC has introduced several new financial products for infrastructure in India which include subordinated debt structures and non-funded products like risk participation and take-out finance. It offers a range of investment banking and advisory services and has total assets of about US$4 billion.

IDFC is the market leader in financing of private sector road projects. To date, 46 deals have been approved and 26 disbursed since inception. Its current exposure to the sector stands at US$560 million and the outstanding disbursals aggregate to US$385 million. Given its unique position and knowledge of the roads sector, IDFC is poised to play a significant role in the financing of the NHDP.

**Cherian Thomas**

**NOTES**

1. This paper was adapted from a presentation made by the author at the Asia Infrastructure Investment & Financing Summit, Singapore held from 29–31 January, 2007. Material from this paper was substantially used in subsequent articles by the author in two publications of Project Finance International, part of Thomson Reuters—one, titled 'The Future for the Road Sector', was included in a special
issue on India titled India Report 2007 dated February 2007, and the other, titled ‘Financing Road Projects in India’, was included in Infrastructure Finance: The Road Ahead, a PFI Market intelligence publication, edited by Rod Morrison and published in 2007.

2. The rest being carried by rail, air, through inland and coastal shipping and other modes.

3. From the NHAI website: nhai.org


5. The rest being two-lane or single-lane roads.

6. National Highways Act, 1956, the Indian Tolls Act, 1851, and various state highways legislations.


8. IDFC served as the secretariat to the Task Force.

9. The prime minister at the time was Atal Behari Vajpayee.

10. Initially on petrol and later covering diesel as well; now Rs 2 per litre.


12. With Dr Manmohan Singh as prime minister.


15. Sometimes these are called Departments of Buildings and Highways or Roads and Buildings.

16. From the website of the Committee on Infrastructure: infrastructure.gov.in.

17. Typically on facilities within or in the vicinity of urban areas.

INTRODUCTION

A public private partnership (PPP) is an arrangement between a public (government) authority and a private (non-government) entity by which services that are the obligation of or which have traditionally been provided by the public authority would now be provided by the private entity under a contractual arrangement (concession, licence or management contract) containing well-defined terms and conditions. Under this arrangement, the obligation to provide such services and consequent accountability to users would continue to vest with the public authority; though it chooses to deliver them through an entity best suited for this purpose.

This point needs reiteration in the current Indian context where PPPs are often seen as the solution to the country’s huge infrastructure deficit and where the bulk of investment in many infrastructure sectors is expected to come by way of private investment—that PPPs are not an end in themselves but one of the means of achieving an end. Internationally, the bulk of infrastructure investment, even in countries that have a significant involvement of the private sector in the provision of infrastructure services, is made by the state—with the level of private investment rarely exceeding 20–25 per cent of the aggregate capital formation in these sectors. This would assume even more importance in India where access to basic infrastructure services for the poor and marginalised sections of our population would continue to remain a concern in the next few decades.

WHY USE PPPs?

Sometimes PPP programmes are pursued because it is fashionable to do so and are the season’s current flavour. Most often, though, the reason for using PPPs is simply
because the state lacks the financial resources required for these investments. This in itself is not unjustified, given the high savings rate (~30 per cent) of the economy, the liquidity in the banking system and the risk appetite of equity investors—both strategic and financial. It is possible to significantly leverage private funds around limited public resources, especially for infrastructure services where commercial returns are possible with either little or no government support. This would also allow for channelising scarce public resources for social infrastructure.

PPPs have been successfully used to unlock the commercial value of various public assets and services—hotels and tourism assets, real estate, or telecom services. For these types of projects, return to the government in the form of an upfront premium, a concession fee or royalty is the key driver. However, the most important reason for using PPPs ought to be the sheer efficiency gain that they bring to the system—achieved by the equitable transfer of risks and responsibilities to the entity best suited to manage them. This is expected to result in value for money for users or the public entity, depending on the payment structure and a gain in efficiency—in terms of higher service and maintenance standards, improved access, better project management and project cost control mechanisms and so on. The value for money gains usually come from the benefits of combining innovative asset design, construction, and operations. A vivid example of lower costs to users through PPPs is the telecom sector which has seen a substantial reduction in STD calls charges and costs of mobile telephony—from Rs 16 per minute to less than a rupee. Consequently, even the poor have access to affordable telecom services and usage has grown several-fold.

**Types of PPPs**

PPP projects may be classified on the basis of how public funds are made available for these projects. Financially freestanding projects are those where the role of the public sector is limited to initial project development, land acquisition, and securing critical approvals such as preliminary environmental clearances. The private entity would undertake the project on the basis that costs and profits would be entirely recovered through charges for services to the users of these services. On the other hand, the public entity may purchase these services on behalf of users and the public sector partner pays for the services delivered by the private sector—either by way of a unit charge or by way of a periodical payment. It is possible to have hybrid structures—where, in order to enhance the viability and commercial attractiveness of the project the public entity may provide a viability gap support by way of a capital grant or through payments spread over the project life.
In joint ventures, the government also participates in the equity capital raised for the project as an equal or minority partner—the overall project control rests with the private sector. The initial railway PPP projects have been implemented through dedicated SPVs where the Ministry of Railways (MoR) has either an equal or controlling stake in the projects. Under this structure, there is a basic conflict of interest in the role of MoR as a concessioning authority, investor and EPC/O&M contractor—which does not allow for objective and speedy decision-making. Unless the directors nominated by MoR have the necessary understanding of PPPs and ability to take unbiased decisions, the joint venture structure is always less optimal than a pure private sector structure. More recently, MoR has awarded concessions to a few private investors for operating container train services across various sections of the network—it is a little early to judge the efficacy of these concessions and their financial viability.

In implementing PPPs, governments could have a range of options to choose from, as set out in Figure 23.1. While at one end of the spectrum—full privatisation and at the other end—works/services contracts, both do not constitute PPP contracts, there are different PPP options to choose from—management contracts (of the entire or bulk of the facility), O&M concessions and BOT concessions, depending on the specific need/requirement. The challenge is in using the right kind of PPP structure for a particular project—since most projects can be made amenable to PPP structures in one form or another.

Several variations of the BOT structure have been used both in India and abroad with acronyms such as BOOT, BOO, BOOST, BOLT, OMT and DBFO. The BOT structure is most widely used in India across various sectors. The BOLT model of the Railways was used mainly as a structure for financing and does not capture the O&M benefits in any significant manner. The applicability of various PPP options to different types of railway projects will be discussed in this paper later.

**Essential Features of PPPs**

In order to derive the best out of PPPs there are a few essential features that need to be incorporated in the PPP framework governing the project. They are as follows:

**Genuine risk transfer:** Risks need to be allocated between the public and private entities—to the party best able to manage them to ensure best value for money.
Over the last two decades, the private sector in India has successfully executed large projects in core sectors of the economy—cement, steel, power generation, oil refining, petrochemicals, roads, bridges, ports and industrial infrastructure—and has thereby acquired strong project management skills. All risks pertaining to design, construction, operations and maintenance, renewals and replacements can therefore be easily transferred to the private entity. The degree to which such demand (traffic) risk can be transferred varies with the extent to which there is a natural monopoly characteristic or where the quality of the services can directly affect demand.

**Output-based specifications:** PPP contracts would need to specify the service outputs required from the private entity rather than the configuration of the capital asset itself or how the service is to be delivered. The emphasis is on defining the type of service and performance standards required. No unnecessary constraints are placed on the private sector’s discretion to deliver these outputs through innovation in the design, financing, and construction of the physical assets, or in the method of subsequent O&M—the proviso being that the output standards—whether pertaining to design, construction, or O&M are fully met.

**Whole life asset performance:** The PPP contract would require the private entity to take responsibility and assume risk for the performance of the asset over the whole life of a project. This provides strong incentives to the private investor to optimise costs, both in construction and in O&M, to realise the efficiencies arising from long-term asset management.

**Performance-related payments:** Payments to the private entity under the PPP contract—whether as fees collected from users, or where the public entity purchases services—would be subject to performance in relation to specific and quantified criteria in the contract. These are derived from asset standards as well as standards of service and so the relationship and inter-operability between the output specification and the payment mechanism should be clearly set out in the contract. Typically, payments are made for the availability of the asset to deliver the agreed outputs, and/or for the performance of the private sector in terms of outputs achieved, and/or for the volume of usage of the asset.

**Prerequisites for successful PPPs**

Successful implementation of PPPs usually requires a comprehensive overhaul of the existing legislative, policy, and institutional frameworks, putting in place processes for adequate project development, equitable risk allocation, and inevitably a change in existing mindsets in dealing with the private sector. Some of the broad issues in the context of railway projects are discussed below.
**Enabling frameworks:** At a fundamental level, the public entity should have the enabling powers under the existing statute to transfer its responsibility under a contract. In most sectors, either legislative amendments needed to be carried out or new laws had to be enacted to allow for widespread private participation in the respective sectors. While the Indian Railways Act, 1989 (Railways Act) allows for the operations of the railways by a non-government railway it may be useful to have a section explicitly allowing for the grant of concessions. Interestingly, historically the Indian Railways started off as a collection of private railway “companies”, which were later amalgamated into the “Indian Railways” as a nationalised government entity. The earlier Indian Railways Act of 1890 therefore had this “PPP” provision. Similarly, the Indian Tramways Act of 1902 had the provision of private tram (rail based urban transport) system.

**Right regulation:** There is an inherent conflict in the role of MoR as the concessioning authority (regulator) under a BOT concession and as a competitor—moving cargo on sections that could serve as alternative routes—in projects where the traffic risk is taken up by the private entity. This has been an issue for MoR’s fully owned subsidiary—Konkan Railway Corporation and two of the SPVs. As more and more projects are sought to be implemented through PPPs, this issue would need to be addressed through an appropriate independent institutional structure that would ensure fair competition. Another issue of relevance is the exercise of setting tariffs—the powers for which vest with the central government and which get reset from time to time. Since there is no certainty about how tariffs would be set over the concession period, this issue could also dampen investor interest in these projects—unless tariff setting is also addressed through an independent regulatory mechanism.

**Project development:** PPP projects require far more rigorous project preparation than is currently undertaken for departmental construction. Where project development has been entrusted to Rail Vikas Nigam Limited (RVNL), this aspect has been substantially addressed through preparation of detailed project reports and bankability reports; however, given the plans to develop facilities such as stations, freight terminals, hotels and other commercial real estate through PPPs it is critical that the rigour of adequate and comprehensive project development on a format suitable for PPP projects, is systematised within the railways. Apart from providing accurate estimates of project costs, this would also be critical for the ex-ante value for value-for-money (VfM) analysis before award of projects.

**Equitable risk sharing framework:** A risk is any factor, event, or influence that that could threaten the successful completion of a project in terms of time, cost or quality or its subsequent operations. The process of project development is, therefore,
expected to identify and highlight the critical risks to which the project would be subjected. Some of the critical risks that could affect a project are set out below:

- Project development or planning risks—including the risk of obtaining various permissions;
- design risks—the risk of designs being deficient and the attendant consequences;
- construction risks—risks of price, quantity and time variation (overruns) leading to increase in the project cost, land acquisition delays/failures, unexpected technical hindrances, for example—unforeseen ground/sub-soil conditions, quality of construction being inadequate and contractor failure, among others;
- environmental and social risks—statutory action due to non-compliance with environment legislation, possible project delays due to protests by those dispossessed of their land or by environmental activists for perceived non-compliance with environmental laws;
- force majeure risks—risk of physical damage to the asset due to natural force majeure events—for instance from natural calamities like floods or earthquakes and events outside the control of both the parties;
- financing risks—funds of the right order and in a timely manner being made available to the project;
- commercial risks—revenue risks such as demand (traffic), tariff level and indexation, costs of operations and maintenance, other operations period risks (quality of road or safety of users);
- regulatory risks—change in law, early determination of the contract, expropriation and other general regulatory risks.

These risks would need to be addressed in the concession design. A key principle, as indicated earlier, is that risk should be allocated to the party best able to manage it. A typical risk allocation framework for railway projects is set out in Table 23.1.

### Table 23.1: Typical risk allocation framework for railway projects

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Allocation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning risk</td>
<td>Outline planning and related permissions may be retained by the public authority. Detailed planning and related permissions are normally passed on to the private entity.</td>
<td>There may, however, be occasions where transfer in whole or part is appropriate or unavoidable.</td>
</tr>
</tbody>
</table>
Table 23.1: Typical risk allocation framework for railway projects (contd...)

<table>
<thead>
<tr>
<th>Risk category</th>
<th>Allocation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design &amp; construction risk</td>
<td>Transferred to the private entity.</td>
<td>Private partner bears risk of cost and time overruns. The public authority retains the risk of changes to output specification/change of scope.</td>
</tr>
<tr>
<td>Operating risk and risks of technological obsolescence</td>
<td>Transferred to the private entity.</td>
<td>Penalties (suspension of payments/revenue sharing or tariff collection rights) for failure to meet service requirements.</td>
</tr>
<tr>
<td>Demand risk</td>
<td>May be retained by public authority, shared, or transferred depending on the project. It would be possible to transfer this risk to the private partner under a concession contract where the private partner can influence demand and/or forecast revenues with reasonable accuracy.</td>
<td>Demand risk transfer is done typically by permitting the private partner to recover costs through a revenue sharing arrangement or levy of tariffs on users.</td>
</tr>
<tr>
<td>Residual value risk</td>
<td>Could be transferred under concession contracts to ensure fitness of purpose throughout the duration of the contract.</td>
<td>In the initial concession contracts, there is a payment for the assets transferred back to the Railways at the end of the concession at the book value.</td>
</tr>
<tr>
<td>Financing risk</td>
<td>Usually, the project financing risk is fully transferred to the private partner under concession contracts.</td>
<td>—</td>
</tr>
<tr>
<td>Legislative risk</td>
<td>Often retained in part or full. The government/agencies are best placed to control regulatory and legislative risks. Discriminatory regulatory risks are usually fully absorbed by the public authority.</td>
<td>In many cases, a key issue could be whether a particular legislative/regulatory change is discriminating against the project, sector, or the individual private partner.</td>
</tr>
<tr>
<td>Inflation and force majeure risks</td>
<td>These are usually shared depending on the nature of the risks.</td>
<td>Insurable risks can be fully passed on to the private entity.</td>
</tr>
</tbody>
</table>

If risk is transferred inappropriately, the authority could end up paying a premium either by paying the private entity too much for a risk that it can manage more efficiently by itself, or by retaining a risk that the private entity is in a better position to manage. On the contrary, in case the authority tries to load inappropriate risks
on to the private entity, there could be either high risk-loading or loss of interest in the project. Inappropriate risk transfer in either case could lead to a “PPP failure”.

Reliable revenue sources: Under the tariff collection mechanism in the Indian Railways, it is not possible for concessionaires to collect freight directly from users for projects. This is because commercial operations would still remain with the Indian Railways. Direct collection could be possible only for projects like the container train concessions, or where both fixed infrastructure and train operations are concessioned for a closed circuit. For the initial projects, revenue to the concessionaire would be in the form of a proportionate share of the freight revenue, suitably reduced by a proportionate share of the cost of train operations and other overheads incurred by the railways. This is a cumbersome exercise and requires operating costs to be re-worked year after year—since standard costing techniques are not used by the railways this adds a lot of uncertainty to the expected cash flows. Further, there could be delays on account of reconciliation of the figures—which could result in delayed remittance of the concessionaire’s share of the freight revenue. This system passes on the operational inefficiencies of the Indian Railways to the concessionaire—throughout the concession period. It is also inequitable to the concessionaire—though the railways is a service provider in some sense (as an operator), it “holds the purse strings” and gets the first right for revenue collection and appropriation of expense.

It would be far more relevant to use a parameter such as access charge for the use of the section—standards (per ton km or per train km) could be developed for different cargo types in various geographical zones. The same, together with the agreed basis for increases, could be set out upfront in the bidding documents. This would enable passing on of the demand risk to the private investor in a far more efficient manner. Where demand risk cannot be passed on, the access charge could be a fixed periodical amount—fixed for different levels of operations (slabs could be based on tonnage carried or number of trains), so that there is the right incentive to adequately maintain fixed infrastructure to the required standards.

Transparent selection process: The process of selection of a private operator would be through an open competitive bidding process, using objective bidding parameters for evaluation of bids. A two-stage process, involving qualification and proposal stages has been used successfully across the various sectors where projects have been implemented under PPP frameworks. A set of standard documents is being developed by the Planning Commission for BOT projects which could serve as a useful guideline. What is important is that evaluation criteria at each stage should be unambiguous, objective and quantitative—to avoid any challenge after award of the project. Since most of the initial projects have been undertaken on the basis of
needs of strategic port investors, the departmental capacity in the Railways to manage these processes is limited. Given MoR’s intentions of developing PPP projects in different areas of the railways, it is important that standard documents are developed for different types of projects and necessary capacities built up to manage these processes efficiently for PPP projects.

*Value for money:* A detailed review of the costs and benefits of private sector involvement versus public alternatives must be undertaken to ensure that a PPP enhances the public benefit. This analysis is the financial test that compares the cost (or net return) to the public sector of implementing the project by itself with the cost of buying the service from the private sector (or the opportunity lost from not undertaking the service). This could be done by computing the present value of the cash flows for each alternative—with suitable public sector efficiency benchmarks based on past experience. These benchmarks would need to be based on a costing framework incorporating assumptions that are reasonable, transparent, and consistent with both current and expected efficiencies the public sector could attain. This would call for an initial identification and costing of risks in a way that is often unfamiliar in much of the public sector.

It is often argued that the benefits of private sector involvement do not always offset the higher borrowing cost and equity return expectations of private investors. Alternatively, the methodology of benchmarking the cost of a privately financed project against a conventionally financed public sector one may be contested. From a political perspective, the problem is not that there are no satisfactory answers to challenges of this sort (invariably there are), rather it is that the answers are complex and may not be easily understood in public debate or by the media. Issues are often trivialised or distorted. It is therefore important to not only invest political capital in sponsoring PPP projects/programmes, but also to ensure that these are successfully implemented.

*Partnership in practice:* As is the case in any long-term relationship, its success depends on how the spirit of partnership is implemented in practice. Given the background of traditional contracting where the public and private proponents often take an adversarial position leading to a general mistrust of the private sector, there is a need for a mindset change in the way PPP contracts are administered. Since the success of the project is equally critical to both parties—the focus of discussions should always be on how the project could be successfully implemented. Arrangements such as an independent engineer for each project could bring in objectivity and fairness to the process of implementation and has been used with a degree of reasonable success in the roads and ports sectors.
FEATURES OF A CONCESSION AGREEMENT

The framework for risk allocation and transfer would need to be suitably embodied in the PPP contract between the public authority and the private partner for the individual project. As mentioned earlier, the most common structure used is the BOT concession. A concession is a licence i.e. a bundle of rights conferred on the private entity in return for certain specified obligations to be undertaken (risks that are transferred). Each project is usually implemented by a dedicated company—(SPV) set up for this express purpose. The rights and obligations to the private entity under the PPP contract therefore wholly vest in the SPV set up for the project.

Railway projects, like most infrastructure projects, involve the creation of assets that have little use except for the purpose that they are created and so have little resale value. The bulk of the financing of these projects comes by way of debt and equity from financial investors—banks, financial institutions, equity funds and other capital market investors, with the private sponsors bringing in not more than 20–30 per cent of the total requirement of funds. The financing structure used is project financing which relies on future cash flows of the project as the primary source of its servicing and repayment, with the rights and interests in the project being the main security.

The main reason for implementing projects through SPVs is one of risk transfer—the existing operations of the private sponsor are insulated from the vagaries of the project and the exposure of the private sponsor is limited to the equity funds that are brought into the project. This structure is considered necessary with the increase in size of projects in relation to existing operations. From the point of view of the government or financial investors in the project, there is comfort that the vagaries of the existing operations of the private sponsor cannot affect the project—rendering the SPV a “bankruptcy remote” structure. Of course, where warranted, financial investors may seek additional comforts from the sponsors in the form of financial guarantees and undertakings—but these are not easily forthcoming. Hence, the focus is exclusively on appraising the project, evaluating the risks based on the risk allocation framework set out in the PPP contract, and estimating the cash flows that the project is likely to generate over the period of concession.

A well-designed PPP contract or concession agreement is therefore necessary to attract private investors for implementing projects and for these projects to find financing at optimal costs. As more and more projects get implemented under PPP structures and given the basic common characteristics of different categories of railway projects, it would be possible to develop a template for these transactions in the form of standard bidding documents and model concession agreements (MCA). The document would also set out detailed and standardised “output based
specifications” in respect of the obligations (risks transferred) of the concessionaire (private partner). This would allow for a common understanding of the risks involved, consistency of approach in pricing risks and could reduce the time and cost of negotiations by bringing all parties to a common understanding early in the procurement process. Needless to say, a Ministry of Corporate Affairs (MCA) would need to be flexible enough to allow for specific differences in projects, risks, project and financing structures, partner profiles and other contractual arrangements.

The key sections that are normally contained in a concession agreement are set out below in Table 23.2.

**Table 23.2: Key sections of a concession agreement**

<table>
<thead>
<tr>
<th>Section</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definitions and Clarity of terms used and basis for interpretation</td>
<td>Concession structure Grant of concession, stipulation of concession period and acceptance of concession</td>
</tr>
<tr>
<td>Concession structure</td>
<td>Project site Procedure for handover of site, warranties as to rights, title and use of the project site, peaceful possession and receipt of clearances</td>
</tr>
<tr>
<td>Concessionaire’s obligations</td>
<td>Concessioning authority’s obligations Specific and general obligations, depending on the nature of the project</td>
</tr>
<tr>
<td>Change of scope Change of scope and procedure to be followed</td>
<td>Concessionaire’s rights Procedure for payment of revenue share/access charges, payment mechanisms, payment of bonus and conditions for payment, if any</td>
</tr>
<tr>
<td>Mode of payment</td>
<td>Capacity augmentation Procedure for capacity augmentation of project and its consequences</td>
</tr>
<tr>
<td>Force majeure</td>
<td>Force majeure Listing and classification of force majeure, obligations of parties in the event of force majeure, termination and liability for losses and damages</td>
</tr>
<tr>
<td>Events of default and termination</td>
<td>Events of default and termination Listing of various events of default of either party, rights and obligations of parties, process of termination and termination payments</td>
</tr>
<tr>
<td>Hand back of project facilities</td>
<td>Hand back of project facilities Procedure for hand back, rights and obligations of parties in the event of hand back and basis for determining transfer payments, if any</td>
</tr>
</tbody>
</table>

In addition, the concession agreement would include provisions for dispute resolution, representations, and warranties by each party, and other standard
provisions (assignment and charges, interest and right of set off, governing law and jurisdiction, waiver, survival, amendments and notices, among others).

**Areas for PPPs in railways**

In a sense, all projects could be amenable to implementation under PPP structures—the challenge is in using the right structure to get an optimal risk-reward formulation to the stakeholders, and economical and efficient services to the users. Construction of new lines (new alignments), conversion projects (broad gauging), capacity augmentation (doubling or additional lines), re-development of stations and terminals, hospitality and commercial real estate projects, and operating of dedicated trains are some areas where private investment can come in. It is important though to develop the right cost standards in an objective and transparent manner that allows for sharing of facilities or levy of capacity (access) charges for use of infrastructure, so that some of these projects can be implemented. Benchmarking on the basis of international standards and practices could be a useful input in this effort.

Where the network can operate as a closed system—it would be possible to have the entire operation—fixed infrastructure and train operations passed on to the private sector. Based on the confidence level with respect to traffic growth potential—demand risk can be passed on incorporating the right payment structure. It is also important that the sizes of the projects chosen are large enough to get credible investors as well as benefit from the increased efficiencies in operations.

**Case study—Hassan–Mangalore broad gauging project**

*Background:* The Hassan–Mangalore rail line commenced its operations in December 1979 as a metre gauge (MG) track, constructed by the Indian Railways. In 1996, the Government of India (GoI) decided to convert the MG line into a broad gauge (BG) line as a part of its uni-gauge policy. However, though the MG line was dismantled, the conversion work was very slow, and by 2004 only a part of the gauge conversion between Hassan and Sakleshpur (47 km) had been completed. The remaining portion—the Sakleshpur–Mangalore stretch (142 km), remained to be converted. MoR and the Government of Karnataka (GoK) decided to expedite the project by setting up a dedicated SPV for implementation of this project. Participation was sought from strategic investors (primarily mining companies), as well as the New Mangalore Port Trust (NMPT), who would benefit from the implementation of the project.

*Shareholding and management:* The Hassan–Mangalore Rail Development Company Limited (HMRDCL) was set up on 1 July 2003, with an authorised capital of Rs 125
crore, of which Rs 112 crore has been subscribed and paid up. MoR and GoK each have the right to appoint three directors on the Board of HMRDCL, K-RIDE—one nominee and the strategic investors—two nominees. The chief executive officer of the company, a suitably experienced railway officer, would be a whole-time director appointed by the Board.

**Table 23.3: Means of finance for the project**

<table>
<thead>
<tr>
<th>Source of funds</th>
<th>Amount (in Rs crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equity (A)</strong></td>
<td></td>
</tr>
<tr>
<td>– MoR</td>
<td>39.50</td>
</tr>
<tr>
<td>– GoK</td>
<td>39.50</td>
</tr>
<tr>
<td>– K-RIDE</td>
<td>2.00</td>
</tr>
<tr>
<td>– Strategic investors</td>
<td>31.00</td>
</tr>
<tr>
<td><strong>Total equity funds (A)</strong></td>
<td>112.00</td>
</tr>
<tr>
<td><strong>Debt (B)</strong></td>
<td></td>
</tr>
<tr>
<td>– Banks and financial institutions (initial amount raised—Rs 40 crore, revised upward to meet cost escalations)</td>
<td>70.00</td>
</tr>
<tr>
<td><strong>Subordinate debt from Indian Railways (C)</strong></td>
<td></td>
</tr>
<tr>
<td>This was the amount expended till HMRDCL took over the project, and is treated as subordinated debt. This amount has also been revised upward by about Rs 4 crore.</td>
<td>145.00</td>
</tr>
<tr>
<td><strong>Total project cost</strong></td>
<td>327.00</td>
</tr>
</tbody>
</table>

The chart in Figure 23.2 below sets out the structure and framework for HMRDCL’s operations.

**Figure 23.2: Deal diagram for HMRDCL**
Status: The project was to be completed by December 2004, but shortage of sleepers, delays caused by landslips, and associated construction delays pushed the commercial operations date to 5 May 2006. Passenger operations are not within the purview of HMRDCL, and are to be undertaken by the Railways. As on date, the Commissioner of Railway Safety has not cleared the line for passenger operations. During the 11 months of operations in FY 2007, about 1.6 million tons (MT) of freight was moved, as against the forecast of about 6 MT. It has been a major accomplishment to complete the line even if there was a delay from the originally estimated timelines—the general impression being that it would have taken much longer if construction depended on the railway budget allocations. However, there are certain key learnings that come out of this experience. Without meaning to detract from the accomplishments of HMRDCL, it would be useful to understand some of these issues while implementing similar railway projects under PPP structures.

**KEY LESSONS**

*Positioning conflict of the Indian Railways:* While Indian Railways is the concessioning authority, it is also a service provider (construction contractor and O&M contractor) to HMRDCL. This gives rise to a contractually piquant situation where HMRDCL is liable for various contractual obligations and problems and delays arising from Indian Railways; though construction delays and/or O&M service standard shortcomings would be mainly caused by slippages by the Indian Railways in its dual roles as construction contractor and O&M contractor. To date such a “liability call” has not seriously occurred, but this always remains a contractual possibility. From the point of view of risk transfer, it is very unusual to have the same agency playing all roles—concessioning authority, promoter of the concessionaire, construction contractor, operator, collector of user charges, and tariff regulator!

The main advantages that have accrued through this structure are related to finances—more efficient (though somewhat costlier) financing structure ensuring that adequate funds were available in a timely manner for the project; the availability of equity funds from other sources; and more intense monitoring of the project through contractual obligations placed on Indian Railways through construction and O&M contracts.

*Commercial limitations:* Tariffs are also collected by the Indian Railways at various loading points, and then passed on to HMRDCL after deducting operating expenses. In some sense, Indian Railways has “first lien” on cash flows—again an unusual situation. Further, there is some delay in payments to HMRDCL, while the calculations are finalised in the Indian Railways.
**Marketing:** HMRDCL has no say on the key aspects of placement of rakes, availability of wagons, and movement. If HMRDCL can give no comfort to customers, it can “market” to a very limited extent. Customers have to make regular wagon indents and wait—as far as they are concerned, HMRDCL has little role, except that of limited facilitation and monitoring.

**Operational issues:** Once rakes are loaded, their movement is completely under the operational purview of the Indian Railways. Inter-divisional and inter-zonal issues, availability of motive power, availability of crew, and even train routing is not in control of any one nodal office. Since the line is in a ghat section, operational issues are further compounded—and HMRDCL can only monitor and request. For instance, because of a combination of such reasons, only 1–2 trains are being moved each way, as against possible 4–6 trains.

**SUGGESTIONS FOR BETTER PPP STRUCTURES**

Given these key learnings from the HMRDCL experience, the following changes may be appropriate for future projects of this type:

**Role of the Indian Railways:** The role of the Indian Railways need not be all-encompassing, leading to conflicts arising from the multiplicity of roles played. While Indian Railways has to be the concessioning authority by virtue of its sovereign function, it need not own any part of the concessionaire company. Construction should be undertaken through suitably qualified construction contractors—this would ensure more comprehensive project preparation and development.

With regard to train operations, it appears improbable that this service can be provided by any party other than the Railways. However, in this case the Railways as a “service provider” should be in a position to maintain certain prescribed standards for operations and maintenance, and accept penalties and receive incentives for its performance, measured against these standards.

**Non-compete and traffic diversion:** It is understood that in many cases (such as the Konkan Railways, or HMRDCL), the Railways is in a position to unilaterally divert traffic at its convenience—to the possible detriment of the special purpose companies. There should be clear contractual understanding of how traffic matters will be handled by policy and by exception. This should not be left to the decision of day-to-day railway divisional/zonal administrations.

**Returns to concessionaire:** In the case of HMRDCL, a “revenue share” arrangement is in place. However, as mentioned in the previous sections, HMRDCL has virtually no control on commercial or operating issues. HMRDCL, being a company largely with the Government (Railways and state government), may be able to handle the
situation, but it would probably be difficult for a private sector entity to do so. There are also issues of tariff fixing, and freight categorisation, which are completely outside the purview of the SPV. Therefore, “revenue share” does not appear to be an appropriate model for Railway PPPs, at this juncture. There are other models of ensuring returns to concessionaires, which are probably better suited to the circumstances of the Indian Railways. For instance, payments could be in the form of an “access charge”, which could be suitably structured. In lines where the assurance of traffic is greater, such charge could be paid on a formula related to traffic moved, and in cases where the traffic is more uncertain, it could be based on “availability” of track-kilometres to a certain specification. Bidding could also be based on formats such as “Least Present Value of Revenues” (LPVR), used successfully for road concessions in Chile or appropriate modifications thereof.

**Way forward**

Projects can be undertaken on PPP formats, if they are seen as win-win situations for both parties and where implemented as true “partnerships”. At the current stage of market maturity vis-à-vis railway projects, there is not much on the table to be able to judge/forecast the future with any degree of confidence. The few projects that have been done on a PPP basis, or through an SPV, seem to be encountering certain issues in operations. Only time will tell how these issues are resolved, and whether the PPP format as practised in the past has been successful. There also seems to be an impression in the Railway administration that “viable projects” will be done by the Railways—however, if that were the case, the private sector would certainly be wary of the “unviable ones”. Finally, as far as funding is concerned, states like Karnataka are also willing to work under a “cost share” (50 per cent to 66 per cent as state contribution) structure, which appears to be a more welcome option to the Railways—compared to the effort needed for true PPP projects.

In the circumstances, there is ample room for discussions, and the subsequent points highlight some areas where such discussions would be fruitful.

- Each “type” of railway project (commercialisation of land, new lines, dedicated freight/container operations, etc) could need a completely different approach, and adequate thought should go into the formulation of the initial projects.
- As NHAI did in the past for the road sector, and continues doing today, there may be a need to experiment with different approaches to PPP, till a certain maturity is reached in the market.
- Revenue sharing formats may not be appropriate for railway lines, in the context of railway operations, and the ability of the private sector to handle certain
risks. Access charges or availability charges would be a much better structure for recovery of costs and returns by the concessionaire. As mentioned earlier, the LPVR structure, suitably modified, could be used as the basis of the bids.

- There is great need to go into this process with a lot of thought. As was the case in the power sector, a single failure could set the entire process back by many years. Thorough project preparation is the need of the day and the atypical basis of railway operations means that it is not easy to directly transplant experience from other sectors. All stakeholders—the government, private sector and financial investors—should understand the risk allocation and reward frameworks properly, before venturing into substantive contracts.

Cherian Thomas and P.V. Ravi

NOTES

1. This paper was published in The Asian Journal, Journal of Transport and Infrastructure, Asian Institute of Transport Development, New Delhi, Volume 15, No. 1, April 2008.

2. Subscriber trunk dialling

3. For example, road projects implemented by the private sector involving direct tolling, where no capital grant is payable by the public entity.

4. The Design, build, finance, operate (DBFO) road programme in the UK involving payment of shadow tolls or the road projects using the annuity method in India are examples of this type of project.

5. The new international airports at Bangalore and Hyderabad and the airport modernisation projects at Mumbai and Delhi also incorporate this approach.

6. The rail connectivity projects serving the ports of Pipavav, Mangalore, and Kandla.

7. Special purpose vehicles

8. Even without a controlling stake, it is possible to exercise control and capture financial returns through provisions in the shareholders’ agreements executed for these projects. Participation in an SPV is not a *sine qua non* for this purpose, though it is frequently thought to be so.

9. Engineering, procurement and construction

10. Operations and maintenance

11. Build, operate, transfer

12. Build, own, operate, transfer—where ownership of underlying land is with the private entity; build, own, operate—power plants and urban infrastructure like parking lots; build, own, operate, share, transfer—where the framework involves a share of the
revenue; build, own, lease, transfer—used by the Railways; design, build, finance, operate—where very little design inputs are provided by the public authority—used for roads in UK and now by the National Highway Authority of India (NHAI) in India; and operate, maintain, transfer—where the initial implementation is undertaken by the state—as in the Mumbai–Pune Expressway

13. The RFQ (pre-qualification) document has already been released.

14. A “concession agreement” is frequently mistaken to mean that something is being “given away” as a concession. In this context, it just means that a sovereign/government entity is giving a certain right to a private entity to operate a public service.

15. Based on detailed output-based specifications for each of the obligations
Buoyed by the streamlining of the project award process and increased focus on the resolution of implementation-related problems, the highways sector is ramping up to meet the 2010–11 plan target. Leading indicators show that 90 per cent of this year’s project award target could be met at the current rate. As larger projects come up for bidding, as is the case this year, developers could turn to financial investors to meet their equity requirements.

**Upsurge in activity after a long lull**

The upgradation of the national highways, which is primarily carried out under the National Highway Development Project (NHDP), is emerging out of challenging times.

After a three-year slowdown, which was marked by the economic downturn in 2008–09, parliamentary elections and impediments to the bidding process, 2009–10 witnessed an uptick in activity in the highways sector. The road length completed increased by approximately 25 per cent. The project award activity increased more than five-fold from 638 km to 3,360 km, although it fell well short of the target. Going forward, the project award activity is envisaged to grow more than 2.5 times during 2010–11 to 9,000 km (see Figure 24.1).

**Leading indicators look promising**

Two leading indicators—project awards and land acquisition rate—show significant improvement.

- *Project awards have grown multi-fold:* In November 2009, the B. K. Chaturvedi Committee (BKCC) proposed changes to the bidding documents and the Model Concession Agreement (MCA). Some of the key changes were relaxing the conflict
of interest clause by increasing the common shareholding limit among consortium partners, allowing developers an early exit after project completion, and allowing concessionaire capacity augmentation, instead of contract termination, should the actual traffic exceed the capacity for three consecutive years. These changes have contributed to a very significant increase in the project award activity. While only 8 projects totalling 643 km were awarded in the entire 2008–09, winning bids have been announced for 28 projects, totalling close to 2,200 km during the five months after the implementation of the BKCC (see Table 24.1).

Winning bids for an additional 19 projects totalling close to 1,900 km have already been announced in the first two months of the current financial year!

Table 24.1: Upsurge in project award activity

<table>
<thead>
<tr>
<th>Project description</th>
<th>No. of projects</th>
<th>Length (km)</th>
<th>Project cost (Rs crore)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 2008–09: Projects awarded</td>
<td>8</td>
<td>643</td>
<td>8,591</td>
</tr>
<tr>
<td>Pre-BKCC (April–Oct 2009): Projects awarded</td>
<td>10</td>
<td>944</td>
<td>9,606</td>
</tr>
<tr>
<td>Post-BKCC (Nov 2009–March 2010): Projects w/ winning bids</td>
<td>28</td>
<td>2,177</td>
<td>21,830</td>
</tr>
<tr>
<td>(April–May 2010): Projects w/ winning bids</td>
<td>19</td>
<td>1,874</td>
<td>22,084</td>
</tr>
</tbody>
</table>

Source: IDFC analysis
Land acquisition rate has doubled: More than three-fourths of the completed NHAI projects were delayed, primarily due to land acquisition problems. Multiple steps are being taken to address the problems. The steps include appointment of senior officials by both the NHAI and the state governments to resolve the implementation problems, and creation of Special Land Acquisition Units (SLAUs), one for each highway project, to expedite land acquisition process. As a result, more than double the land (8,191 ha) was acquired in 2009–10 (till February 2010) compared to the annual average (4,000 ha) of the previous three years.

Time reduction in the post-RFQ submission stage likely to be reduced even further as RFQ stage is to be done away in the future: Post-BKCC, it took projects eight months from the RFQ submission date to the announcement of the winning bids, a little improvement over the pre-BKCC period when some projects languished in this stage for more than a year. However, the time taken needs to be further shortened. Going forward, acting on a BKCC recommendation, the government is likely to conduct an annual technical qualification assessment of potential bidders, thereby obviating the need for a separate RFQ for each project. This step should shave off, at the minimum, three to four months from the pre-project award time.

So where do we stand now?
The National Highways Authority of India (NHAI), through the seven phases of NHDP, aims to upgrade 54,454 km of national highways (see Table 24.2). The majority of projects under phases I and II are complete or under implementation. Currently the bulk of the pre-construction activity is in phase III and phase V, with a sprinkling of phase IV and phase VII projects (5 in phase IV and 1 in phase VII) in the pre-award stage. We anticipate that both these phases will pick up speed this financial year.

As of March 2010, 25 per cent of the highway development was complete, a little over 10 per cent under implementation and over 60 per cent yet to be awarded. Clearly, the NHDP programme is well behind schedule, and phases III to VII are likely to be delayed by several years.

What do the leading indicators tell us?
We are gearing up to meet the 2010–11 plan target, but the momentum needs to increase.

For the year 2010–11, the government has set a target of building 2,500 km of roads and awarding projects totalling 9,000 km.
### Table 24.2: Progress of NHDP up to March 2010—over 60% yet to be awarded

<table>
<thead>
<tr>
<th>NHDP phases</th>
<th>Project description</th>
<th>Total length (km)</th>
<th>Length completed (%)</th>
<th>Length under implementation (%)</th>
<th>To be awarded (%)</th>
<th>Likely date of completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHDP-I</td>
<td>Golden Quadrilateral (GQ), North-South – East-West (NS-EW) corridor, port connectivity &amp; others</td>
<td>7,498</td>
<td>98%</td>
<td>2%</td>
<td>0.10%</td>
<td>—</td>
</tr>
<tr>
<td>NHDP-II</td>
<td>4/6-laning NS–EW corridor, others</td>
<td>6,647</td>
<td>67%</td>
<td>24%</td>
<td>9%</td>
<td>Substantially by Dec 2010</td>
</tr>
<tr>
<td>NHDP-III</td>
<td>Upgradation, 4/6-laning</td>
<td>12,109</td>
<td>13%</td>
<td>32%</td>
<td>55%</td>
<td>Dec 2013</td>
</tr>
<tr>
<td>NHDP-IV</td>
<td>2-laning with paved shoulders</td>
<td>20,000 (5,000 km shoulders approved under phase-A)</td>
<td>—</td>
<td>—</td>
<td>100%</td>
<td>Dec 2015</td>
</tr>
<tr>
<td>NHDP-V</td>
<td>6-laning of GQ and high density corridor</td>
<td>6,500</td>
<td>3%</td>
<td>19%</td>
<td>78%</td>
<td>Dec 2014</td>
</tr>
<tr>
<td>NHDP-VI</td>
<td>Expressways</td>
<td>1,000</td>
<td>—</td>
<td>—</td>
<td>100%</td>
<td>Dec 2015</td>
</tr>
<tr>
<td>NHDP-VII</td>
<td>Ring roads, bypasses and flyovers, and other structures</td>
<td>700</td>
<td>—</td>
<td>6%</td>
<td>94%</td>
<td>Dec 2014</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>54,454</strong></td>
<td><strong>25%</strong></td>
<td><strong>13%</strong></td>
<td><strong>63%</strong></td>
<td>—</td>
</tr>
</tbody>
</table>

Source: NHAI

### Table 24.3: Project pipeline—a steady flow on per month basis

<table>
<thead>
<tr>
<th></th>
<th>Length (km)</th>
<th>Cost (Rs crore)</th>
<th>Number of projects (km)</th>
<th>Avg project length</th>
<th>Avg project cost (Rs crore)</th>
<th>Km/month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects in RFQ Stage (submission months: Jan–June 2010)</td>
<td>3,686</td>
<td>30,390</td>
<td>35</td>
<td>105</td>
<td>868</td>
<td>614</td>
</tr>
<tr>
<td>Projects in RFP Stage (submission months: Feb–June 2010)</td>
<td>3,335</td>
<td>18,616</td>
<td>33</td>
<td>108</td>
<td>564</td>
<td>667</td>
</tr>
<tr>
<td>Project w/ winning bids (announcement period: 23 November 2009–May 2010)</td>
<td>4,052</td>
<td>43,914</td>
<td>47</td>
<td>86</td>
<td>934</td>
<td>648</td>
</tr>
</tbody>
</table>

Source: IDFC analysis
The current pipeline of projects in RFQ, RFP and winning-bid stages (about 650 km/month—see Table 24.3) suggests that, at the current rate, approximately 8,000 km of work can be awarded per year, or 90 per cent of the Ministry’s 2010–11 target of 9,000 km.

**PROJECT LENGTH BY LANES: DOMINANCE OF 4-LANING PROJECTS TO DECREASE**

A little over half of the project pipeline comprises 4-laning of highways, with the other half of the pipeline equally divided between 2- and 6-laning projects. In the future, with phases IV to VII picking momentum, more 2- and 6-laning projects are anticipated. As per the 2010–11 annual plan, of the 9,000 kilometres envisaged to be awarded, 30 per cent each would be 2-laning and 6-laning projects. The beginning of this trend is visible in the slight decrease in the proportion of 4-laning projects from 59 per cent in the winning-bid stage to 53 per cent in the RFQ and 51 per cent in the RFP stages (see Figure 24.2).

**Figure 24.2: Decreasing proportion of 4-lane projects in pipeline**

*Source: IDFC analysis; based on 113 projects, of which 33 projects are in RFQ, 36 in RFP and 44 in winning-bid stage*

The current project pipeline reveals significant inter-regional differences in project award with almost 40 per cent of projects (by length) in the western states, followed by around one-quarter in the east, and one-fifth in the north and the south, respectively. Among the 4-laning projects, approximately three-quarters of the projects are concentrated in the west and the east (almost equal proportions), and the remaining one-quarter equally distributed in the north and the south.
Among the states, Madhya Pradesh, Uttar Pradesh and Bihar lead in 2-laning projects, while West Bengal, Madhya Pradesh, Rajasthan and Gujarat lead in 4-laning projects. Almost half of the 6-laning projects fall in the west, with Rajasthan, Gujarat and Goa taking the lead.

**Impact of Shift in Project Type**

Data on projects in the pre-award stage show that for 4- and 6-laning projects, while the cost per lane–km does not vary much by lane width (see Figure 24.3), the

**Figure 24.3: Average cost per lane–km (Rs crore)**

*Source: IDFC analysis based on NHAI cost estimates for 114 projects*

Note: The project cost displays significant variation at the project level. The averages above are only indicative and should not be construed as a norm.
average project cost varies substantially. A typical 6-laning project costs almost twice as much as a 4-laning project (see Figure 24.4), primarily due to the longer length (see Figure 24.5). As the project cost increases, the set of technically and financially qualified bidders reduces. Further, developers are barred from bidding for new projects if they have three or more projects which have not achieved financial closure. Given that more 6-laning and expressways projects would be awarded in the future, and the need for equity capital would increase, bidders could explore options such as private equity funds and foreign investors.

**CONTINUED RELIANCE ON GOVERNMENT SUPPORT**

The PPP projects still rely on government support, with almost two-thirds of the projects for which winning bids were announced post-BKCC requiring grant or annuity (in 55:45 grant to annuity ratio). The remaining one-third were on premium basis wherein the concessionaires paid a specified sum annually to the government. The total grant amount is approximately Rs 3,469 crore on total project cost of Rs 17,006 crore, or 20 per cent of the project cost. Finer grained analysis at the regional- and state-level reveals that projects in the east (led by West Bengal) and the north (led by Jammu and Kashmir and Uttar Pradesh) require much higher government support—90 per cent and 83 per cent respectively. High reliance on government support is largely due to 4-laning of highways connecting smaller cities of Uttar Pradesh (such as Bareilly–Sitapur, Moradabad–Bareilly, Muzafarnagar–Haridwar–Dehradun) and West Bengal (such as Farakka–Raiganj, Behrampore–Farakka and Raiganj–Dalkhola in the central part of the state).
The reliance on government support is expected to increase in the future as more phase IV (2-laning of 20,000 km of highways) projects are offered on stretches with low traffic volumes. Indeed, all the 2-laning projects for which winning bids have been announced need government support (they were all offered on annuity basis). In contrast, one-third of the 6-laning projects need government support (see Figure 24.6).

Figure 24.6: Decrease in government support with lane width increase

*Source:* IDFC analysis based on 44 projects

Shishir Mathur and Kunal Katara
Rising Viability Gap Funding (VGF) and annuity payments to private operators could affect the National Highways Authority of India’s (NHAI) ability to continue to fund the remaining stretches of the National Highway Development Programme (NHDP). An annuity outflow in 2011–12 of Rs 5,263 crore for the total of 42 annuity projects has been budgeted for in the Union Budget 2011–12. The total committed annuity over the lifetime of these projects is Rs 83,794.85 crore. For toll projects, the cumulative VGF outflow since 2006 has been about Rs 14,000 crore.

This note assesses the likely outflows on account of the remaining stretches of NHDP in the future against the potential revenue streams. On analyzing three scenarios (modest roll-out with short-term debt, fast-track roll-out with long-term debt, and a conservative scenario with medium-term debt), we observe that NHAI would have large deficits in the immediate future which are eventually covered by the secular increase in revenue from cess and tolls. Thus, short- and medium-term deficits can be met using debt instruments, though it remains to be seen if such a large market for infrastructure debt does exist.

**Progress and achievements in NHDP**

The National Highways Development Project is perhaps the most significant road infrastructure project in India. National highways in India account for only about two per cent of the total length of roads, but carry about 40 per cent of the total traffic. The project is being implemented by the National Highways Authority of India (NHAI). The status of the NHDP as on November 2011 is presented in Table 25.1.
Table 25.1: Status of the National Highways Development Project as on November 2011

<table>
<thead>
<tr>
<th>Phase</th>
<th>Total</th>
<th>Completed</th>
<th>Under Implementation</th>
<th>Yet to be awarded</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase I</td>
<td>5,846</td>
<td>5,829</td>
<td>17</td>
<td>–</td>
<td>Golden Quadrilateral: Connecting the four major metros</td>
</tr>
<tr>
<td>Phase II</td>
<td>7,300</td>
<td>5,831 *</td>
<td>1,013 *</td>
<td>420</td>
<td>North–South &amp; East–West</td>
</tr>
<tr>
<td>Phase III</td>
<td>12,109</td>
<td>2,617</td>
<td>6,112</td>
<td>3,380</td>
<td>Convert from 2-lane to 4-lane</td>
</tr>
<tr>
<td>Phase IV</td>
<td>14,799</td>
<td>–</td>
<td>1,744</td>
<td>13,055</td>
<td>Improve to 2-lane standards with paved shoulders</td>
</tr>
<tr>
<td>Phase V</td>
<td>6,500</td>
<td>655</td>
<td>2,538</td>
<td>3,307</td>
<td>6-laning of existing 4-lane projects</td>
</tr>
<tr>
<td>Phase VI</td>
<td>1,000</td>
<td>–</td>
<td>–</td>
<td>1,000</td>
<td>Construction of expressways</td>
</tr>
<tr>
<td>Phase VII</td>
<td>700</td>
<td>–</td>
<td>41</td>
<td>659</td>
<td>Construction of ring roads, flyovers and bypasses</td>
</tr>
<tr>
<td>Total</td>
<td>48,254</td>
<td>14,932</td>
<td>11,465</td>
<td>21,821</td>
<td></td>
</tr>
</tbody>
</table>

*The number of kilometres completed and current implementation under Phase II is not clear; figures vary with sources. Nevertheless, the number of kilometres that remain to be awarded has been consistently reported to be around 420 km.

Until 2005–06, EPC contracts accounted for the largest share of projects awarded.\(^2\) In fact, more than 74 per cent of Phase I and II of the NHDP has been awarded on EPC contracts. Since 2006–07 onwards, the share of EPC contracts has fallen to just 7 per cent of the total km awarded while the remainder have been awarded to private developers on build, operate, transfer (BOT) modes (Box 25.1).

**Box 25.1: PPP options in the highways sector**

Annuity and toll are two forms of BOT projects, based on which NHAI engages the private sector for executing highway projects. In the annuity model, the private developer is given semi-annual ‘annuity’ payments by NHAI once the road is commissioned. In this case, the bid parameter is the annuity sought by the private developer. In the toll model, the private developer collects tolls over a concession period, and bids are evaluated based on the premium that the private developer is willing to pay. In case of a negative premium, that is, if a grant is sought, this grant is channelled through the viability gap funding (VGF) of NHAI.
PROJECTED WORK PLAN AND COST STREAMS FOR NHAI

The NHAI awarded 5083 km in 2010–11, the highest km awarded in a year since its inception, thus reflecting a rapid upscaling of its award programme in the last year. This probably reflects the minimum capacity of NHAI to award projects, and we assume that NHAI would award at least 5000 km a year from 2011–12 onwards. This upsurge in NHAI’s ability to award new contracts has also been possible due to considerably higher engagement of private players in the construction and managements of the NHDP using BOT–toll and BOT–annuity contracts. In fact, out of the total kilometres awarded since 2006–07, nearly 80 per cent have been awarded as BOT contracts with nearly 80 per cent of the BOT kilometres being awarded as toll contracts.

Taking note of an increasing share of PPP projects in the NHDP since 2006 onwards, the Empowered Group of Ministers on financing the remaining NHDP in December 2009 approved the following break-up of the various types of contracts for the remaining stretches of the NHDP, re-emphasizing the trend towards greater private participation:

- 60 per cent under toll
- 25 per cent under annuity
- 15 per cent under EPC

We applied this ratio to the cumulative total remaining NHDP in 2009 to project NHAI’s work plan under each type of contract from 2008–09 onwards (Table 25.2). We also take into account the high proportion of toll contracts (90 per cent) awarded annually between 2008–09 and 2010–11, and being proposed for 2011–12 (87 per cent). As a result, the share of annuity and EPC contracts projected to be awarded from 2012–13 onwards rises sharply while that of toll projects awarded falls to 45 per cent.

REVENUE PROJECTIONS FOR NHAI

On the revenue side, NHAI gets budgetary support from the government in the form of cess revenue from the Central Road Fund (Box 25.2). In addition, NHAI also collects toll on some annuity and EPC stretches (Box 25.3). Finally, some BOT–toll projects, instead of seeking a ‘negative grant’ or VGF, pay a premium per annum to NHAI.

Box 25.2: Cess revenue from the Central Road Fund

The Government of India has set up the Central Road Fund with the accruals from a cess levied on High Speed Diesel (HSD) and Motor Spirit (petrol) with the Central Road Fund Act, 2000. Currently, Rs 2 per litre is collected for both. The fund is distributed for development and maintenance of national highways, state roads, rural roads and for provision of road overbridges and underbridges and other safety features at unmanned railway crossings. Funding for national highways is defined in the Central Road Fund Act (2000) as being 28.75 per cent of the total cess collected on petrol and diesel per annum.
### Table 25.2: Projected work plan for NHAI and shares of toll, annuity and EPC

<table>
<thead>
<tr>
<th></th>
<th>Unit</th>
<th>FY 09*</th>
<th>FY 10*</th>
<th>FY 11*</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects awarded</td>
<td>km</td>
<td>643</td>
<td>3,360</td>
<td>5,083</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>3,300</td>
</tr>
<tr>
<td>Toll</td>
<td>km</td>
<td>643</td>
<td>3,183</td>
<td>3,058</td>
<td>4,375</td>
<td>2,233</td>
<td>2,233</td>
<td>2,233</td>
<td>1,474</td>
</tr>
<tr>
<td>Annuity</td>
<td>km</td>
<td>–</td>
<td>177</td>
<td>1,577</td>
<td>625</td>
<td>1,562</td>
<td>1,562</td>
<td>1,562</td>
<td>1,031</td>
</tr>
<tr>
<td>EPC</td>
<td>km</td>
<td>–</td>
<td>–</td>
<td>448</td>
<td>–</td>
<td>1,205</td>
<td>1,205</td>
<td>1,205</td>
<td>795</td>
</tr>
<tr>
<td>Cost per km</td>
<td>Rs crore/km</td>
<td>7.6</td>
<td>8.1</td>
<td>8.6</td>
<td>9.1</td>
<td>9.6</td>
<td>10.2</td>
<td>10.8</td>
<td>11.5</td>
</tr>
<tr>
<td>Value of projects</td>
<td>Rs crore</td>
<td>4,871</td>
<td>25,455</td>
<td>38,506</td>
<td>45,441</td>
<td>48,167</td>
<td>51,057</td>
<td>54,121</td>
<td>37,863</td>
</tr>
<tr>
<td>Toll</td>
<td>Rs crore</td>
<td>4,871</td>
<td>24,114</td>
<td>23,163</td>
<td>39,756</td>
<td>21,513</td>
<td>22,804</td>
<td>24,172</td>
<td>16,911</td>
</tr>
<tr>
<td>Annuity</td>
<td>Rs crore</td>
<td>–</td>
<td>1,341</td>
<td>11,948</td>
<td>5,684</td>
<td>15,047</td>
<td>15,950</td>
<td>16,907</td>
<td>11,828</td>
</tr>
<tr>
<td>EPC</td>
<td>Rs crore</td>
<td>–</td>
<td>–</td>
<td>3,395</td>
<td>–</td>
<td>11,607</td>
<td>12,303</td>
<td>13,042</td>
<td>9,124</td>
</tr>
</tbody>
</table>

*Source:* IDFC analysis

*Actual total for the year based on presentations made by NHAI at various fora.

*Assumptions*

a. The cost per km has been estimated to be Rs 8.6 crore per km for the remaining NHDP stretches based on the cost per km for nearly 170 projects of NHDP that have already been executed, and the remaining number of km in each phase of the NHDP. This excludes Phase VI (Expressways) and the Northeastern projects.

b. An inflation rate of 6% per annum has been assumed.
The total cess fund budgeted for NHAI in the Union Budget 2011 is Rs 8250 crore. Revenue from cess has grown at 6 per cent since 2005–06, similar to the long-term growth rate in the volume of consumption of diesel and petrol (about 5.8 per cent per annum between 1994 and 2010).

**Box 25.3: Toll policy for national highways in India**

India’s toll policy allows for tolls to be collected on all four-laned stretches, bridges, and bypasses. Toll rates are differentiated between those collected by NHAI and those collected by private developers for BOT–toll projects. In case of the former, the toll rates are determined on the basis of vehicle operating costs, the impact of different vehicles on road surface, and the willingness of users to pay toll. The ‘base rates’ for five different vehicle categories have been specified in Rs per km in a government notification for 2007–08. These are then inflated to current year prices using the wholesale price index for each case where tolls are charged for using national highways.

In case of BOT–toll projects where tolls are collected by private developers, the toll rates are notified on the basis of project viability. The Planning Commission reports that the toll rates in both cases are similar.

NHAI expects toll revenues collected on the stretches under its management to grow by nearly 30 per cent from Rs 1623 crore in 2010–11 to Rs 2093 crore in 2011–12. The NHAI attributes this large increase to checking leakages in toll collections and improvements in management of toll booths. We assume a more modest growth in toll revenue of 15 per cent per annum over a longer term. This is assumed to include all three elements of growth: increase in traffic, inflation, and new annuity and EPC roads being tolled.

NHAI is also expected to receive Rs 2077 core as annual premium receipt in 2011–12. Finally, NHAI’s tax-free bond issue of Rs 10,000 crore has been oversubscribed by more than 2.5 times. Two types of bonds were issued: 8.2 per cent for 10-year bonds, and 8.3 per cent for 15-year bonds. We have taken the shorter term bond in this analysis: a term of 10 years and an interest rate of 8.2 per cent.

**Projected cash flows of NHAI for the remaining NHDP projects to be awarded**

Given the value of projects to be awarded under toll, annuity, and EPC in Table 25.2, the VGF, annuity, and EPC outflows on NHAI’s accounts has been estimated based on past trends in toll and annuity bids, and the Total Project Cost (TPC) (Table 25.3).
Table 25.3: Assumptions on VGF, annuity and EPC cost streams

<table>
<thead>
<tr>
<th>Item</th>
<th>Assumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>VGF as proportion of TPC</td>
<td>24%</td>
</tr>
<tr>
<td>Premium as proportion of TPC</td>
<td>5% p.a. with 5% escalation per annum</td>
</tr>
<tr>
<td>% of BOT–toll projects with VGF</td>
<td>50%</td>
</tr>
<tr>
<td>% of BOT–toll projects with premium</td>
<td>50%</td>
</tr>
<tr>
<td>Annuity as proportion of TPC</td>
<td>22% p.a.</td>
</tr>
<tr>
<td>Length of BOT contract</td>
<td>18 years</td>
</tr>
<tr>
<td>Time for achieving financial closure</td>
<td>6 months</td>
</tr>
<tr>
<td>Construction period for all projects</td>
<td>2.5 years</td>
</tr>
<tr>
<td>Phasing of TPC</td>
<td>Year 1: 30%</td>
</tr>
<tr>
<td></td>
<td>Year 2: 40%</td>
</tr>
<tr>
<td></td>
<td>Year 3: 30%</td>
</tr>
</tbody>
</table>

*Source:* This table is based on a review of 91 toll projects awarded until July 2011 and the statement for 42 annuity projects awarded until February 2011 presented in the Union Budget 2011.

The projected cash flows are presented in Table 25.4.

There are still growing negative cash flows on account of VGF, EPC, and rising annuity outflows until 2016–17 accumulating to Rs 34,553 crore between 2011–12 and 2015–16. These would be eventually covered by subsequent positive cash flows only by 2021–22.

**THREE SCENARIOS PROJECTING CASH FLOWS**

In the absence of direct government support, the large debt burden that NHAI faces would need to be financed using some form of debt instrument. To assess the impact on cash flows of different forms of debt instruments, and the rate at which the NHAI awards new sections of the NHDP, three different scenarios are presented (Table 25.5). In addition, the impact of delays in project execution, higher inflation, and more conservative bids by the private BOT developers, is also analyzed.

**Scenario 1: Financing cash flow deficits using debt**

The NHAI issued tax-free bonds of Rs 10,000 crore with a tenure of 8.2% for 10 years and 8.3 per cent for 15 years. We assume that the cash flow deficits presented in Table 25.4 are funded using the shorter term bond as shown in Table 25.6.
Table 25.4: Projected cash flows for NHAI until 2020 (Rs crore)

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annuity projects</td>
<td>5,263</td>
<td>7,842</td>
<td>6,323</td>
<td>6,936</td>
<td>9,174</td>
<td>12,518</td>
<td>16,064</td>
<td>19,165</td>
<td>20,441</td>
</tr>
<tr>
<td>EPC projects</td>
<td>–</td>
<td>3,482</td>
<td>8,334</td>
<td>12,316</td>
<td>11,645</td>
<td>7,562</td>
<td>2,737</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>VGF for toll projects</td>
<td>1,310</td>
<td>1,499</td>
<td>1,775</td>
<td>2,451</td>
<td>2,477</td>
<td>2,590</td>
<td>1,682</td>
<td>609</td>
<td>–</td>
</tr>
<tr>
<td>O&amp;M*a</td>
<td>–</td>
<td>20</td>
<td>70</td>
<td>152</td>
<td>239</td>
<td>307</td>
<td>346</td>
<td>367</td>
<td>389</td>
</tr>
<tr>
<td>Renewal costsa</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>262</td>
<td>664</td>
<td>1,040</td>
</tr>
<tr>
<td>Administrative expensesb</td>
<td>124</td>
<td>133</td>
<td>147</td>
<td>193</td>
<td>214</td>
<td>237</td>
<td>262</td>
<td>287</td>
<td>308</td>
</tr>
<tr>
<td>Land acquisition costsc</td>
<td>6,250</td>
<td>6,625</td>
<td>7,023</td>
<td>7,444</td>
<td>5,208</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Total outflows</td>
<td>12,947</td>
<td>19,600</td>
<td>23,672</td>
<td>29,493</td>
<td>28,957</td>
<td>23,215</td>
<td>21,354</td>
<td>21,092</td>
<td>22,179</td>
</tr>
<tr>
<td>Revenues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cess revenue</td>
<td>8,250</td>
<td>8,726</td>
<td>9,230</td>
<td>9,762</td>
<td>10,326</td>
<td>10,921</td>
<td>11,552</td>
<td>12,218</td>
<td>12,923</td>
</tr>
<tr>
<td>Toll revenue</td>
<td>2,093</td>
<td>2,407</td>
<td>2,768</td>
<td>3,183</td>
<td>3,661</td>
<td>4,210</td>
<td>4,841</td>
<td>5,567</td>
<td>6,403</td>
</tr>
<tr>
<td>Premium for toll projects</td>
<td>2,077</td>
<td>2,181</td>
<td>2,736</td>
<td>6,331</td>
<td>7,401</td>
<td>8,569</td>
<td>9,844</td>
<td>10,928</td>
<td>11,474</td>
</tr>
<tr>
<td>Total inflows</td>
<td>12,420</td>
<td>13,314</td>
<td>14,734</td>
<td>19,277</td>
<td>21,387</td>
<td>23,700</td>
<td>26,237</td>
<td>28,713</td>
<td>30,800</td>
</tr>
<tr>
<td>Surplus</td>
<td>-527</td>
<td>-6,286</td>
<td>-8,938</td>
<td>-10,216</td>
<td>-7,569</td>
<td>485</td>
<td>4,883</td>
<td>7,621</td>
<td>8,621</td>
</tr>
<tr>
<td>Bonds issuedd</td>
<td>10,000</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Interest payment</td>
<td>205</td>
<td>922</td>
<td>820</td>
<td>820</td>
<td>820</td>
<td>820</td>
<td>820</td>
<td>820</td>
<td>820</td>
</tr>
</tbody>
</table>

Source: IDFC analysis

Assumptions:

a. O&M expenses are assumed to be about 0.5% of TPC. Renewal costs appear in the cost streams at the rate of 5% of TPC every five years. Thus, the first stream of renewal costs is borne in 2017–18.
b. Administrative costs are capped at 1% of total revenues.
c. Land acquisition costs have been assumed at a normative rate of Rs 1 crore per km of national highway.
d. The Ministry of Road Transport and Highways has budgeted Rs 7,500 crore as Internal and Extra Budgetary Resources (IEBR) for 2011–12. We include this in our revenue stream as 54 EC Tax Free bonds that NHAI currently issues: a term of 3 years and an interest rate of 6%. Thus the interest payment on these bonds is until 2014–15 only.
### Table 25.5: Scenarios for projecting cash flows

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Base case with deficits funded using debt</th>
<th>Fast track roll-out</th>
<th>Modest roll-out with higher costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Km awarded in a year</td>
<td>5,000</td>
<td>7,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Projects awarded post FY 09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll</td>
<td>60%</td>
<td>60%</td>
<td>52%</td>
</tr>
<tr>
<td>Annuity</td>
<td>25%</td>
<td>25%</td>
<td>24%</td>
</tr>
<tr>
<td>EPC</td>
<td>15%</td>
<td>15%</td>
<td>24%</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>6%</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td>VGF rate</td>
<td>24%</td>
<td>24%</td>
<td>35%</td>
</tr>
<tr>
<td>Phasing of project cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yr 1</td>
<td>30%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Yr 2</td>
<td>40%</td>
<td>40%</td>
<td>25%</td>
</tr>
<tr>
<td>Yr 3</td>
<td>30%</td>
<td>30%</td>
<td>25%</td>
</tr>
<tr>
<td>Yr 4</td>
<td></td>
<td></td>
<td>25%</td>
</tr>
</tbody>
</table>

### Table 25.6: Financing cash flows using debt (Rs crore)

<table>
<thead>
<tr>
<th></th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surplus</td>
<td>-527</td>
<td>-6,286</td>
<td>-8,938</td>
<td>-10,216</td>
<td>-7,569</td>
<td>485</td>
<td>4,883</td>
<td>7,621</td>
<td>8,621</td>
</tr>
<tr>
<td>Bonds required to break even cash flow</td>
<td>10,000</td>
<td>8,916</td>
<td>10,490</td>
<td>12,627</td>
<td>11,016</td>
<td>3,865</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Interest payment*</td>
<td>205</td>
<td>922</td>
<td>1,551</td>
<td>2,411</td>
<td>3,447</td>
<td>4,350</td>
<td>4,667</td>
<td>4,667</td>
<td>4,667</td>
</tr>
</tbody>
</table>

*a. The interest payment here includes interest on bonds that NHAI proposes to issue in 2011–12, as well as interest on additional bonds that need to be issued to balance the cash flows.*

**Source:** IDFC analysis

The key highlights of the projected cash flows are presented in Table 25.7.

### Table 25.7: Bonds issued for financing NHAI deficits

<table>
<thead>
<tr>
<th>Item</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum bonds issued in a year</td>
<td>Rs 12,627 crore in 2014–15</td>
</tr>
<tr>
<td>Maximum outstanding bonds</td>
<td>Rs 56,913 crore in 2017–18</td>
</tr>
<tr>
<td>Last bonds issued</td>
<td>2016–17</td>
</tr>
</tbody>
</table>

**Source:** IDFC analysis
As shown in Figure 25.1, the short tenure of the bonds leads to increasingly large issuances every year (shaded area) of more than Rs 12,600 crore at their peak since bond repayments need to be financed well before cash flows turn positive. Compared to this, the Indian Rail Finance Corporation raised just under Rs 6,000 crore in 2010–11, and the Rural Electrification Corporation (REC) which also raised 54 EC Capital Gains Tax free bonds of Rs 5045 crore in 2010–11. Incidentally, over 80 per cent of the debt raised in 2010–11 used instruments other than 54 EC bonds, including loans from commercial banks, non-priority sector bonds, commercial paper, short-term loans from commercial banks and Official Development Assistance loans. This could be a matter of concern since a large proportion of bond issuance in this case would be for debt servicing instead of capital expenses. Nevertheless, NHAI’s latest tax-free bond issue of Rs 10,000 crore was received very positively and has been oversubscribed by more than two times.

**Figure 25.1: Bond issuance to finance cash flow deficits**

*Source: IDFC analysis*

**Scenario 2: Fast track roll-out with longer term debt**

NHAI has an ambitious target of awarding 7300 km in 2011–12 and 7000 km every year after this until the end of the programme. While this is far in excess of what has been achieved in the past, if the NHAI does keep to this plan, it would have awarded the remaining stretches of the NHDP by 2014–15, that is, two years prior to the work plan presented in Table 25.2. This revised work plan from 2011–12 onwards, and the share of toll, annuity, and EPC contracts is presented in Table 25.8.
Table 25.8: Projected work plan for NHAI with a fast track roll-out

<table>
<thead>
<tr>
<th>NHAi work plan</th>
<th>Unit</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual award during</td>
<td>km</td>
<td>7,000</td>
<td>7,000</td>
<td>7,000</td>
<td>2,300</td>
</tr>
<tr>
<td>the FY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll</td>
<td>km</td>
<td>6,124</td>
<td>2,203</td>
<td>2,203</td>
<td>724</td>
</tr>
<tr>
<td>Annuity</td>
<td>km</td>
<td>876</td>
<td>2,711</td>
<td>2,711</td>
<td>891</td>
</tr>
<tr>
<td>EPC</td>
<td>km</td>
<td>–</td>
<td>2,086</td>
<td>2,086</td>
<td>685</td>
</tr>
<tr>
<td>Cost per km</td>
<td>Rs crore/km</td>
<td>9.1</td>
<td>9.6</td>
<td>10.2</td>
<td>10.8</td>
</tr>
<tr>
<td>Value of projects</td>
<td>Rs crore</td>
<td>63,617</td>
<td>67,434</td>
<td>71,480</td>
<td>24,896</td>
</tr>
<tr>
<td>Toll</td>
<td>Rs crore</td>
<td>55,659</td>
<td>21,223</td>
<td>22,496</td>
<td>7,835</td>
</tr>
<tr>
<td>Annuity</td>
<td>Rs crore</td>
<td>7,958</td>
<td>26,114</td>
<td>27,681</td>
<td>9,641</td>
</tr>
<tr>
<td>EPC</td>
<td>Rs crore</td>
<td>–</td>
<td>20,097</td>
<td>21,303</td>
<td>7,420</td>
</tr>
</tbody>
</table>

**Source:** IDFC analysis

A faster award programme results in a higher negative cash flow in the early years of the programme compared to a slower roll-out. However, cash flows also turn positive a year earlier in 2016–17 (Table 25.9).

![Figure 25.2: Long-term bonds issued to finance fast track roll-out](image)

**Source:** IDFC analysis
Table 25.9: Projected cash flows for NHAI until 2020 with fast track roll-out (Rs crore)

<table>
<thead>
<tr>
<th>Expenditure</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annuity projects</td>
<td>5,263</td>
<td>7,842</td>
<td>6,323</td>
<td>7,182</td>
<td>10,859</td>
<td>16,664</td>
<td>20,691</td>
<td>21,731</td>
<td>21,731</td>
</tr>
<tr>
<td>EPC projects</td>
<td>–</td>
<td>6,029</td>
<td>14,430</td>
<td>16,776</td>
<td>9,359</td>
<td>2,226</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>VGF for toll projects</td>
<td>1,826</td>
<td>2,260</td>
<td>2,736</td>
<td>2,536</td>
<td>1,407</td>
<td>785</td>
<td>187</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>–</td>
<td>34</td>
<td>122</td>
<td>235</td>
<td>312</td>
<td>346</td>
<td>367</td>
<td>389</td>
<td>412</td>
</tr>
<tr>
<td>Renewal costs</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>453</td>
<td>1,150</td>
<td>1,417</td>
</tr>
<tr>
<td>Administrative expenses</td>
<td>124</td>
<td>133</td>
<td>147</td>
<td>193</td>
<td>214</td>
<td>237</td>
<td>256</td>
<td>275</td>
<td>295</td>
</tr>
<tr>
<td>Land acquisition costs</td>
<td>8,750</td>
<td>9,275</td>
<td>9,832</td>
<td>3,424</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Total outflows</td>
<td>15,964</td>
<td>25,573</td>
<td>33,127</td>
<td>30,346</td>
<td>22,150</td>
<td>20,257</td>
<td>21,954</td>
<td>23,545</td>
<td>23,856</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Revenues</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cess revenue</td>
<td>8,250</td>
<td>8,726</td>
<td>9,230</td>
<td>9,762</td>
<td>10,326</td>
<td>10,921</td>
<td>11,552</td>
<td>12,218</td>
<td>12,923</td>
</tr>
<tr>
<td>Toll revenue</td>
<td>2,093</td>
<td>2,407</td>
<td>2,766</td>
<td>3,183</td>
<td>3,661</td>
<td>4,210</td>
<td>4,841</td>
<td>5,567</td>
<td>6,403</td>
</tr>
<tr>
<td>Premium for Toll projects</td>
<td>2,077</td>
<td>2,181</td>
<td>2,736</td>
<td>6,331</td>
<td>7,391</td>
<td>8,548</td>
<td>9,249</td>
<td>9,712</td>
<td>10,197</td>
</tr>
<tr>
<td>Total inflows</td>
<td>12,420</td>
<td>13,314</td>
<td>14,734</td>
<td>19,277</td>
<td>21,377</td>
<td>23,679</td>
<td>25,642</td>
<td>27,497</td>
<td>29,523</td>
</tr>
</tbody>
</table>

| Surplus                           | -3,543 | -12,259 | -18,393 | -11,069 | -773 | 3,422 | 3,688 | 3,952 | 5,667 |
| Bonds required to break even cash flow | 10,000 | 13,557 | 20,325 | 14,667 | 5,574 | 1,836 | 1,721 | 1,598 | 14    |
| Interest payment                   | 130    | 847    | 1,932  | 3,598  | 4,801 | 5,258 | 5,409 | 5,550 | 5,681 |

**Source:** IDFC analysis

**Assumptions:** Same as in Table 25.4

With the longer term debt instrument compared to the short-term bond currently in use, annual debt issuance is much lower (Figure 25.2).

However, given that this is long-term debt, it does accumulate on the balance sheet leading to very high outstanding bonds (Table 25.10).

Table 25.10: Bonds issued to finance NHAI deficits in fast track roll-out with longer term debt

<table>
<thead>
<tr>
<th>Item</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum bonds issued in a year</td>
<td>Rs 20,235 crore in 2013–14</td>
</tr>
<tr>
<td>Maximum outstanding bonds</td>
<td>Rs 69,291 crore in 2020–21</td>
</tr>
<tr>
<td>Last bonds issued</td>
<td>2023–24</td>
</tr>
</tbody>
</table>

**Source:** IDFC analysis
Scenario 3: Modest roll-out with higher costs and medium-term debt

Given a rise in commodity and input prices, delays in project award and execution, and uncertainty regarding the traffic levels in remaining phases of the NHDP, a more modest scenario has been constructed. The following assumptions describe this scenario:

- Delays in project award and construction result in a 4-year construction period instead of 2.5 years in the base year and only 25 per cent of the project is executed every year compared to 2½ years in the base case.
- The lag between the DPR and project award, and increases in commodity prices result in a higher inflation of 10 per cent compared to 6 per cent in the earlier projections.
- Since stretches that will be awarded in the future are likely to have less traffic, VGF bids as a proportion of TPC rise from 24 per cent to 35 per cent.
- Only stretches that are 4-laned or more will have enough traffic for sufficient private sector interest in BOT–toll contracts. This includes the remaining stretches of the NSEW, Phase III (4-laning), and Phase V (6-laning). Half of Phase IV (improving 2-laned highways) has been included in annuity contracts, and the remaining half, along with Phase VII (construction of ring roads and city bypasses) would be on EPC contracts. This implies a change in the share of toll, annuity, and EPC projects for projects that will be awarded 2011–12 onwards (Table 25.11).

Table 25.11: Projected work plan with higher share of annuity and EPC contracts

<table>
<thead>
<tr>
<th>Unit</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Award during FY km</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>3,300</td>
</tr>
<tr>
<td>Toll km</td>
<td>4,375</td>
<td>1,156</td>
<td>1,156</td>
<td>1,156</td>
<td>763</td>
</tr>
<tr>
<td>88% 23% 23% 23% 23%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annuity km</td>
<td>625</td>
<td>1,746</td>
<td>1,746</td>
<td>1,746</td>
<td>1,153</td>
</tr>
<tr>
<td>13% 35% 35% 35% 35%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPC km</td>
<td>0</td>
<td>2,097</td>
<td>2,097</td>
<td>2,097</td>
<td>1,384</td>
</tr>
<tr>
<td>0% 42% 42% 42% 42%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost per km Rs crore/km</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Value of projects Rs crore</td>
<td>47,156</td>
<td>51,871</td>
<td>57,058</td>
<td>62,764</td>
<td>45,567</td>
</tr>
<tr>
<td>Toll Rs crore</td>
<td>41,257</td>
<td>11,997</td>
<td>13,197</td>
<td>14,516</td>
<td>10,539</td>
</tr>
<tr>
<td>Annuity Rs crore</td>
<td>5,899</td>
<td>18,117</td>
<td>19,928</td>
<td>21,921</td>
<td>15,915</td>
</tr>
<tr>
<td>EPC Rs crore</td>
<td>–</td>
<td>21,758</td>
<td>23,933</td>
<td>26,327</td>
<td>19,113</td>
</tr>
</tbody>
</table>

Source: IDFC analysis
The projected cash flows during the 12th Plan for the revised cash flows are presented in Table 25.12. By staggering cash outflows over four years instead of 2 ½ years, the net cash flow deficits are smaller in the early years, especially compared to the fast track roll-out.

**Table 25.12: Projected cash flows for NHAI until 2020 with a modest roll-out and higher inflation (Rs crore)**

<table>
<thead>
<tr>
<th>Item</th>
<th>FY 12</th>
<th>FY 13</th>
<th>FY 14</th>
<th>FY 15</th>
<th>FY 16</th>
<th>FY 17</th>
<th>FY 18</th>
<th>FY 19</th>
<th>FY 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annuity projects</td>
<td>5,263</td>
<td>5,263</td>
<td>7,842</td>
<td>6,323</td>
<td>6,960</td>
<td>9,551</td>
<td>13,657</td>
<td>18,173</td>
<td>22,255</td>
</tr>
<tr>
<td>EPC projects</td>
<td>–</td>
<td>5,439</td>
<td>11,423</td>
<td>18,004</td>
<td>22,783</td>
<td>17,343</td>
<td>11,360</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>VGF for toll projects</td>
<td>1,811</td>
<td>3,005</td>
<td>2,677</td>
<td>1,924</td>
<td>2,344</td>
<td>1,455</td>
<td>1,107</td>
<td>725</td>
<td>–</td>
</tr>
<tr>
<td>O&amp;M(^1)</td>
<td>–</td>
<td>33</td>
<td>112</td>
<td>255</td>
<td>464</td>
<td>664</td>
<td>841</td>
<td>926</td>
<td>1,018</td>
</tr>
<tr>
<td>Renewal costs</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>530</td>
<td>1,224</td>
</tr>
<tr>
<td>Administrative expenses</td>
<td>124</td>
<td>133</td>
<td>147</td>
<td>193</td>
<td>211</td>
<td>230</td>
<td>252</td>
<td>274</td>
<td>294</td>
</tr>
<tr>
<td>Land acquisition costs</td>
<td>6,250</td>
<td>6,875</td>
<td>7,563</td>
<td>8,319</td>
<td>6,039</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Total outflows</td>
<td>13,448</td>
<td>20,749</td>
<td>29,764</td>
<td>35,018</td>
<td>38,800</td>
<td>29,243</td>
<td>27,747</td>
<td>21,321</td>
<td>25,690</td>
</tr>
<tr>
<td>Cess revenue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toll revenue</td>
<td>8,250</td>
<td>8,726</td>
<td>9,230</td>
<td>9,762</td>
<td>10,326</td>
<td>10,921</td>
<td>11,552</td>
<td>12,218</td>
<td>12,923</td>
</tr>
<tr>
<td>Premium for toll projects</td>
<td>2,093</td>
<td>2,407</td>
<td>2,768</td>
<td>3,183</td>
<td>3,661</td>
<td>4,210</td>
<td>4,841</td>
<td>5,567</td>
<td>6,403</td>
</tr>
<tr>
<td>Total inflows</td>
<td>2,077</td>
<td>2,181</td>
<td>2,736</td>
<td>6,331</td>
<td>7,068</td>
<td>7,883</td>
<td>8,785</td>
<td>9,593</td>
<td>10,073</td>
</tr>
<tr>
<td>Surplus</td>
<td>12,420</td>
<td>13,314</td>
<td>14,734</td>
<td>19,277</td>
<td>21,054</td>
<td>23,014</td>
<td>25,178</td>
<td>27,379</td>
<td>29,399</td>
</tr>
<tr>
<td>Bonds issued</td>
<td>10,000</td>
<td>8,733</td>
<td>16,566</td>
<td>18,635</td>
<td>22,169</td>
<td>12,470</td>
<td>9,832</td>
<td>2,011</td>
<td>4,525</td>
</tr>
<tr>
<td>Interest payment</td>
<td>-1,028</td>
<td>-7,434</td>
<td>-15,030</td>
<td>-15,741</td>
<td>-17,746</td>
<td>-6,229</td>
<td>-2,569</td>
<td>6,058</td>
<td>3,709</td>
</tr>
</tbody>
</table>

*Source: IDFC analysis*

*Assumptions: Same as in Table 25.4*

With higher overall costs of the NHDP, both due to a higher cost of construction as well as a higher share of annuity and EPC projects, the overall debt levels are higher (Table 25.13).

**Table 25.13: Bonds issued to finance NHAI deficits in modest roll-out with medium-term debt**

<table>
<thead>
<tr>
<th>Item</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum bonds issued in a year</td>
<td>Rs 22,169 crore in 2015–16</td>
</tr>
<tr>
<td>Maximum outstanding bonds</td>
<td>Rs 1,04,940 crore in 2020–21</td>
</tr>
<tr>
<td>Last bonds issued</td>
<td>2026–27</td>
</tr>
</tbody>
</table>
However, large debt servicing takes place when cash flows are positive and large (Figure 25.3).

![Figure 25.3: Medium-term bonds issued to finance modest roll-out with higher costs](image)

Source: IDFC analysis

Nevertheless, the level of outstanding bonds is much larger, even relative to other scenarios. In general, while the structure of debt and the continuous increase in revenues implies that cumulative cash flows will be positive in the long run, there would be cash flow issues in the short run, especially in terms of the ability to issue new bonds with a large amount of outstanding bonds. Sensitivity to cost and revenue parameters have to be considered.

On the revenue side, cess revenue is exogenously determined and would continue to grow with increase in the consumption of transportation fuels. On the cost side, while VGF/premium bids are expected to change as roads with less traffic are contracted, trends in annuity bids do not show a clear trend, either rising or falling. The cost of construction would raise the total project costs and need to be accounted for in the inflation rate. Thus the four parameters that affect project viability are the inflation rate, the growth rate in toll revenue, and the proportion of VGF and premium bids to the total project cost. However, premium payments become a significant part of the revenue stream only after 2018–19, well after the largest bond issuance by NHAI. Thus only inflation rate, toll revenue, and proportion of VGF bids are taken into account in this sensitivity analysis (Table 25.14).
Table 25.14: Sensitivity to key parameters in base scenario

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Max bonds issued (Rs crore)</th>
<th>Change with respect to base scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in toll revenue growth rate</td>
<td>15%</td>
<td>12,627</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td>13,049</td>
<td>3.34%</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>13,435</td>
<td>6.40%</td>
</tr>
<tr>
<td>Annual inflation</td>
<td>6%</td>
<td>12,627</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>9%</td>
<td>13,435</td>
<td>6.40%</td>
</tr>
<tr>
<td></td>
<td>12%</td>
<td>14,103</td>
<td>11.69%</td>
</tr>
<tr>
<td>Proportion of VGF to TPC</td>
<td>24%</td>
<td>12,627</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>35%</td>
<td>13,878</td>
<td>9.91%</td>
</tr>
<tr>
<td></td>
<td>40%</td>
<td>14,447</td>
<td>14.41%</td>
</tr>
</tbody>
</table>

Source: IDFC analysis

Other potential risk factors

Contingent liabilities due to arbitration disputes: According to NHAI’s Annual Report 2009-10, there were 133 arbitration cases pending with claims amounting to Rs 9471.56 crore. However, progress on settling these disputes and clearing these liabilities has been limited. The Ministry of Road Transport & Highways (MoRTH) reported in 2009 in response to a Lok Sabha question that no amount had been released on account of arbitration cases. The B. K. Chaturvedi Report in February 2010 also presents the following analysis of disputes where the arbitration award had been decided until January 2010. As can be observed from Table 25.15, only 14 per cent of the projects comprising less than 5 per cent of arbitration awards were accepted by both parties. The remaining are still outstanding. As and when these disputes are settled, the eventual impact on NHAI’s cash flows may be significant, being nearly 70 per cent of the highest annual losses projected in Table 25.4.

Table 25.15: Arbitration awards until 2010

<table>
<thead>
<tr>
<th>Disputes</th>
<th>Rs crore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbitration award decided</td>
<td>490</td>
</tr>
<tr>
<td>Accepted by both parties</td>
<td>68</td>
</tr>
<tr>
<td>Award challenged by NHAI</td>
<td>300</td>
</tr>
<tr>
<td>Award challenged by private contractor</td>
<td>80</td>
</tr>
<tr>
<td>Yet to be accepted or challenged</td>
<td>42</td>
</tr>
</tbody>
</table>

Source: IDFC analysis
**Aggressive bidding:** In recent awards, some bids have been very aggressive such that the IRRs could be negative or lower than the cost of capital (cost of raising the funds for the project). For example, the equity IRR for the Khagaria–Purnea annuity project won by Punj Lloyd was 7.8 per cent while for the Barasat–Krishnagar project, the IRR was negative. It does not make economic sense for a company to take a project with a negative IRR, unless it is compensated in some other way, like development rights along the highway. However, in most of the recent BOT cases, such rights have not been awarded. One reason for developers bidding so low could be that they are already situated close to the project site or are already carrying out other projects close to the project site. This has allowed them to exploit economies of scale and scope to reduce average costs and hence bid lower. These developers are also likely EPC contractors and thus would get some return from project construction as well. Finally, market watchers expect that since most developers who have bid aggressively for BOT projects are well-established corporate houses with large infrastructure investments and are able to absorb short-term losses, the projects are unlikely to be stranded or abandoned before the completion of the concession period. However, financial institutions that have lent to such projects may have to consider debt restructuring if inflows on account of tolls are persistently lower than levels required for achieving a reasonable IRR. The impact on NHAI’s finances in this case will be limited to renegotiation on the premium bids. Each percentage point decrease in premium with respect to the TPC would lead to a decline in revenues of Rs 452 crore per annum.

**Conclusion**

While there would be large and growing cash flow deficits on account of the remaining NHDP stretches being awarded over the next few years, a secular increase in revenues from cess and tolls would eventually allow NHAI to be able to service debt that may arise from these cash deficits. Even with a faster roll-out or an increase in project costs, positive cash flows do eventually cover the deficits of the early years. However, the issue that needs to be addressed is whether there exists a sufficiently large bond market for NHAI’s debt since NHAI would have to raise very large volumes of debt every year. Some policy support in terms of providing tax relief on interest earned to investors would help support NHAI’s efforts in raising debt. However, there will be concerns regarding NHAI’s balance sheet once the debt levels rise. Finally, given the substantial impact that land acquisition costs have on NHAI’s cash flows in the early years of the project when outflows on account of VGF and EPC payments are also large, some budgetary support for land acquisition would also help NHAI.

*Kaushik Deb and Kunal Katara*
REFERENCES
6. National Highways Authority of India. 2011c. *National Highways Authority of India—Presentation by Dr. J N Singh, Member (Finance), NHAI*

NOTES
1. The authors gratefully acknowledge inputs and comments from all business groups and IDFC colleagues in the preparation of this sector note. Feedback and comments from Mr Raghav Chandra, Mr G Suresh, Mr Gajendra Haldea, Mr Arnab Bandhopadhayay, and Mr Srikumar Tadimalla also added great value to this exercise.
2. EPC contracts here are assumed to be ‘fixed term, fixed price’ contracts.
3. The *Economic Survey 2011* restates this goal, maintaining that going forward, the remaining length of NHDP will be developed in the ratio of 60:25:15 for toll, annuity, and EPC respectively. Discussions with NHAI reveal that this ratio has been the guiding criterion since 2008–09 onwards for awarding new projects. This ratio was originally proposed by the B. K. Chaturvedi Committee on the National Highways Development Programme based on projected traffic level and the expected IRR from tolling that traffic level for the remaining stretches of the NHDP.
4. NHAI goes on to assume toll revenues of Rs 5000 crore per annum for their work plan projections for the Twelfth Five-Year Plan.
5. TPC in this analysis is the total project cost estimated in the detailed project report of each project and not the actual project cost at the end of the project borne by the developer.
6. Liabilities will accrue to NHAI only as the projects are executed and VGF and EPC payments are assumed to be phased in a similar manner: 30 per cent in Year 1, 40 per cent in Year 2, and 30 per cent in Year 3.
1. INTRODUCTION

Vision: Ideally, a water supply system should provide its product continually in accord with sanitary standards, without interruptions or shortages at an adequate pressure, and at a price that is affordable to the end consumer. Similarly, sewage services should keep their networks free of obstructions and leakages and treat the entire volume of waste collected in a manner that preserves waterways, water sources and the environment as a whole.1

Reality: The situation in India is unfortunately far from ideal. The extent of water supply and sanitation facilities is grossly inadequate, and even in those areas which are served water supply is intermittent and often of poor quality, resulting in negative health impacts.

Confining itself to the issues in urban water supply and sanitation, this paper examines some of the reasons behind the dismal state of affairs in the sector, and finds that under the current system of public provision of services, not only are urban water utilities financially unviable and essentially inefficient, they also lack the incentives necessary to improve performance. The paper therefore suggests that the provision of water supply should be delegated to the private sector, which can not only bring in funds, but also possesses the commercial orientation necessary to improve efficiencies. It also takes a closer look at some common options for private sector participation, and cautions that the choice of model should be one that attracts much-needed investments into the sector, and apportions enough risks onto the private operator, so as to inculcate the incentive structures that are sorely lacking in the public model.
The paper is organised as follows: Section II highlights the administrative structure of the urban water sector, while Section III gives details of the current status of the sector. Section IV looks at some of the issues in water provision, including the problems with public provision and the plight of the poor, who often end up paying more for water than their wealthier counterparts. Section V suggests measures for reform, while Section VI concludes the paper.

2. **Administrative set-up**

2.1 **Policy and institutional frameworks**

As per the Constitution of India, water is essentially a ‘state subject’, and is therefore the responsibility of state governments. Water policies are usually formulated by state water supply departments or their equivalents, and implemented either directly through public health engineering departments, or through parastatal agencies such as state water supply and sewerage boards, industrial development corporations and city level boards, or through urban local bodies (ULBs) such as municipalities, which are legally empowered to provide such services by the 74th Constitutional Amendment (see Box 26.1). Water quality is usually monitored by state pollution control boards.

The functional domain and scope of services of the different water entities in an area varies from implementation of water supply projects and responsibility for the distribution and supply of water to the maintenance of services and collection of tariffs. For example, while the Kerala Water Authority is responsible for this entire range of services, the Punjab Water Supply and Sewerage Board is responsible only for the implementation of projects, leaving service provision to the ULBs. Thus, the institutional arrangements for the provision of water varies between states, cities and even within a single city.

**Box 26.1: The 74th Constitutional Amendment (74th CA)**

The 74th CA accords constitutional status to ULBs, and enables local governments to assume a greater role in the planning, management and financing of urban services. The CA prescribes a uniform structure of municipal governance throughout the country, and calls for each state to set up three types of institutions, namely, municipal corporations for larger cities, municipal councils for smaller cities and towns, and nagar panchayats for transitional areas—in transition from rural to urban status. While the provisions of the CA include an indicative list of functions to be assigned to urban local bodies, it is up to the states to decide which of these functions they actually wish to devolve to ULBs. Municipalities’ actual powers therefore depend on laws passed at the state level. Among the activities which states may devolve to municipalities are: water supply for domestic, industrial and commercial purposes; and public health,
sanitation and solid waste management. All states (except Jammu and Kashmir) have either enacted a new municipal law, or have amended existing laws to conform to the provisions of the 74th CA.

At the centre, the Ministry of Urban Development and Poverty Alleviation assists state governments/union territories by providing guidance for policy formulation, legislation and technical clearance for schemes, as well as by providing training facilities, etc. It also facilitates external assistance from bilateral/multilateral agencies. Policies and programme content are decided at the time of formulation of the five-year plans. The union government also influences the sector through specialised finance institutions such as the Housing and Urban Development Corporation (HUDCO).

2.1.2 The National Water Policy

This policy was adopted by the Government in 1987. It prioritised the allocation of water amongst its various uses, and also laid down conditions for water quality, conservation, etc. A revised draft of this policy was prepared in 1998, to address issues such as inter-state river water disputes, private participation in the provision of water services, resettlement and rehabilitation of project-affected persons, etc. This revised draft was however rejected, due to disagreements between states on issues such as inter-state water disputes.

3. Status of the Water and Sanitation Sector

According to official estimates, the extent of the population estimated to be covered by safe drinking water was 84 per cent at the beginning of the Eighth Five-Year Plan. This figure is however deceptive, as it conceals large distributional inequities between states, circles and settlements within states. Except for Class I cities (with populations of over one lakh), water supply in all other cities falls far below the national target of 140 litres per capita per day (LPCD), with Class IV cities (10,000–20,000 people) receiving an average of only 57 LPCD.

Further, in most cities, water is supplied for just a few hours a day. India’s four largest cities are ranked among the five worst in terms of hours of availability of water per day, in comparison to other Asian cities with populations of over 1 million (see Table 26.1). Between 25 to 50 per cent of water supplied is lost due to leaks and water and sewerage assets are in very poor condition, in many cases having outlived their operational efficiency. Many consumers have responded to water scarcity by partially self supplying water through ground-level pumps, roof tanks, boreholes, etc. or by purchasing water from private tankers.
Table 26.1: Results for water utilities in selected Asian cities

<table>
<thead>
<tr>
<th>City</th>
<th>Coverage (per cent)</th>
<th>Availability (hrs)</th>
<th>Metering (per cent)</th>
<th>Staff per 1000 connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kolkata</td>
<td>66</td>
<td>10</td>
<td>—</td>
<td>17.1</td>
</tr>
<tr>
<td>Chennai</td>
<td>97</td>
<td>4</td>
<td>25.9</td>
<td>25.9</td>
</tr>
<tr>
<td>Delhi</td>
<td>86</td>
<td>4</td>
<td>73.0</td>
<td>21.4</td>
</tr>
<tr>
<td>Mumbai</td>
<td>100</td>
<td>5</td>
<td>67.0</td>
<td>33.3</td>
</tr>
<tr>
<td>Shanghai</td>
<td>100</td>
<td>24</td>
<td>100.0</td>
<td>6.10</td>
</tr>
<tr>
<td>Colombo</td>
<td>58</td>
<td>22</td>
<td>94.0</td>
<td>7.30</td>
</tr>
<tr>
<td>Jakarta</td>
<td>27</td>
<td>18</td>
<td>100.0</td>
<td>5.90</td>
</tr>
<tr>
<td>Kuala Lumpur</td>
<td>100</td>
<td>24</td>
<td>100.0</td>
<td>1.10</td>
</tr>
<tr>
<td>Manila</td>
<td>67</td>
<td>17</td>
<td>98.0</td>
<td>9.80</td>
</tr>
</tbody>
</table>


In the case of urban sanitation as well, though about 46 per cent of the population had provision for sanitary excreta disposal facilities at the beginning of the Eighth Plan, only 29 per cent had a sewerage system, while the rest had only limited sanitation facilities. Of the total municipal waste water generated in cities, less than half is collected, and of this, less than half goes through some form of treatment. For example, in the 23 metro cities, while 9.3 billion litres per day (BLD) of waste water is generated, only about 2.9 BLD is treated, while the remaining 6.4 per cent is disposed of untreated.

These dismal conditions in the supply of safe drinking water and sanitary disposal of solid and liquid waste have contributed to the continued high morbidity from water-borne and vector-borne diseases in the country. It is estimated that about 30.5 million disability adjusted life years (DALY) are lost each year due to poor water quality, sanitation and hygiene.

4. Issues

4.1 Problems with public provision of water services

The provision of water services has been largely in the public domain, because water has been considered a ‘merit good’ that should be universally available to all, coupled with the natural monopoly characteristics of water systems—i.e. the fact that it may be inefficient to have more than one water provider serving a particular area. The extent of water services has however been largely inadequate under this system, because public providers of service are financially constrained due to low cost recovery levels, and are also inhibited in their ability to raise resources. This leads to under-investments in the sector, especially for operations and maintenance. Their
lack of finances also leads to continued dependence on state governments for funds, as a result of which they lack hard budget constraints, which manifest themselves in inefficiencies.

4.1.1 Cost recovery

Most ULBs are in financial disarray, and are not even able to cover their operational and maintenance (O&M) costs. Further, ULBs are also constrained in their ability to raise finances. While the 74th CA provides for functional autonomy at the local level, ULBs to a large extent continue to remain dependent on state governments for their finances, as the 74th CA does not provide for any corresponding fiscal autonomy.

### Table 26.2: Sources of revenue for urban local bodies 1997–98

<table>
<thead>
<tr>
<th>States</th>
<th>Total revenue (Rs crore)</th>
<th>Own sources</th>
<th>Transfers (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Tax</td>
<td>Non-tax</td>
</tr>
<tr>
<td>Octroi-levying states</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gujarat</td>
<td>10921.00</td>
<td>79.74</td>
<td>7.71</td>
</tr>
<tr>
<td>Haryana</td>
<td>5716.80</td>
<td>42.80</td>
<td>37.71</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>21721.10</td>
<td>65.44</td>
<td>29.96</td>
</tr>
<tr>
<td>Orissa</td>
<td>5046.70</td>
<td>46.92</td>
<td>20.20</td>
</tr>
<tr>
<td>Punjab</td>
<td>7074.20</td>
<td>69.60</td>
<td>19.42</td>
</tr>
<tr>
<td>Manipur</td>
<td>906.90</td>
<td>90.42</td>
<td>7.87</td>
</tr>
<tr>
<td>States without octroi</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>13800.10</td>
<td>36.37</td>
<td>14.80</td>
</tr>
<tr>
<td>Assam</td>
<td>4721.40</td>
<td>23.24</td>
<td>35.84</td>
</tr>
<tr>
<td>Bihar</td>
<td>10313.30</td>
<td>36.86</td>
<td>15.91</td>
</tr>
<tr>
<td>Karnataka</td>
<td>11417.30</td>
<td>18.12</td>
<td>25.06</td>
</tr>
<tr>
<td>Kerala</td>
<td>7629.60</td>
<td>44.69</td>
<td>25.63</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>11472.80</td>
<td>22.61</td>
<td>24.73</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>8713.80</td>
<td>62.90</td>
<td>26.90</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>13418.40</td>
<td>21.21</td>
<td>23.13</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>17478.10</td>
<td>13.50</td>
<td>5.95</td>
</tr>
<tr>
<td>West Bengal</td>
<td>9764.41</td>
<td>36.51</td>
<td>22.82</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>2117.60</td>
<td>15.27</td>
<td>10.59</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>947.50</td>
<td>37.66</td>
<td>8.62</td>
</tr>
<tr>
<td>Tripura</td>
<td>1130.30</td>
<td>27.31</td>
<td>15.61</td>
</tr>
<tr>
<td>All</td>
<td>163413.49</td>
<td>56.40</td>
<td>26.38</td>
</tr>
</tbody>
</table>

Table 26.2 provides some details of the finances of ULBs in 1997–98. As can be seen, municipal governments in India derive their revenue from both their own sources (tax and non-tax), as well as from state government transfers which include grants-in-aid and shares in taxes collected from state governments. The implications of these sources on ULB revenues are discussed below.

Tax revenues for ULBs are generated mainly from octroi and property taxes. Tax revenues were an important source of income for the six states that charged octroi at that time, i.e. Gujarat, Haryana, Maharashtra, Manipur, Orissa and Punjab. Octroi, however, cannot be relied upon to provide a steady stream of revenues for ULBs, as it is a highly distortionary tax that adversely affects the movement of goods across states. It is for this reason that it has been abolished in many states now, including Gujarat, and is currently on its way out in Maharashtra as well.

In many developed and developing countries, property tax is the primary source of funding for infrastructure services. In India, however, these levies, which include water taxes and sewerage taxes, have not been considered to be a buoyant source of revenue for municipalities because of poor collection efficiency, narrow base, high rates, under-valuations, etc. Further, as these taxes are linked to the annual ratable value of properties, they are also affected by limits imposed on rents of properties under rent control laws.

Non-tax revenues comprise user charges, rent from municipal properties, licence fees, etc. As can be seen from the table, these charges form an abysmally low percentage of total revenues. Generally, water charges do not reflect costs, but are differentiated depending on the type of user, i.e. domestic, commercial and industrial. In almost all cities, the rates for non-domestic users are much higher than those for domestic users. In some cities which have rising block rates by consumption levels, the lowest rates for metered domestic connections are generally pegged to affordable lifeline rates. In unmetered areas, rates are fixed according to the varying size of connections. In the case of people in low-income areas, the policy has usually been to provide stand posts and common toilets with almost free charges. In addition to affecting cost recovery levels, these policies also act as a disincentive to save water.

Insufficient revenues for local bodies result in insufficient expenditures, as municipal governments are legally required to have a balanced budget. In states where municipal receipts are low, expenditures too are low. This limits the quality and nature of services provided by the municipality—as it leads to compromises on O&M spending. In fact, O&M constitutes only 20 per cent of total expenditure of municipal services, while wages and salaries account for 60 per cent.
As a result of the inadequacy of their own sources of revenue, municipalities across states depend on state transfers as an important source of revenue (in some cases to a great extent, as in Uttar Pradesh). Budgetary resources for such facilities are however becoming increasingly scarce. It is estimated that the total investment requirements per annum for urban infrastructure, including about Rs 9000 crore towards operational and maintenance expenses, is about Rs 30000 crore for the period 1996–2001. As against this, the annual availability of funds for urban infrastructure is roughly Rs 5000 crore. For the total backlog to be cleared, and additional investment requirements to be met, the current investment in urban infrastructure would have to increase by at least 30 per cent per annum.10

It is therefore imperative that these bodies reduce their dependence on states, and rely more on their own sources of revenue. Urban local bodies are however constrained in their ability to raise resources. The problem with property taxes have been described above. It is also difficult to raise user charges, because, other than municipal corporations, which have some control over tariffs, in most other local bodies, tariffs are prone to state control and to politicisation. User charges are also difficult to raise, because people are unwilling to pay more for an inadequate and inefficient service.

Some municipalities have tried to access the debt market through bond issues. However, outdated budgeting systems and lack of financial discipline has made it hard for these ULBs to derive a good credit rating and obtain investor confidence. As a result, these debt instruments require backstop guarantees by state governments, which defeats the purpose of making ULBs financially independent.

4.1.2 Lack of commercial orientation

Because of the continued dependence on state government finances as described above, urban local bodies in most cases are not faced by hard budget constraints. There is often no direct connection between the risks undertaken by utilities, and their returns. In many cases, with the exception of some large cities, capital investments are usually undertaken by state governments or parastatal organisations, after which assets are transferred to local bodies for operations and maintenance. This lack of investment and operational risks seriously distorts any incentives for ULBs to improve their performance and increase efficiencies. Further, continued dependence on states for finances also affects the autonomy of ULBs, subjecting them to considerable political interference.

Operational inefficiencies have manifested themselves in the system in a number of ways. Water systems in India deliver an average of less than 50 to 60 per cent of their capacity to end users, compared with best practice delivery rates of around 80 to 85 per cent in other countries, mainly because of poor procurement and construction
practices and inadequate maintenance. Overstaffing is also endemic, with the ratio of staff per 1000 service connections well above international best practice rates of 2–3 (see Table 26.1). Water losses are also very high—almost up to 50 per cent in some cases. Most of this is on account of leakages. Metering is also largely inadequate. While water meters do exist in most places, these often do not work, and are hampered by particulate matter in the distribution mains, as well as by ineffective supervision and vandalism.

4.2 Willingness to pay

As mentioned before, in the case of people in low-income areas, the policy has usually been to provide standposts and common toilets with almost free charges. Low tariffs and near-free services to the poor have been justified on the grounds that consumers are unable or unwilling to pay for water services. Ironically though, the poor often end up paying more for their ‘free’ water supply in the form of ‘coping costs’, than what is paid by those with individual water connections. For the poor, these costs imply the opportunity cost of time spent in the collection of water, or the cost of procuring water from alternative sources such as private vendors. Incidentally, while even those with individual connections incur coping costs through investments in ground-level pumps, roof tanks, etc. as well as payments at high prices to private water vendors such as tankers, in quantitative terms, this may sometimes still be lower than what is being paid by the poor. A number of ‘willingness to pay’ studies have thus found that people are ready to pay a higher price for water, provided they are supplied with a full service (i.e. continuous, piped, potable and high pressure). For example, a study conducted in Baroda in 1995 found that households were willing to pay up to 3.4 times more than the tariff rates proposed by the Baroda Municipal Corporation, as they were paying even more than this amount in coping costs. A similar study carried out in Dehradun (see Box 26.2) found that 80 per cent of households were willing to pay more than the prevailing tariff rates. Such willingness to pay studies have however been largely ignored by governments while setting tariffs.11

Box 26.2: Coping costs and the urban poor

A study carried out by the US Agency for International Development (USAID) in Dehradun found that the intermittent nature of water supply in the city adversely affected the poor. While the higher income households dealt with inadequate water supply through investment in supplementary household storage, filters, and pumping equipment, the poor had to procure ‘free’ water by queuing for long periods at public taps and then walking home, or by purchasing from door-to-door vendors. Quantifying this, it was found that households with individual piped connections paid US$0.06 per cubic metre
in addition to the current water tariff. However, households using public taps spent over three hours a day collecting water, and the opportunity cost of this in terms of working hours lost amounted to US$1.28 per cubic metre, which increased to US$1.57 in the dry season, when the time spent fetching water increased by one hour a day.

The study also found that the willingness to pay for a continuous water supply exceeded the current revenue received by the Dehradun water works department (WWD). Moreover, full service water supply was actually a commercially viable proposition in Dehradun, as current coping costs were at least as great as the current amount being paid to the WWD in water billings. Thus, with proper planning, this revenue potential could be recovered into the cash flows of the WWD.


5. REFORMING THE WATER SECTOR

While suggesting reforms for the water sector, it must be kept in mind that there is no single template that may be applied to all cases. Not only is this because of the fact that the size and scope of water systems differ from city to city, but also because of the lack of uniformity in institutional arrangements across states, and even within different areas in a single state. In addition, the 74th Amendment does not specifically define the functional responsibilities of municipalities, leaving this decision to state governments. As a result, the levels of empowerment and autonomy of municipal bodies also vary across states.

Nevertheless, it is also important to note that there are certain common principles in water sector reform that can be applied to water utilities across states. These include private participation in the provision of water services to improve efficiencies; competition—to the extent possible—for the market, and between water providers; and independent regulation, to oversee resultant monopolies and to set cost-reflective tariffs. These issues are discussed in further detail below.

5.1 Private sector participation

The argument against private provision of water services has hitherto been that water and sanitation are essentially ‘merit goods’, meeting basic needs, and with general benefits for all in terms of public health. As the previous section has pointed out, however, inefficient public provision of water services has actually led to a distortionary situation where the poor sometimes end up paying more than their wealthier counterparts. Further, local bodies are financially constrained and the extent and quality of water services have been far from adequate. This situation thus warrants a change.
Private provision of water services has been increasingly recognised in many developing countries to be an important additional source of capital, and also a means to address inefficiencies, since the private sector possesses the necessary incentives required to reduce losses and cover costs. These incentives stem from the fact that a private company would have to pay for inefficiency and low-paying customers out of its own profits, and would therefore be far more determined and effective in minimising these conditions. While before 1990 most developing countries relied on government provision of water supply and sewerage services, by the end of 1997, the private sector had implemented 97 water and sanitation projects in 35 developing countries.\textsuperscript{12}

In India, the concept of private participation of water services is not entirely new. There have been some attempts by states to contract out services to the private sector. However, these efforts have been on a piecemeal, project-wise basis (see Box 26.5).

\subsection*{5.1.1 Unbundling}

Water utilities have traditionally operated as an integrated operation, which carries out capital works, bulk transmission and treatment, as well as the retail distribution of water. Recent international experience in countries such as Australia and South Africa\textsuperscript{13} however shows that water operations may be vertically segregated into two distinct categories, i.e. bulk operations and retail operations, and it is not necessary that the same operator should provide both these services (see Figure 26.1). In fact, in some areas, it may be more efficient for a provider of water services to focus on only one type of operation. Further, in some areas, one bulk supplier could cater to more than one retail supplier. The extent to which functions are divided among separate organisations would depend on the size of the utility, and there may be economy of scale arguments for keeping bulk and retail operations together for smaller entities, or in areas where there is localised source extraction at low consumption levels. Private participation in water services can then be introduced either for an integrated utility, or at different levels for unbundled utilities.
5.2 Competition

Apart from the ‘merit good’ argument, another common reason for public provision of water services has been the belief that water supply is a natural monopoly, i.e. a single provider would be able to supply the market more efficiently than two or more competing providers. While this may be true, recent evidence from a number of countries suggests that competition may be introduced in the provision of water services in a number of ways, thus to some extent alleviating concerns that the private sector would exploit its monopoly status if allowed to provide water services.

5.2.1 Competition for the market

Competition may be introduced through the use of a competitive bidding procedure at the time of privatisation. While this would probably be a one-off event, bidding
parties could compete on the basis of higher performance levels, or lower tariffs, as was the case in Argentina (see Annexure). In case a privatisation contract is to be renewed after a fixed period of time, a re-bid would also attract competition.

**Box 26.3: Competition in the water and sewerage industry in England and Wales**

In 1989, England and Wales carried out one of the first privatisation efforts in the water sector by selling ten publicly-owned water companies. OFWAT (Office of Water Services), the independent water regulator, has evolved a number of ways to introduce competition in the sector.

1. **Inset appointments**
   Inset appointments provide for the existing regulated water or sewerage supplier to be replaced by another, for a specific site. A successful inset appointee can serve its new customer(s) either using its own resources or methods of treatment, or by requesting the use of the existing licensed supplier’s assets.

2. **Cross-border supplies**
   Companies have a duty to allow connections to their water mains from outside their areas. Thus, customers are entitled to receive water for domestic purposes from any licensed supplier, irrespective of where they live. The company is entitled to recover the costs of connecting the customer to its mains. Owners of private sewers and drains have a similar entitlement to connect to the public sewer.

3. **Unregulated supplies**
   Customers are entitled to buy water and sewerage services from private operators who are not licensed or regulated by OFWAT. These private supplies are subject to quality standards, enforced by local authorities.

4. **Common carriage**
   Common carriage occurs when one service provider shares the use of another’s assets, such as its pipe network or treatment works. If an incumbent supplier refuses without proper justification a request for common carriage, or imposes unreasonable terms for access, such conduct might be an abuse of a dominant position and infringe on UK’s competition legislation.

*Source:* www.ofwat.gov.uk

5.2.2 *Third-party access*

Competition may also be introduced by allowing third-party access—i.e. by allowing consumers in an area to derive water from a provider other than the one licensed for that area. Box 26.3 shows how this has been carried out in England and Wales.
In those areas where a utility has been vertically disaggregated, competition could then arise between bulk suppliers and retail suppliers if large water users are allowed to bypass their distribution networks and derive water directly from bulk suppliers. Further, in some larger areas, water systems may be divided on geographical lines, as was done in Manila. Consumers in one area may then opt to be served by the operator in a neighbouring area, if prices in another area are lower. Such a division would also allow a one-time choice to large new consumers, such as factories, who may choose to locate in a particular area where water prices are relatively lower than in neighbouring areas.

5.3 Options for private sector participation

Private contracts can be entered into either for an integrated water entity or at different levels for an unbundled utility. Private participation is especially crucial for retail water operations, as increased operational efficiency at this end is the only way to inculcate ‘willingness to pay’ amongst consumers, and therefore to recover cost-based tariffs.

While awarding private contracts, it may be beneficial to club water and sanitation activities, as consumers may be willing to pay more for water delivery services that yield immediate and direct benefits than for services such as sewage treatment—the benefits of which are more dispersed. In addition, there are also environmental linkages between water and sanitation, as industrial reuse is possible for treated water. Also, stand-alone sewage treatment contracts, often based on volume of water treated, may provide incentives to waste water.

There are various common options for private sector participation, which include, among others, service or management contracts, lease contracts, build/rehabilitate-operate-transfer contracts, concessions or an outright sale or divestiture. A comparative description of these options is provided in Table 26.3.
Table 26.3: Options for private sector participation in water supply

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
<th>Finance investment</th>
<th>Autonomy</th>
<th>Financial risk</th>
<th>Collect tariffs</th>
<th>E.g.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service contracts (1–2 years)</td>
<td>A water utility contracts with a private contractor for the provision of certain specific services such as tariff collection, tunnelling, operations and maintenance, and construction.</td>
<td>Public sector</td>
<td>Low</td>
<td>Low</td>
<td>Public sector</td>
<td>Mexico City</td>
</tr>
<tr>
<td>Management contracts (3–5 years)</td>
<td>These are a more comprehensive form of service contracts. The public authority appoints a private contractor to manage all or part of its operations. All capital and investment responsibility, as well as the bulk of commercial risks remains with the government.</td>
<td>Public sector</td>
<td>Low</td>
<td>Low</td>
<td>Private sector</td>
<td>Trinidad &amp; Tobago</td>
</tr>
<tr>
<td>Lease contracts (5–10 years)</td>
<td>The water utility leases the full operation and maintenance of a utility within a geographic area, and pays the government a fee for rental of assets. The operator collects charges from customers and may finance working capital investments. The government still owns assets and remains responsible for capital investments.</td>
<td>Public sector (not working capital)</td>
<td>Low–medium</td>
<td>Low–medium</td>
<td>Private sector</td>
<td>Guinea</td>
</tr>
<tr>
<td>Concession contracts (20–30 years)</td>
<td>The private operator is given a contractual right to use existing infrastructure assets to supply customers. All investment obligations and decisions lie with the private operator. Concession contracts are therefore longer than lease contracts, so as to enable the operator to recover capital and financing costs.</td>
<td>Private sector</td>
<td>High</td>
<td>High</td>
<td>Private sector</td>
<td>Manila/Buenos Aires</td>
</tr>
<tr>
<td>Divestiture/ build, own, operate</td>
<td>This entails direct sale of infrastructure assets to the private sector. This may be achieved either through 100 per cent private ownership or joint ventures with public sector corporations. Divestiture can be by way of sale of assets, sale of shares or a management buy-out. In a full divestiture or build, own, operate arrangement (for greenfield projects), the private sector has full responsibility for operations, maintenance, and investment in a utility.</td>
<td>Private sector</td>
<td>High</td>
<td>High</td>
<td>Private sector</td>
<td>England &amp; Wales</td>
</tr>
<tr>
<td>Build/ rehabilitate, operate, transfer (15–30 years)</td>
<td>These are specifically designed for greenfield water supply projects or investments in water supply infrastructure which require extensive rehabilitation, and are most applicable to bulk water supply, where the private sector designs, constructs and operates facilities.</td>
<td>Private sector</td>
<td>Medium –high</td>
<td>High</td>
<td>Public sector</td>
<td>Johor Bahru (Malaysia)</td>
</tr>
</tbody>
</table>

The choice of privatisation model is extremely important, and should be based on whether its adoption would address the problems that currently affect the performance of public sector utilities. Thus, the choice of model should be able to address the issue of under-investments into the sector by bringing in much-needed funds, but should also allocate adequate risks onto the private sector operator, so as to incentivise it to perform efficiently. Unless a privatisation model addresses these issues, the condition of the water sector will remain more or less the same, irrespective of who is providing services. Some of the common options for private sector participation in water services are discussed below.

5.3.1 Service and management contracts

Service contracts involve recruiting the private sector to carry out specific operations and maintenance activities such as meter reading, billing and collection, etc. usually for a period of 1–2 years. Management contracts can be distinguished from service contracts by the amount of responsibility that they pass on to the private sector, as these agreements move beyond individual service functions to encompass a fuller range of operations and maintenance, and may last for about 3–5 years.

Taking a closer look at these options for private participation, it can be seen that both service and management contracts are essentially short-term solutions. While these have been known to lead to efficiency gains, they would essentially apply to those who already have connections, but may not do much for those without connections. This is because all investment decisions and funding still come from the public sector. Autonomy levels for these contractors are also low. Further, while contracts may include performance targets—such as improvements in unaccounted for water and staff productivity—the attainment of these targets may depend on factors that are beyond the control of the private operator. For example, success in reducing operating costs may depend on the ability to lay off workers, which may not be within the powers entrusted to the private operator.

5.3.2 Lease contracts

Under a lease contract, a private firm operates and maintains a government-owned enterprise for a period of 5–10 years. Lease contracts thus provide medium to long term solutions, but, while operators have control over working capital investments, they rely on state governments to make decisions on capital investments. There may thus be a mismatch in expectations between the contractor and the government as to the type of new investment required, which could lead to negotiations and delays. This would again go against the interests of potentially new customers. Guinea, in West Africa, faced such a problem with its water lease (see Box 26.4).

All the three types of contracts described above, i.e. service, management and lease contracts are temporary solutions, as the private sector does not bring new
investments into the sector, but rather continues to rely on public sector funding. Further, the degree of risk passed on to the private operator is relatively low, which reduces incentives to improve efficiencies.

**Box 26.4: The Guinea water lease**

In 1989, the Government of Guinea, West Africa, entered into a 10-year lease arrangement for private sector operation of water services in the capital city, Conakry, and sixteen other cities and towns. The state-owned national water authority, Société Nationale des Eaux de Guinée (SONEG) owns the water supply facilities and is responsible for planning and implementing new investments and servicing sector debt, while a water management company, Société d’Exploitation des Eaux de Guinée (SEEG) is the lessee.

By 1996, while the population with access to safe water did increase from 38 per cent in 1989, to about 47 per cent, and metering also increased substantially, the water supply system, particularly in Conakry, had not improved and expanded as far as had been initially hoped for.

Unaccounted for water remained high, at about 47 per cent, and new connections to the system had been added slowly. Further, the relationship between SONEG and SEEG had not been smooth. For new connections, each entity blamed the other for the slow progress in this area. While SONEG claimed that SEEG was reluctant to make new connections from existing extensions to the network, SEEG argued that most demand for connections was in those areas where SONEG had not yet invested in. Unaccounted for water remained high because SEEGs incentives to reduce losses were weakened by its low production costs.

The Guinea water lease thus exposes the risks of contracting with the private sector to administer investments it does not fund.


**5.3.3 Concessions and divestitures**

Concessions are long term contracts—up to about 30 years, which confer a private operator with the right to use existing infrastructure assets to supply customers, and also to take on all investment obligations and decisions. Divestitures pass on these same rights through an outright sale. These are therefore the only options that attract much needed funds, and also place full operational and investment responsibilities, and associated commercial and investment risk, with the private sector, thereby maximising the potential benefits of efficiency gains from private sector provision.

Concessions are in fact the most common form of private sector participation in the water and sewerage sector. Of the ninety-seven contracts with the private sector
that had been implemented by 1997 in developing countries, forty-eight were concession contracts, accounting for 80 per cent of all private capital investment in the sector\(^1\) (see Figure 26.2). Concessions have been successfully implemented in countries like the Philippines and Argentina.

\[\text{Figure 26.2: Private participation in water and sewerage in developing countries, 1990–97}\]


Given a choice, governments would probably prefer concession contracts over a divestiture, as they may be insecure about the indefinite nature of the latter. However, divestitures may be based on an operating licence, that provides the buyer of a water utility with the right to supply water, and may contain a clause that permits the revocation of this licence. For example, in England and Wales, the government may terminate the privatised water utilities’ licences after twenty-five years, with ten years’ notice. Thus, the difference between a fixed term concession and an indefinite divestiture with a licence may not be as significant as might appear at first.

\[\text{5.3.3.1 Step-wise contracts}\]

It may be argued that a step-wise contract, i.e. beginning with a management contract or lease, and building up to a concession or divestiture would be feasible in an area where there is resistance to private sector involvement. Arguments in favour of such step-wise approaches state that a less risky contract in the initial years of private participation would enable governments to make gradual increases in tariffs, or require the contractor to build a database on the state of the water system, considering that there is often uncertainty about the condition of assets of a water utility, as they are buried underground. Private sector involvement can thus be broken in gently, this being a politically sensitive area.

The problem with such approaches is that there is no guarantee that utilities will reach the next step, especially if governments have not raised tariffs to cost recovery.
levels during the initial term of the contract. Further, during re-bidding at the time of replacing the initial low-risk contracts with a more risky contract, the re-bid may not attract much competition. This is because the company that wins the management contract would naturally have an advantage in bidding for subsequent contracts, causing potential bidders to stay away. While a solution to this may be in disallowing the initial contractor to bid for the next stage, this would reduce the number of bidders for the first stage of the contract. Further, starting with a short-term contract may delay efficiency gains because of the problems attached to such low-risk contracts, as described above.

5.3.4 **Build, operate, transfer contracts**

Under build, operate, transfer (BOT) contracts, the private sector designs, constructs and operates facilities for a specified period, and then hands it back to the public sector. These contracts are essentially suited to greenfield bulk water operations such as treatments stations, etc. Similarly, rehabilitate, operate, transfer (ROT) contracts would apply to existing bulk operations in need of restoration. In both cases, the private sector brings in investments, and undertakes a significant level of commercial risk. It should be stressed here that such contracts, especially for stand-alone bulk water supply operations will only come into being if off-take risks are taken care of—i.e. through secure contracts with a credible distribution body.

**Box 26.5: Private participation in water supply and sanitation projects in India**

<table>
<thead>
<tr>
<th>City</th>
<th>Services</th>
<th>Management option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chennai</td>
<td>O&amp;M WS&amp;S (pumping stations &amp; tube wells)</td>
<td>Service contracts</td>
</tr>
<tr>
<td>Tiruppur</td>
<td>Bulk water supply and new sewerage</td>
<td>Joint sector company/BOT</td>
</tr>
<tr>
<td>Pune</td>
<td>Augmentation of WS&amp;S</td>
<td>Construction contract Management contract for O&amp;M of new facilities and part billing &amp; collection</td>
</tr>
<tr>
<td>Bangalore</td>
<td>Bulk water supply</td>
<td>BOT</td>
</tr>
<tr>
<td>Alandur</td>
<td>(a) Sewage collection</td>
<td>(a) Construction contract</td>
</tr>
<tr>
<td></td>
<td>(b) Treatment plant</td>
<td>(b) BOT</td>
</tr>
</tbody>
</table>

*Note:* WS&S = Water storage and supply; O&M = Operations and maintenance. The above table provides examples of some prominent contracts that have been entered into with the private sector for water provision in India. As can be seen, the focus of new investments has been on the provision of bulk water supply, through the BOT route.
However, BOT projects do not address the problems of existing water supply and sanitation systems, such as high levels of unaccounted for water, high expenditure on energy, and low cost recovery. In addition, adding more bulk supply without improving the existing distribution systems will further increase the proportion of unaccounted for water and energy consumption, leading to an additional burden on urban bodies. There is therefore a need to shift the focus from adding bulk supply to reforming existing distribution systems.

As can be seen from the table, the only initiatives in this direction have been in the form of service and management contracts, which do not garner fresh investments, and are mostly beneficial to existing customers. It is thus imperative that the scope of private sector participation is shifted to more meaningful long-term contracts such as concessions and divestitures.


5.4 Independent regulation

As pointed out before, water systems, particularly at the distribution end, are usually natural monopolies, i.e. duplication of the system is uneconomical. To some extent, these monopolies can be controlled through competition for the market—i.e. through a bidding process. However, recurring bids for a particular water system may not be feasible, as the private sector would not be able to make accurate capital investment decisions if contract periods are too short. Thus, in a situation where the private sector is being entrusted with a long-term contract where it occupies a monopoly position, regulation becomes necessary to ensure that water utilities do not earn monopolistic rents at the cost of the consumer.

While doing this, regulators would have to balance the interests of both the investor and consumer—on the one hand, ensuring that the former are incentivised to invest and operate systems efficiently, and on the other, seeing to it that consumers are charged a reasonable price for water, but are also encouraged to use water efficiently and avoid wastage. Ideally, water charges that reflect demand and supply should vary by location, quality and time of use, as the cost of supplying water would depend on the desired quality, the costs of transportation, and the time of day that it is required (whether at peak periods).

In the process of ensuring the viability of the sector, regulators would also be responsible for defining other parameters such as the extent of subsidies required, the expected levels of coverage, performance standards, etc. It should be stressed here that considering that all these parameters affect the investment decisions to be taken by potential private operators, they should be spelt out well in advance of the
award of a contract, so as to avoid uncertainty for potential investors at the time of bidding. Other than economic regulation, regulators, if need be, may also take over the task of overseeing water quality from state pollution control boards.

While setting tariffs, regulators may adopt different approaches for regulating utilities. On the one hand, this may be extremely intrusive in the form of rate of return regulation, which specifies the maximum return that can be earned on capital by operators while providing services. Under such a system, the classes of capital and expenditures that comprise the rate base are precisely defined, and prices are reviewed frequently to ensure that actual returns coincide with the allowed rate. On the other hand, in order to limit the frequency of tariff revisions, the regulator may decide to set a medium—long term price-cap, which could be indexed to some variation of a general price index, with the level of variation reflecting estimates of potential cost reductions to be achieved by the firm. The advantage of the latter system is that it motivates the regulated firm to improve productivity in order to reduce costs.

The regulators task to a large extent depends on the amount of information it can extract from the firm it is regulating. In this context, this task becomes easier in the case of an unbundled water utility, where different companies perform different tasks, as the ability to shift costs and revenues within company accounts becomes limited when each individual company keeps separate records and accounts. Also, where there are a number of providers operating in different zones within an area, the regulator can use yardstick or benchmark regulation, whereby, to check whether a company is providing accurate information, it can compare data from one firm with that of similar firms in adjoining areas that may be under its jurisdiction.

Long-term contracts involve the specification of various terms such as those for the purchase and sale of water, third-party access arrangements, etc. Even if these terms are clearly spelt out at the time of awarding a contract, they could change over time, and it is then up to the regulator to balance the interest of the different stake-holders. The regulator may at such times also need to assume the role of an arbitrator.

It is imperative that the regulator remains ‘independent’ from the government, to de-politicise the nature of tariff setting, and to instill confidence amongst potential private investors. In some cases where a certain class of consumers is being undercharged, or overcharged, tariffs may need to be rationalised to make a utility financially viable, and to attract the private sector. In India, regulatory bodies could probably be set up at the state level, as most water policies are formulated at this level.

5.5 Water services and the urban poor

As has been seen, the urban poor often end up paying more for their ‘near free’ water supply than their wealthier counterparts. As a result of their high ‘coping
costs’, this section of consumers is often willing to pay commercial rates, if they are provided with a continuous, reliable water supply. This ‘willingness to pay’, should therefore not be ignored and in those areas where such willingness is not directly forthcoming, the concept of water as an ‘economic good’ should be inculcated.

For those cases where the poor really cannot afford services, subsidies may be continued, but should be as direct and transparent as possible. Further, small-scale infrastructure providers such as resellers, tankers, vendors, latrine diggers, etc. who have hitherto been responsible for supplying a large section of the poor should be allowed to co-exist with private contractors in a particular area. Not only would these providers be able to provide some base level of service to un-served customers until the private contractor is able to roll-out services to these areas, such vendors would also provide a degree of competition to the private provider. In Ghana, tanker associations provide an example of how previously informal means of water provision have been under the regulatory purview of the local water utility (see Box 26.6).

Innovative ways to serve the poor may be evolved, while providing water and sanitation services. For example, in Argentina, under a ‘labour for connection’ scheme—for small-scale water projects that served less than 3000 inhabitants—families in the area provided the labour requirement needed in exchange for a connection to the water network. Similarly, in Kibera (an informal settlement in Nairobi), ‘water kiosks’ serve people without individual connections. A water kiosk is a shop selling primarily water. People pay for water on collection, and carry it to their homes. Users thus pay for what they need, and since this system only requires distribution mains rather than service pipes, installation costs are reduced. In Kibera, many of the kiosks are operated as family enterprises, and also serve as a source of income.

Box 26.6: Tanker associations in Ghana

Teshie is a two square kilometre, low income, residential area, about ten kilometres away from the centre of Accra. Most housing development is unapproved and the area is statutorily ‘unplanned’. As a result, the Ghana Water Company Limited (GWCL), the water utility, is not obliged to extend its services to this area, so most residents do not have in-house or yard water connections.

Tankers therefore supply water to about 25 per cent of the Accra municipality. These tanker services came up initially to supply water to construction sites. However, as the gap between household demand and GWCL water supply grew larger, tanker services extended to households. In order to obtain water of potable quality, some tankers initially started drawing their water illegally from fire hydrants. This practice caused such concern, that it led GWCL to authorise tanker operations, establish water tanker service points at various locations within the municipality, and establish contractual links with tanker owner associations. These associations were established in order to
offer improved conditions of service for tankers, including regularisation of previously illegal operations, access to a reliable water supply, and a favourable bulk rate for water purchased through tanker association service stations. There are currently three tanker associations in Accra, which facilitate competition, and also allow benchmarking.

Under the terms of the contract between GWCL and tanker associations, several quality and pricing measures are to be observed. For example, water tankers may no longer be used for fuel delivery, and member tankers are to be regularly inspected for cleanliness by their association. Failure of one member of an association to comply could lead to disqualification of the contract for the entire association. This acts as a self-regulating measure among members. For its part, GWCL provides each association with metered service points, which are manned by that association.

Through the establishment of the tanker associations, illegal trade has been curbed, as tanker operators themselves monitor the activities of their fellow members. GWCL has benefited through improved revenue collection, increased access to water supply in previously un-served areas, reducing illegal operations and improved control over water quality. Most of these benefits have also been transferred to low income customers, who now have better access to information, and easy access to tanker services. With the improvement in communication systems, vendors can call anytime they require water. This has helped reduce water storage periods. Hygiene conditions required by the association have also increased consumer confidence.


6. ROLE OF THE GOVERNMENT

Having passed on the functions of water provision to the private sector, governments should assume an enabling role, to ensure the smooth functioning of the sector. Rather than embarking on ad hoc projects, each state should develop a cohesive water policy, delegating further responsibilities to Urban Local Bodies (ULBs). States should also evolve the legislation necessary for private participation in the provision of water services and independent regulation. If this task is not assumed by the independent regulator, states would also be required to continue with the task of environmental and quality regulation. The central government on its part should concentrate on bringing about amicable solutions between states for sharing of water resources, and continue to act as a nodal agency for external aid.

7. CONCLUSION

It is imperative that governments hand over the task of providing water and sanitation services to the private sector, which not only has the potential to bring in much-
needed capital into the sector, but also possesses the incentive structures necessary to operate efficiently. This should be done through a long-term contract such as a concession or a divestiture which apportions a significant amount of risk to the private sector to inculcate these incentive structures. At the same time, competition should be introduced wherever possible and any resultant areas of natural monopoly should be brought under an independent regulator. This regulator, while balancing the interests of investors and consumers alike, would be responsible for setting tariffs, performance standards, coverage levels, etc. and, if need be, may take over from state governments the responsibility of governing water quality.

Having thus devolved the responsibility of providing water services to the private sector, governments on their part, and particularly those at the state level, should provide clarity and consistency in policy making, to ensure the smooth functioning of the sector.
ANNEXURE

The Buenos Aires concession

Argentina privatised the water and sanitation services in the Buenos Aires metropolitan area in 1993, through a 30-year concession contract.

Before the award of the contract, the operation of the Greater Buenos Aires system by the public provider, Obras Sanitarias de la Nación (OSN), suffered from a number of systemic inefficiencies, very similar to those faced by utilities in India. Unaccounted for water was very high—about 45 per cent, water meters were installed at only 20 per cent of connections, and the ratio of staff to connections was also very high. The company was also subject to considerable political intervention. After continuous efforts to improve this scenario, and the recognition that huge investments were required for rehabilitating and expanding the water and sewerage sector, it was decided to privatise the system.

Under the terms of the contract, the government remained the owner of the assets, but the concessionaire was responsible for operating, maintaining and managing the system and investing in rehabilitation and expansion works. An autonomous regulatory body, Ente Tripatito de Obras y Servicios Sanitarios (ETOSS), was established to ensure quality of service, protect consumers and to monitor compliance with the terms of the contract. The Department of Natural Resources and Environment was in charge of environmental regulation.

One of the significant features of the privatisation process was the transparency of the bidding process, which enabled competition for the water market. Preparations for the transformation towards private sector provision were extensive, and about US$4 million was spent on data collection, preparation of legal documents and identification of potential bidders. The concession was awarded to the bidder who offered the lowest water rate, while meeting the required service levels and performance targets. Tariff levels, as per the contract, are to be formally reviewed at five-year intervals, and are set on the basis of price caps. The concession contract also stipulates goals for coverage, quality and investment.

By December 1995, a number of positive results ensued. The maintenance system had been revamped, and the backlog of repairs significantly reduced. Production capacity increased by 26 per cent, while rehabilitation of pipes cut water losses to about 25 per cent. Coverage for sewerage services was also up, by about 8 per cent. Staff was reduced by 47 per cent. While prices were initially reduced by 27 per cent, after an increase, they were still 17 per cent below those charged by the public utility.

One aspect of the concession that did run into rough weather was in the area of regulation. In 1997, a renegotiation of the concessionaire’s contract was called for,
on the grounds of lower than expected revenues, non-fulfilment of the investment plan, and growing misunderstandings between the firm and the regulator. These renegotiations were held between the concessionaire and the Ministry of Economy and the Department of Natural Resources, but ETOSS was not invited to participate in the process. The changes agreed to at the talks included, amongst other things, the inclusion of a new connection charge for consumers. A few days after the decree initiating these changes was issued, appeals were made against it by consumer associations and the National Ombudsman, on the grounds that there could not be any new regulation without ETOSS’s participation. These appeals were upheld in court, and the changes sought in the decree were suspended.

NOTES

7. The rateable value is the rental value which the property would fetch.
8. For example, in Chennai, while commercial and industrial users consume only about 16 per cent of the total water supplied, they contribute about 46 per cent of the board’s revenue. Similarly, in Mumbai, water charges are set on a bulk rate basis, and vary from Rs 3 per cubic metre per month for domestic users, to Rs 20–60 for commercial and industrial users.
11. A study entitled ‘Willing to Pay but Unwilling to Charge’ was carried out by the Department of International Development (DFID) in the UK to determine the impact of such ‘willingness to pay’ studies on local government policies. In the case of the Baroda study, they found that while the municipal corporation did raise tariffs, this increase was much below that recommended by the study. In Dehradun, though the results of the study were presented to the Dehradun Water Works Department and other representatives of the government, no tariff policy changes resulted.
13. In 1995, the Melbourne Water Corporation was split into four entities—a wholesaler and three retail water distribution companies for metropolitan Melbourne. The latter purchase water from the wholesaler, and pay it for treatment of sewage and drainage.
Similarly, in South Africa, regional water boards in South Africa have traditionally been responsible for both bulk and retail water operations. The government however passed legislation which separated these functions, with boards retaining responsibility only for the delivery of bulk services, while distribution services would be contracted out. Municipalities may thus either sign contracts with retailers to provide water and sanitation services within their areas, or may provide these areas on their own.

14. In Manila, prior to the privatisation of the water and sanitation system (through a concession), the total service area was divided into two zones, to be served by two different concessionaires.


16. Water kiosks differ from standpipe connections, as they are fitted with a storage tank, which can provide water even if the supply in the distribution mains is intermittent.
For us to establish SEZs and adopt open door policies, we must have a clear guiding ideology that is not to constrain but to release.

Deng Xiaoping (on a visit to the Chinese SEZs in 1984)

1. INTRODUCTION

“With a view to augmenting infrastructure facilities for export production [the Government of India] has … decided to permit the setting up of Special Economic Zones (SEZs) in the public, private, joint sector or by the state governments. The minimum size of the Special Economic Zone shall not be less than 1000 hectares. This measure is expected to promote self-contained areas supported by world-class infrastructure oriented towards export production” (from the official SEZ website, http://sezindia.nic.in/sezdetail.htm). Fourteen SEZs, including a private zone at Positra in Gujarat, have been notified to date. Appendix 1 provides details. This note tries to examine the rationale of this initiative in the context of our past experience with EPZs (Export Promotion Zones) and EOUs (Export Oriented Units, i.e. firms exporting at least 75 per cent of their production) and China’s reported success with SEZs.

2. SEZs AND THEIR RATIONALE

2.1 What are SEZs?

This note uses the term SEZ to refer to all forms of free trade zones including EPZs though it can be argued that the Chinese SEZs are very different entities. Later in the note, we will examine these differences more closely. In their most prevalent form, SEZs, which are reputed to have been around even during the Roman Empire,
are fenced-in industrial estates specialising in manufacturing for exports that offer firms free trade conditions and a liberal regulatory environment. Foreign direct investment (FDI) is expected to play a prominent role, though zone firms can be domestic, foreign or joint ventures. Broadly, SEZs share the following features, though some of these are now being affected by WTO agreements:

- Liberal foreign exchange access and FDI encouragement
- Permission for duty-free imports of inputs and capital goods for export production
- Generous, long-term income tax concessions
- Industrial permits are streamlined in an attempt to provide a “one-stop shop” for permits, investment applications, etc.
- Better infrastructure with more developed communications, transport and power as compared to other parts of the country. Sometimes, there are utility and rental subsidies.
- Labour laws are sometimes more flexible as compared to firms in the domestic market.
- Limitations on sales to the Domestic Tariff Area (DTA), i.e. to consumers who are also served by producers outside the borders of the SEZ, who do not enjoy the duty reliefs of the SEZ, in order to preserve a level playing field.

### 2.2 Why create SEZs?

An SEZ is often seen as a way of generating employment and foreign exchange while providing the country with basic industrial infrastructure (which many, especially smaller, developing countries often lack), improving efficiency and competitiveness, building human capital and serving as a catalyst through demonstration effects. In general, the principal sources of benefit a government seeks through SEZs are:

1. Generation of employment, which appears empirically to be the primary benefit
2. Generation of foreign exchange
3. Generation of agglomeration economies, whereby there are generalised benefits or cost reductions for firms resulting from the clustering of activities
4. Generation of linkages between domestic and foreign firms and between firms in the SEZ and the DTA (Domestic Tariff Area). These linkages take a number of forms, such as attraction of foreign capital and technology and acquisition of superior labour and management skills through direct linkages as well as through a “demonstration effect”.


2.2.1 SEZs as second-best options

Obviously, if the policies and the infrastructure of SEZs were beneficial for the SEZ, they would be equally beneficial for the rest of the country, unless the government is constrained in extending these benefits. While it is easy to conceive of resource constraints that restrict the provision of world class infrastructure to limited geographical areas, the constraints with respect to liberal policies are likely to be more on the political front, and to that extent, SEZs are essentially the second-best strategy to more widespread liberalisation. Unfortunately, such a lack of political consensus can also affect investor perception about the continuity of the SEZ policy itself.

Government strategies to foster SEZs rely on a two-pronged approach. Drawing from the characteristics of SEZs listed earlier, they can be grouped as:

1. Reduction in restrictions, including liberal access to foreign exchange, permission for duty-free imports, streamlined industrial permits, flexible labour laws, etc.
2. Provision of incentives such as income tax concessions and better infrastructure (including, sometimes, utility and rental subsidies), with power, transport and communications being more developed than in other parts of the country.

The effectiveness of government policy lies in creating an environment that would deliver most of the above benefits while minimising the costs of infrastructure development, limiting distortions and leveraging the demonstration effect of the SEZ for more widespread reform.

3. The Indian policy on SEZs

3.1 How typical is India’s SEZ policy?

3.1.1 Liberal foreign exchange availability and access to the domestic market

The two main sources of foreign exchange flows for SEZs are net export earnings and FDI flows. Governments usually assure free access to foreign exchange in order to reassure producers of the ability to import inputs as also to assure repatriation of profits.

However, the extent of foreign exchange benefit from direct exports is limited as the net foreign exchange is considerably less than gross earnings. This is because production is often based primarily on the processing of imported inputs, and there are limited linkages to the domestic economy. However, even with low net export earnings, a large and growing export industry and associated industrial development can attract considerable FDI, and thereby improve the foreign exchange position of
the country. China’s current annual FDI flow (about US$40 billion) is of the same magnitude as India’s annual exports (US$44 billion)!

3.1.1.1 Foreign direct investment

FDI can broadly be classified into four types: (a) resource-seeking, based on extraction of raw material, (b) efficiency-seeking, (c) market-seeking and (d) strategy-based. Most FDI into SEZs around the world is efficiency-seeking, where investments are made to reduce processing costs that are often labour-related. Foreign investors use SEZs to cater to their home and third-party markets, using imported inputs, when reliable domestic supplies are not available.

The market-seeking and strategy-based FDI are both focused on the domestic market and are therefore not export-oriented, though it may be import-substituting. The policy on domestic sales differs from country to country. A policy that allows access to the DTA generates FDI flows to serve such markets and can generate substantial foreign exchange while putting pressure on the domestic industry to improve efficiency and competitiveness. In addition, the ability to sell to the DTA also mitigates the risk that exporting firms face due to the volatility of international markets and fosters stability in employment.

In India today, foreign exchange is freely convertible on the current account, thereby allowing all producers to access imported inputs, subject, of course, to tariffs. There are also very few restrictions on repatriation of profits, and foreign firms routinely do so. As such, a relaxed foreign exchange regime is not a strong differential incentive in India, as regards the SEZ. The new SEZ policy insists on a positive net foreign exchange earning to be calculated cumulatively over a period of five years, which is a relaxation from the earlier policy that specified norms for value addition and currency balancing for exports to the Rupee Trade Area. However, there can really be no effective mechanism to enforce this as seen in our previous experience with EPZs/EOUs. At best, benefits extended to firms can be recovered, but this will not increase the foreign exchange earning.

More importantly, on the FDI front, the current SEZ policy envisages automatic approval, instead of current procedures through the Foreign Investment Promotion Board (FIPB). It does not place any restrictions on domestic sales, but subjects it to the restriction that they would be charged the same tariff as regular imports as compared with the present policy on EPZs/EOUs, which limits the quantum of access to 50 per cent of exports, but at half the rate of customs duty. The policy is thus unlikely to put additional pressure on domestic industry.
3.1.2 Streamlined permit regime

In India, the existing industrial policy, while much more liberal since 1991, still has a number of restrictive features, largely relating to the extent of permissions and paperwork needed. A number of products are still under the ambit of small-scale industry (SSI) reservations, though these restrictions do not apply to EOUs, and a number of possible products for export, notably garments, are already off the SSI reservation list. The SEZ is expected to ease this process by designating a single-point clearance authority. Apart from self-certification for imports, automatic approval for 100 per cent FDI and exemption from SSI reservations, the SEZ policy promises simplified record keeping for inter-unit transfers, sub-contracting, disposal of waste material and scrap, etc. However, the actual administrative implementation is a moot issue. Some of these benefits also apply to firms under the current EPZ/EOU policy, but most of it is neutralised because of the cumbersome procedures and restrictions. These include adherence to prescribed value addition, realisation of foreign exchange and currency balancing (for sales to the Rupee Trade Area), procedures for duty exemptions, import of capital goods and inputs, sales to the DTA, and disposal of waste material.

3.1.3 Tax concessions

3.1.3.1 Income tax

SEZs usually are associated with a variety of tax benefits to investors, which include reduced tax rates or total tax holiday. Such tax concessions result in revenue losses to the government, if the investment would have occurred in the absence of such tax benefits. More to the point, as far as FDI is concerned, the consensus of research is that “Tax exemption is like a dessert; it is good to have, but it does not help very much if the meal is not there,” implying that these tax concessions may not bring much incremental investment.

Revenue losses are only a part of the costs that tax holidays induce. A greater cost may be induced by distortions in investment due to the manner in which benefits are structured. The main advantage of tax holidays is that they provide large benefits as soon as the company begins earning income, and are thus more valuable than an alternative incentive such as a lower corporate tax rate where the benefit accrues more slowly over a longer time. They also tend to reward the founding of a company, rather than investment in existing companies and discriminate against investments that rely on long-lived depreciable capital. This means that it primarily benefits short-term investments, characterised by companies that can quickly relocate from one jurisdiction to another. Furthermore, they can lead to large erosion of the tax base as taxpayers learn how to escape taxation of income from other sources.
The current SEZ policy continues with the usual practice of tax holidays. It provides tax benefits (section 10A of the Income Tax Act), which extends a 100 per cent tax holiday until 2009–10. Units that come up later will thus have a shorter tax holiday as compared to earlier units. In this preference for tax holidays, the policy suffers from the shortcomings mentioned above.

### 3.1.3.2 Customs and excise duty

SEZs invariably provide duty-free imports of raw and intermediate inputs and often also capital goods for export production. Our SEZ policy provides all of these benefits. However, more than duties, a significant irritant in India are import procedures, because of the obstructive administrative manner in which customs regulations are implemented rather than the presence of actual import restrictions. The same obstructiveness in procedures affects the reimbursement of duties for export. One of the primary benefits of the SEZs lies in the expectation that these obstructive procedures would either not apply or be implemented in an administratively transparent and simple manner. Indeed, the current SEZ policy specifies, “All activities of SEZ units, unless otherwise specified, shall be through self certification procedure”, and there would be no routine customs examination.

In addition to duty-free imports, the policy provides for exemption from excise duty for domestic procurement of goods by granting “deemed export” status for the supply of goods to firms in the SEZ. This ensures that domestic suppliers are not disadvantaged due to the fiscal regime and encourages firms in the SEZ to build stronger linkages with them.

### 3.1.4 Flexible labour laws

There is no special flexibility provided for labour laws in our SEZs. Internationally, the record on this is mixed, with many countries preferring not to extend special dispensations. However, China, as discussed later, and to a smaller extent, Mauritius did provide a more flexible labour policy for their SEZs.\(^\text{12}\)

### 3.1.5 Availability of better infrastructure

An SEZ is expected to insulate the firms from the vagaries of working in an environment of interrupted electricity supply, congested telecom bandwidth, insufficient water supply and dilapidated transport networks. As noted above, SEZs are the second-best solution to a widespread improvement in infrastructure and an implicit admission that, for the present, it is not possible to make these facilities available, either by government or the private sector, on a wider scale, and therefore a more limited initiative to provide these facilities is undertaken in and around the SEZ.
It cannot be denied that the poor quality of infrastructure does constrain efficient growth of industries in India. However, apart from the mention of “world-class infrastructure”, the policy does not make any specific commitments. The state government has to ensure that the area incorporated in the proposed SEZ is free from environmental restrictions and that water, electricity and other services would be provided as required. In addition, it should permit generation, transmission and distribution of power within the SEZ and fully exempt electricity duty and tax on sale of electricity for self-generated and purchased power. Furthermore, to ensure that the initiative is not overly limited, the policy stipulates that the minimum size of the SEZ shall not be less than 10 sq km (1000 hectares).

3.1.5.1 Cost of infrastructure development
The cost of developing quality infrastructure can be substantial in an SEZ. Here there are two choices: (a) whether to start de novo in a new location and build new infrastructure or (b) concentrate on an existing location and improve the existing infrastructure in that limited area. The first approach will involve larger investment as de novo SEZs incur substantial additional costs due to the need to make investments in new infrastructure and connectivity to the hinterland. Given that in the initial years there will be few users, this investment will take a longer time to recover. The second approach would mitigate such risks by leveraging existing infrastructure. For a given amount of investment, a much better quality of infrastructure can often be provided since it is much less expensive to upgrade and improve existing infrastructure. Furthermore, the lower cost allows the government to assure “world-class infrastructure” to prospective firms over a wider area (see Box 27.1).

3.1.5.2 Agglomeration effects
Existing locations also benefit from a developed industrial base and labour pool and associated social infrastructure, which make it more likely that “agglomeration effects” will be positive. This is important because the larger share of non-employment and non-foreign exchange benefits can be expected to accrue from the exploitation of agglomeration economies and creation of linkages between SEZ industries and domestic firms. A relatively large and well-diversified industrial sector can leverage SEZ investment to build linkages to the domestic economy. However, the experience in countries like Mexico suggests that the presence of such a sector alone does not guarantee the formation of such linkages, which may, in addition, need a strong proactive push, as in East Asia, though the extent to which such proactive policies determine the formation of such linkages is not yet clear.
3.2 Evaluation of SEZ policy in India

3.2.1 India’s earlier experience with EPZs

The Indian experience with EPZs began soon after Shannon was established in 1959. Kandla (2.8 sq km) was the first to be established in 1965, followed by the tiny (0.4 sq km) SEEPZ (Santa Cruz Electronic Export Processing Zone) in 1972, Cochin (0.4 sq km), Falta, Madras (now Chennai) and NOIDA (all around 1 sq km) in 1984, and finally Vizag (1.4 sq km) in 1989. As of 1997, 513 units were functioning in these zones out of 2333 units granted letters of approval (LoA). Of these, 1357 approvals had been cancelled or had lapsed, which could be an indicator of the limited attractiveness of these EPZs. The impact of these EPZs was limited, as they employed only 0.009 per cent of the labour force and accounted for less than 4 per cent of exports. Net exports were much lower as imports were 62 per cent of exports. FDI was less than 20 per cent of total investment. Most firms do not sell to the DTA or subcontract, limiting linkages to the domestic economy, reportedly because of the procedural hurdles involved in doing so.

Overall, it is doubtful whether these EPZs have generated any positive social returns. India is not an exception in the indifferent performance of SEZs. As seen in Appendix 2, SEZs (or EPZs) have had a limited effect on the economy of most countries, with the odd exception of small countries like Mauritius. The consensus, of considerable research on the empirical effectiveness of fenced-in SEZ interventions, appears to be that “EPZs are a second-best policy, whose welfare implications are often ambiguous.”

Box 27.1: Location, location, location

While early proponents of SEZs considered them as potential hubs for non-urban decentralised industrial development and favoured locating them away from urban and populated centres to encourage job creation and economic development and to reduce the urban pressure, it soon became clear that SEZs would not flourish in such environments unless they had easy access to infrastructure and adequately skilled workers. It is now accepted that the agglomeration and linkage effects of SEZs are more difficult to exploit if the SEZ is located in a new area as compared to one that builds on existing industrial base. The Bataan Zone in the Philippines, located in a mountainous area, 160 km from Manila, is a prime example of a poor choice of location. Despite substantial government spending on building the zone, it failed to reach its goals due to its isolation from the country’s industrial centre and poor connecting infrastructure. China’s SEZ in Hainan is a similar story.

It would appear that the incentives are not enough to compensate for the distance from international ports, lack of necessary infrastructure and difficulties of managing
Do "De Novo" SEZs Make Sense?

operations in remote locations. Closer home, the Kandla Free Trade Zone, the country's oldest, is far from being a success even after nearly 40 years of development. There is a substantial risk that the benefits of the SEZ may not prove sufficiently attractive to overcome the disadvantages of a completely new location. The infrastructure investment would then be rendered infructuous. This lesson can be learnt from the EPZs in India too. Of the seven zones, three (SEEPZ in Mumbai, NEPZ in Delhi and MEPZ in Chennai) are relatively more successful, accounting for 86 per cent of exports and 79 per cent of employment. SEEPZ has in fact run out of capacity, while Kandla continues to languish. This reflects the advantages of leveraging existing infrastructure and industrial base.

Impact on wider reform: An SEZ policy that is limited to a small geographical area has the possibility of attracting and diverting investments from their optimal location. This could result in increased demand for connectivity and higher social cost of production. To the extent that a generalised liberalisation of the economy would reduce the attraction of the SEZ, investments in such infrastructure are likely to become stranded unless the SEZ area has sufficiently strong intrinsic benefits that would continue to attract investment to the region. Such agglomeration effects would be stronger if the SEZs were above a certain critical size. Otherwise, the limited nature of SEZs and special concessions accorded to them create a constituency for blocking further reform. This is even more the case for private SEZs since the investor cannot recover his/her investment if firms move to intrinsically better locations.

The story of Yangpu: The stranding of such investments is more likely to be the case if the SEZ is in a new location, because it would take longer for such areas to build up a critical mass. Yangpu Economic Development Zone (EDZ) in Hainan SEZ was founded in 1992 as a possible international centre to distribute processed products and a freight-handling port, taking advantage of its location in the core area of the Asia–Pacific sphere, adjoining the international ocean shipping lanes. In the early 1990s, investors swarmed here, though it took them more than half a day to drive to Yangpu from Haikou City, the capital of Hainan, due to poor roads. Today’s Yangpu has better-equipped ports crossed by several high-quality highways and expressways, but as China liberalised more widely, Yangpu lost its original attraction. Today, two high buildings built in 1996 to greet foreign-funded enterprises with modern office equipment stand side by side at the entrance of the EDZ—almost empty. Investments in de novo SEZs therefore implicitly assume that the generalised liberalisation of the economy will not occur for the foreseeable future.

3.2.2 Has the SEZ policy learnt from past mistakes?

The SEZ policy has made a number of improvements over the existing EPZ/EOU policy. Appendix 3 provides a comparison of the two regulations. The norm of a net positive foreign exchange requirement, to be calculated cumulatively over a period of five years, is a simplification over current norms for value addition and
currency balancing. The automatic approval for 100 per cent FDI and exemption from SSI reservations are other steps in the right direction. The self-certification procedure also simplifies customs and excise procedures and sales to the DTA. The extension of excise relief on purchases from the DTA may help foster linkages with firms outside the SEZ, though these firms would continue to suffer from the same unhelpful environment that the SEZ is designed to insulate its firms from.

3.2.2.1 Compatibility with WTO

One aspect that is often overlooked is the need for special incentives to take into account the WTO’s Agreement on Subsidies and Countervailing Measures (SCM). While India has been exempted, along with other developing countries (with per capita income below US$1000) from the prohibition against export subsidies, this does not imply immunity from countervailing duties, should such exports cause material injury to industries in the importing country. Broadly, within an SEZ framework, it is permissible to reimburse firms so as to bring them to a free trade status (where they do not incur any duties) for inputs used in production, but exemptions from income tax and duty remissions on capital goods are countervailable as they act as subsidies to the firm. Furthermore, schemes that rely on industry average parameters such as input–output ratios or those where the exporter can earn a premium such as Duty Free Replenishment Certificate (DFRC) or Duty Entitlement Pass Book (DEPB) schemes may also be countervailable if they can be shown to reimburse firms in excess of their actual expenses. However, under the SCM principles, a more widespread liberalisation such as a regime of generalised low taxation and reimbursements related to actual duties borne by exporters is immune from countervailing measures.

3.2.3 The SEZ policy: A limited mandate

To sum up, the principal incremental benefit as a result of the SEZ policy appears to be the easing of red tape. It is however difficult to conceive that the SEZs would be insulated from the intrusion of bureaucratic procedures for an extended period in the absence of general administrative reform. Ironically, if generalised administrative reforms were to remove such obstructiveness from the DTA, it would neutralise some of the benefits to firms located in the SEZ. A second boost may come from the improvement in the quality of infrastructure, though on this there are no clear signals from the policy per se, apart from the initial objective.

That said, the SEZ policy addresses a limited mandate—for “augmenting infrastructure facilities for export production”—and is not a part of an overall “export-led” regional growth strategy. In this, the policy differs sharply from the Chinese model, discussed in more detail below, from which the current SEZ policy
Do "De Novo" SEZs Make Sense?

reportedly derives its inspiration. The Chinese policy is directed not at export promotion but at exploiting FDI to build an internationally competitive industrial sector that would by its very nature lead to the generation of additional exports. The Chinese policies do not restrict the benefits of the SEZ to exporting firms. However, exports were encouraged by providing additional benefits in terms of tax concessions and, in the early years, via an activist exchange rate policy (see section 4.3.6).

Box 27.2: Do Indian EOUs perform better than EPZs?

India also permits EOUs to benefit from concessions similar to those available in the EPZs, which include duty-free imports and tax holidays. The growth of EOUs has been somewhat better than EPZs. Their share in exports has grown consistently, from 0.5 per cent in 1984 to 8 per cent in 1997, as compared to the EPZs, whose share stayed around 3 per cent over 1984 to 1994 and has only recently crept up to nearly 4 per cent. Most EOUs are concentrated in Tamil Nadu, Maharashtra, Karnataka, Gujarat and Andhra Pradesh, and the major items of export are textiles, garments and yarn (49 per cent), manufacturing—including electronics, engineering and chemicals (20 per cent), food and agro products (15 per cent) and minerals and granite (13 per cent). By contrast, electronics and engineering make up 46 per cent of EPZ exports, largely as a result of SEEPZ and MEPZ, followed by gems and jewellery (33 per cent), textiles and garments and pharmaceuticals (8 per cent each). The composition of exports from the EOUs is more reflective of India’s underlying comparative advantage as it is the result of actions taken by economic agents in a relatively undistorted environment, and therefore it permits better linkages to the domestic economy. Consequently, as compared to the EPZs, the EOUs enjoy a much higher net foreign exchange earning. Imports are only 38 per cent of exports for the EOUs as compared to 62 per cent for the EPZs. The relative success of the EOUs reflects the need to expand SEZ policies beyond small fenced-in areas. Indeed, the more successful Software Technology Parks (STPs) also have a similar feature.


The fact that we have not focused on regional growth is partially reflected in the assumption that the SEZ would be a “self-contained” area, albeit larger than the EPZs, even though the EOUs seem to have outperformed the EPZs (see Box 27.2). Other limiting features are the lack of flexibility with respect to labour policy and the 100 per cent tax holiday that skews the investment incentives away from long-term investments. Furthermore, the administrative oversight, while simpler than the EPZ/EOU regime, continues to be cumbersome because, inter alia, the policy does not make a quantum leap to a single-stop administrative regime with a single-point authority, and customs and excise functions continue to be independently exercised.
4. **The Chinese Recipe**

4.1 Comparing the billionaires

At the first sight, the Chinese experience appears to belie the consensus opinion that SEZs have a marginal impact except in small economies like that of Mauritius and appears to suffer from few of the usual problems associated with SEZs. This alone would merit a fuller discussion of the Chinese SEZ experience. However, a quick comparison of the two billionaire economies, India and China, gives even more reason to look closely. Two items are especially illustrative. In 1980, the foreign exchange reserves and export–GDP ratios of the two countries were strikingly similar. Today, they are strikingly different (import–GDP ratios remain comparable). Is this really only a story of SEZs or do the differences go much deeper?

As shown in Table 27.1, the difference between them is not limited to their “export orientation”. It is, rather, the result of a wholly different growth path. As seen in the table, China’s savings and investment rates are twice that of India’s. Not surprisingly, so is its growth rate. This better growth performance is reflected in China’s better social indicators. Their economy is much more lightly taxed and less services-based than ours. The higher proportion of manufactured to total imports is another facet to this story. Finally, despite being a market economy, our stock market capitalisation has gone from being twenty times China’s in 1990 to less than half today. But the story of reserve accumulation is not a mercantilist story—export more and import less—which is inherently unsustainable. Rather, it is based on a strong and consistent flow of FDI. India’s FDI flow today is roughly where China’s was in 1980, a year after their opening up. China moved quickly from there on. FDI levels jumped from US$4.4 billion in 1991 to US$11.1 billion in 1992 and then to US$27.5 billion in 1993 to US$33.8 billion in 1994, a growth of nearly eight times in three years! Since then, it has grown more sedately (but still faster than India, which has been almost unchanged since 1995–96) to level off at approximately US$40 billion a year. FDI is merely one indication of the depth of the Chinese reform process. A second indicator is the quality of Chinese infrastructure, which is far superior to ours. Most of this infrastructure was built initially with public support, though some of it was privatised later. Today, China has the highest number of mobile phones in the world, and its electricity rates for industry are a third of ours. In 1997, it had 4771 km of high capacity expressways and another 14,637 km of four-lane highways. Nor did it stop there. The next year, in 1998, China committed about US$22 billion for highway construction from central government sources. While not the consequence of SEZs alone, it can be argued that much of the opening up of China and growth in FDI and infrastructure began with the SEZs, to which we now turn.
Table 27.1: Comparing the two billionaires

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th></th>
<th>India</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Then</td>
<td>1998</td>
<td>Then</td>
<td>1998</td>
</tr>
<tr>
<td>Annual per capita income</td>
<td>—</td>
<td>US$750</td>
<td>—</td>
<td>US$430</td>
</tr>
<tr>
<td>Income growth (’80–90), (’90–98)</td>
<td>10.2%</td>
<td>11.1%</td>
<td>5.8%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Investment (savings)/GDP ratio</td>
<td>35% (35%)</td>
<td>39% (43%)</td>
<td>20% (17%)</td>
<td>23% (18%)</td>
</tr>
<tr>
<td>Manufacturing (Services) Ratio</td>
<td>41% (21%)</td>
<td>37% (33%)</td>
<td>16% (39%)</td>
<td>19% (45%)</td>
</tr>
<tr>
<td>Tax (non-tax)/GDP ratio</td>
<td>—</td>
<td>4.9% (0.6%)</td>
<td>9% (1.8%)</td>
<td>10.8% (3.3%)</td>
</tr>
<tr>
<td>Exports (incl. services)</td>
<td>US$23.6 bn</td>
<td>US$207.2 bn</td>
<td>US$11.3 bn</td>
<td>US$44.1 bn</td>
</tr>
<tr>
<td>Imports (incl. services)</td>
<td>US$18.9 bn (70%)</td>
<td>US$166.7 bn (77%)</td>
<td>US$17.4 bn (53%)</td>
<td>US$59.2 bn (51%)</td>
</tr>
<tr>
<td>(%age of manufactured goods)</td>
<td>US$225.0 bn (70%)</td>
<td>US$345.4 bn (77%)</td>
<td>US$250.5 bn (53%)</td>
<td>US$856.3 bn (51%)</td>
</tr>
<tr>
<td>Annual FDI flow</td>
<td>US$3.5 bn</td>
<td>US$44.2 bn</td>
<td>US$0.2 bn</td>
<td>US$3.3 bn</td>
</tr>
<tr>
<td>Foreign reserves</td>
<td>US$10.1 bn</td>
<td>US$152.8 bn</td>
<td>US$12.0 bn</td>
<td>US$30.6 bn</td>
</tr>
<tr>
<td>Export/GDP ratio</td>
<td>6%</td>
<td>22%</td>
<td>6%</td>
<td>12%</td>
</tr>
<tr>
<td>Number of listed companies</td>
<td>14</td>
<td>764</td>
<td>6200</td>
<td>5843</td>
</tr>
<tr>
<td>Literacy ratio</td>
<td>—</td>
<td>Male 91%</td>
<td>Fem. 75%</td>
<td>—</td>
</tr>
<tr>
<td>Energy consumption (T&amp;D loss)§</td>
<td>253 (8%)</td>
<td>687 (7%)</td>
<td>130 (18%)</td>
<td>347 (18%)</td>
</tr>
<tr>
<td>Poverty (%age below US$1 PPP a day)</td>
<td>—</td>
<td>22.2% (1995)</td>
<td>—</td>
<td>47.1% (1994)</td>
</tr>
<tr>
<td>Under 5 mortality (per 1000)</td>
<td>65</td>
<td>39</td>
<td>177</td>
<td>88</td>
</tr>
</tbody>
</table>

“Then” relates for the most part to 1980, except where mentioned.
§ These figures may need substantial revision. In India, T&D loss is now reported to be around 40%

4.2 The evolution of SEZs in China

4.2.1 The birth of SEZs

Soon after the liberalisation of the agricultural sector in July 1979, China established four SEZs. Of these, three (Shenzhen, Zhubai and Shantou) were established in Guangdong, while the fourth, Xiamen, was established in Fujian. Privatisation and capitalist ventures were first approved and practised in China through SEZs. They were established principally to test the effectiveness of an alternative market-based growth strategy, to provide a welcoming environment for Foreign Invested Enterprises (FIE) and to encourage export processing. Each of the zones was allowed to introduce its own legislation to govern investment, as well as approval
procedures relating to foreign investment enterprises and special tax concessions, and the government invested heavily in infrastructure (see Section 4.3.2).

4.2.2 The growth of SEZs

Within five years, in 1984, the SEZ benefits were expanded to 14 coastal open cities, all of which were former treaty ports. Economic and Technological Development Zones (ETDZ) and High-tech and New Technology Industry Development Zones were encouraged in the coastal open cities. Soon thereafter, in May 1985, three development triangles—the Pearl River Delta (PRD), the Yangtze River Delta (around Shanghai) and the Minnan Delta (around Xiamen)—were designated as coastal open areas. Hainan Island was declared as the fifth SEZ in 1988, when the Liaodong and Shandong peninsulas were declared as open areas and Pudong New Area near Shanghai was declared as an SEZ. Since then, fifty-two cities (including all provincial capitals) have become open cities, and all FDI projects are treated alike, based on the nature of investment regardless of location.

4.2.3 The Hong Kong factor

Since the onset of the openness policy, Hong Kong has proved to be a major growth driver, funnelling investment and acting as an entrepôt for the region. Shenzhen, which adjoins Hong Kong, is today the most successful of the SEZs, and most of Guangdong’s counties and towns are now open to FDI and enjoy favourable economic policies, and it is by far the largest recipient of FDI in China. The province has virtually become a production base for Hong Kong (see Box 27.3). The specific advantage of Hong Kong (and overseas Chinese and Taiwanese) firms is not their level of technology, which may be poor compared to transnationals, but their knowledge of advanced consumer markets in Europe and the USA and reputation for delivery of quality goods, such as toys for Christmas and garments for Spring fashion, on time. These are non-standard markets, which change very quickly and where margins are low but the time and quality pressure is high. Hong Kong firms such as Li & Fung Co. excel in this coordination of production and delivery of products. Interestingly, Hong Kong also fuelled the growth of the EPZ in Mauritius, which grew only in the 1980s. The presence of a small but active Chinese business community on the island helped bring in investors from Hong Kong into the garment industry. They were concerned about rising wages and Hong Kong’s future reunification with China and attracted to Mauritius by its lower wages, political stability and the absence of export quotas for the European Union and the United States. Concomitantly, Mauritius’ big sugar plantation owners, who had amassed considerable wealth, thanks to the Lomé Convention’s sugar protocol, also decided to diversify their activities by investing in the EPZ and tourism.
Box 27.3: Hong Kong’s move to China’s Pearl River Delta

Since the early 1980s, much of Hong Kong’s manufacturing has shifted out of Hong Kong Special Administrative Region (SAR) to China’s Pearl River Delta (PRD) in search of lower-cost land and labour. The share of manufacturing in Hong Kong’s GDP declined steadily from 24.3 per cent in 1984 to 6.2 per cent in 1998. In 1984, as much as 45.2 per cent of Hong Kong’s labour force was employed in manufacturing, but this proportion dropped to 10.9 per cent in 1999. Today, an overwhelming majority of Hong Kong’s manufacturers have facilities in China, and more than 50 per cent of all external investment in the mainland is from Hong Kong. Cumulatively, from 1979 to 1999, Hong Kong’s realised FDI in the mainland had a cumulative value of over US$150 billion, about 70 per cent of the realised FDI in China. Naturally, Hong Kong’s economy has become inextricably intertwined with that of China. Over 1988 to 1994, the correlation of the cyclical components of Hong Kong’s GDP and China’s industrial production rose from almost zero to nearly 0.8. Border crossings increased from 1,50,000 in 1980 to 2.2 million in 1986 and 9 million in 1996. Furthermore, since 1993, Chinese enterprises have been able to raise capital by issuing shares in Hong Kong, and a number of Chinese investors have acquired both property and equity in Hong Kong.32

Investment concentrated in Guangdong: Over 90 per cent of Hong Kong’s outward processing33 in China takes place in Guangdong, and about 65 per cent of Hong Kong’s outward direct investment to China is directed here. About 70 per cent of total FDI into Guangdong is from Hong Kong.34 About 50,000 companies involving Hong Kong interests are registered in Guangdong alone, employing over five million workers—more than 20 times the size of Hong Kong’s own manufacturing workforce. Hong Kong’s firms use Guangdong as a base for manufacturing goods that are exported internationally. Overall, 59 per cent of China’s total exports (not just related to outward processing) in 1999 were produced by FIEs. Unsurprisingly, Guangdong accounts for over 40 per cent of these FIE exports, 70 per cent of which is from Shenzhen. To accomplish this, Guangdong’s industries rely on other provinces and imports for raw material supplies, e.g. cotton, coal, plastic chips and paper pulp.

Trade links: Not only has Hong Kong provided a strong investment source for the Pearl River Delta, it also acts as the premier entrepôt for China’s trade. Trade related to outward processing accounted for 52.6 per cent of Hong Kong’s total exports (76 per cent of Hong Kong’s domestic exports and 50 per cent of re-exports) to the mainland in 1999, reaching US$30.2 billion. In the same year, 80.5 per cent of Hong Kong’s imports from the mainland were related to outward processing (with a value of US$62.5 billion) as were 87 per cent of Hong Kong’s re-exports of goods originating from the mainland.

Broadening directions: As Hong Kong’s economic relationship with China has matured in recent years, there has been a broadening in the composition of Hong Kong’s investment both geographically into different provinces and across sectors, from industrial processing...
to a wider spectrum of business ventures such as hotels, real estate and infrastructure development. By the end of 1999, approximately 14 per cent of Hong Kong companies had investments in the Yangtze River Delta and surrounding areas like Shanghai, Jiangsu and Zhejiang, 12 per cent had operations in Fujian and other coastal areas, and 8 per cent had investments in interior provinces. Further, in the face of expected increase in competition and the changing investment environment within China, many Hong Kong businesses are reducing operating costs by increasing their procurement of inputs from the mainland, promoting mainland talent to management positions, and aggressively developing the local mainland market for their products.35

4.3 Chinese SEZs: Not a limited liberalisation

4.3.1 Size and location

The sites for the first SEZs were picked strategically because they were close to Hong Kong, Macau and Taiwan, the original homeland of most overseas Chinese. Shenzhen, though a vast rice field, was separated from Hong Kong only by a small river; Zhuhai was next to Portuguese Macau; Shantou was home to the Chaozhou diasporas, who had emigrated in large numbers to Hong Kong, Thailand, Singapore, Malaysia and cities in Europe and America (one of them is Li-ka-Shing, who controls the Hutchinson group); and Xiamen opposite Taiwan.

Apart from picking the right location by leveraging existing infrastructure and growth poles such as Hong Kong and Taiwan (though not always, see the story of Yangpu in Hainan SEZ in Box 27.1), the Chinese approach, based as it was on an alternative growth strategy rather than just an export promotion effort, moved away from the concept of small fenced-in industrial estates. The Shenzen SEZ, though fenced-in, covered an area of 328 sq km. (Appendix 4 provides a snapshot view of the size of the SEZs. Notice how close Hong Kong is to Shenzhen.) As SEZ benefits spread to more areas, such as the coastal open cities, the open economic zones and the provincial capitals (see Figure 27.1), artificial location incentives diminished. The PRD Open Economic Zone (enjoying broadly similar benefits) covers an area of 45,000 sq km, which is larger than Kerala and about the size of Haryana.

4.3.2 Provision of infrastructure

The removal of artificial location incentives was enhanced by the development of infrastructure on a regional basis, through public funds rather than limiting it to the SEZ. Private investment, which responded to meet the demand as the region grew, did not take off until a much later stage in the mid-1990s, as shown in Appendix 5. Cities like Shanghai started a comprehensive programme of resource mobilisation and expenditure management and built new infrastructure. It set up separate transport and energy funds in municipal revenue collection, guaranteeing much of the funding
for the two sectors and tapped into the international market to lure direct investment and BOT schemes. Municipal service departments were given full responsibility for planning, investment, operations and maintenance. They adopted an independent cost-accounting system to facilitate sector management and financing and increased user charges for infrastructure services like bus transport, gas supplies, water, wastewater discharge and sanitation services. The city also raised funds by leasing land, in the process attracting a large volume of FDI into real estate development, including commercial and apartment complexes catering to foreign companies.

Figure 27.1: China’s SEZs, Coastal Open Cities and Open Economic Regions

4.3.3 Local autonomy

The growth process was accompanied by considerable delegation of authority to the provincial governments. Each was allowed to introduce its own legislation to govern investments, approval procedures relating to FIEs and local tax concessions. For a while, this did lead to a “tax concession war” until the State Administration of Taxation stepped in to rationalise concessions. Often before legislation was passed at the Chinese government level, SEZs promulgated their own legislation to test its effectiveness. Local authorities could clear foreign investment proposals without referring to the Centre. They were also permitted to retain a large share of incremental taxes generated as a result of the increased economic activity, which was used to invest in infrastructure as well as equity contributions to joint ventures with foreign investors. The four SEZs and their home provinces, Guangdong and Fujian, were awarded financial benefits in the form of more advantageous fiscal and foreign exchange revenue contracts. Beginning in 1980, Guangdong and Fujian were awarded five-year fiscal contracts permitting them to retain almost all of the taxes and industrial profits generated by firms in their jurisdiction. In contrast, the three provincial-level cities of Beijing, Tianjin and Shanghai were still required to turn over 63 to 88 per cent of their revenues. In terms of foreign exchange retention, the SEZs were allowed to retain all of the hard currency they earned from trade, in contrast with the average of 25 per cent allowed to other localities. Guangdong and Fujian were also allowed higher retention rates.

This reliance on natural locational advantages and local policy decisions led to substantial differences in regional incomes. In 1994, the per capita income of the Pearl River Delta was estimated at US$1,173. Within it, Guangzhou, Zhuhai and Shenzhen had per capita incomes of US$3,580, US$6,413 and US$12,590 respectively. Figure 27.2 shows the growth in different provinces. While growth was relatively even in a number of provinces (as evidenced by the fact that their status relative to Shanghai has remained broadly unchanged), there were sharp improvements in some provinces, all of which were on the coast. These were Guangdong, Jiangsu, Zhejiang and Fujian, all of whom grew nearly twice as fast as Shanghai. This disparity was not only tolerated; it also had official sanction. Deng Xiaoping pronounced that “egalitarianism will not work” and that “some areas will become rich first”. Today, in order of export value, the ten biggest provinces are Guangdong, Jiangsu, Shanghai, Zhejiang, Shandong, Xinjiang, Fujian, Liaoning, Beijing and Tianjin, all of which are coastal provinces, except Xinjiang.
4.3.4 Labour policies

Under the planned economy system in China, the urban and rural labour forces were separated from each other and deployed strictly according to government plans. Urban jobseekers were provided with employment by the government, and rural labourers could not be employed in urban areas without the permission of the government. Employees had no right to choose their jobs, and the employers had no right to select what they needed.

After the reform, the relationship between the employer and the employee underwent a big change. As the household responsibility system was carried out in rural areas, a great deal of the labour force left the farming sector.39 Township and Village Enterprises (TVEs)40 became a major place for absorbing them. In addition, considerable rural labour came to urban areas for employment, mainly into construction, urban sanitary and service sectors. This resulted in an active labour market. A survey in 1992 found that 23.7 per cent of the employed labour force changed jobs once, 7.7 per cent twice, and 7.3 per cent did so thrice or more.41 In 1983, certain localities experimented with gradual replacement of permanent employment with contract labour (see Box 27.4 below). The government formalised this practice in 1986 and promulgated “Provisional Regulations on Employment in State-owned Enterprises”. All the state organs, government institutions and state-owned enterprises had to execute labour contracts for new employees, either on long-term contracts (one year or above) or short-term contracts. In part due to this approach, formal sector employment increased dramatically, from 95 million in 1978 (9.7 per cent of the economically active population) to 148.5 million in 1994 (19.2 per cent). India, by contrast, has...
experienced a decrease in the share of the economically active population employed in the formal sector, from 6.8 per cent (22.9 million) in 1978 to 5.4 per cent (27.4 million) in 1994. In the 1995 Labour Law, contracts were made mandatory in all industrial enterprises, including TVEs.

**Box 27.4: Labour contracts in China**

Labour contracts signed between the employer and the employee regulate the labour relationship between the contracting parties and defines the respective responsibilities, rights and interests of both parties, thus introducing a new competitive mechanism in the employment system. However, the nature of the contract is subject to approval by local authorities. Enterprises gain the right to dismiss employees who violate labour discipline. Workers benefit because as more profitable enterprises expand, they bid workers away from the latter with higher wages and/or more generous benefits. A labour contract stands terminated upon the expiration of its term or the emergence of conditions for the termination of the contract as agreed upon by the parties involved. During the period of statutory consolidation, when the employing unit comes to the brink of bankruptcy or runs into deep difficulties in production and management, and if reduction of its personnel becomes really necessary, the unit may make such reductions after it has explained the situation to the trade union or all of its staff and workers 30 days in advance, solicited opinions from them and reported to the labour administrative department. But, if the employing unit recruits personnel within six months after the personnel reduction, the laid-off workers have priority for re-employment.

**4.3.5 Tax policy**

Chinese SEZs usually did not provide a long tax holiday. Instead, production enterprises attracted a reduced tax rate with a substantial investment tax credit that varied from 100 per cent for investment in export-oriented and high-tech enterprises to 40 per cent for investment in other FIEs. This mitigated distortions in the type of investment and reduced discrimination against investment in existing companies. While exports were encouraged, there was no specific export obligation. Rather, as noted above, the policy focused on enhancing new production and employment, and attracting FDI. Among the preferential policies for FDI firms in the SEZs were, for example, a reduction of income tax to 15 per cent (FDI firms engaged in production and scheduled to operate for a period of ten years or more were exempted from income tax in the first and second profit-making years and allowed a 50 per cent reduction of income tax in the following three years), exemption from income tax on the remitted share of profits, exemption from export duties and from import duties for equipment, instruments and apparatus for producing export products, and the easing of entry and exit formalities.
4.3.6 Foreign exchange policy

China had a fairly active foreign exchange management policy, with a dual exchange rate, until as late as 1994. Although there was no insistence on exports, FIEs were initially required to keep a balance between foreign exchange receipts and expenditures, though they were given a number of options for this.\(^{45}\) From 1981 to 1993, there were six major devaluations in China. Their magnitude ranged from 9.6 per cent to 44.9 per cent, and the official exchange rate fell from 2.8 yuan per US dollar to 5.32 yuan per US dollar. On 1 January 1994, China unified the two-tier exchange rates by devaluing the official rate to the prevailing swap rate of 8.7 yuan per US dollar (the exchange rate has since appreciated slightly in nominal terms and substantially in real terms to 8.3 yuan per dollar). In addition to the devaluation over 1981 to 1994, additional export incentives were provided by a foreign exchange retention scheme till its end in 1994. By the end of 1996, the renminbi was freely convertible under the current account.

4.3.7 Foreign trade management

In 1978, almost all trade was carried out through thirteen Foreign Trade Companies (FTCs) responsible for implementing the central plan. Exporters supplied targeted quantities to the FTCs for export and all foreign exchange receipts were surrendered to the central bank at the official exchange rate. The FTCs were often not free to determine the goods that were exported or the procurement price. As such, markets or relative prices had little impact on export volumes. In 1984, the FTC monopoly was abolished. The system was decentralised by allowing branches to become independent and competing operating entities to operate as agents of the enterprises, which meant that they could charge a fee for their services, but could not absorb profits or losses on goods traded.\(^{46}\) In 1988, further reforms led to a reduction in goods covered by the mandatory export plan by about 30 per cent, an increase in retention quotas and access to the foreign exchange. In 1991, the mandatory export plan as well as fiscal subsidies for exports was abolished, leading to greater competition among the FTCs in purchasing products from enterprises and better prices for export suppliers. By 1994, there were more than 9000 FTCs actively competing for exporters. With the unification of the exchange rate, there was also a change in the tax system regarding the treatment of exports under the VAT. Zero rating for exports was introduced, which meant that exporters could claim a refund of the VAT paid on inputs. By 1996, when the renminbi became convertible on the current account, the FTCs and China’s foreign trade were almost entirely market driven.
4.3.8 FDI encouragement: Not just a policy, but a framework

In a sense, China had no specific policies to attract FDI. Nor can there be any. FDI is the result of investment decisions by firms, based on a number of considerations, as highlighted earlier in Section 2.3.1.1. Considerations such as these led Hong Kong firms to move their manufacturing almost wholesale into Guangdong. The importance of firm decisions can also be seen in Figure 27.3, where the three primary regions, the PRD, the Yangtze Delta and the Shandong Peninsula have consistently secured 90 per cent of the FDI into China, even though similar incentives are available in a number of places throughout China. The surge in FDI from 1991 can be attributed to a substantive improvement in the statutory framework.47

The Chinese attraction for foreign firms can perhaps be best understood in contrast to the deterrents to larger FDI flows into India in a recent study.48 The study points out that, in India, FDI approvals through the Foreign Investment Promotion Board (FIPB) are restrictive; implementation on the ground is difficult, with a number of relatively obscure state level regulations to be met; state governments are disconnected from the process; tariff rates, while much lower than before, remain high; our SEZs (EPZs) are limited in scale; it is difficult to exit from a business or to lay off labour (both of which are subject to approval from the state government); our corporate tax rates are high, and we may add, our infrastructure wanting.
By contrast, in China, in the SEZs and in the open areas, which by now comprise almost all the economic centres of China, approval for FDI is decentralised; state (provincial) governments are in control of the process; SEZ type policies apply across the country; tariff rates are lower (or exempt for export processing); and it is, as seen above, relatively easy to adjust the labour force to market conditions. It is thus the result of concerted action on good infrastructure, administrative decentralisation, liberal tax and foreign exchange regime, and responsive exit and labour policies. It is not a single replicable policy, but a framework.

**Box 27.5: Why did China set up SEZs?**

The creation of the four SEZs not only symbolised the beginning of China’s economic reform but also constituted an integral part of the overall open door policy. However, the interesting question is whether it was necessary to set up SEZs when China had decided to implement the open door policy nationwide. First, there was a strategic plan to resume sovereignty over Hong Kong, adjacent to Shenzhen, by 1997. It was believed that the SEZs could contribute positively to the peaceful handover of Hong Kong to China. Second, the geographic proximity of the SEZs, which are the original home of many overseas Chinese, to Hong Kong, Macao, Taiwan and ASEAN, made it possible to exploit the overseas Chinese business network to obtain capital, productive technology, management skills and to get access to the international market. Third, at the start of carrying out market-oriented economic reforms, the establishment of a small number of selected SEZs also served as a laboratory for China’s overall economic reforms. The idea was to introduce the successful experience drawn from the actual practice of market-oriented economic reforms in a small number of SEZs into other areas and, meanwhile, to limit it so that it could be easily controlled if something went wrong. In addition, from the perspective of their geographical diffusion, the establishment of the SEZs could be viewed as a pilot project for the more extensive operation of the uneven development strategy that was implemented in 1988. Fourth, the creation of the SEZs was aimed at providing a favourable investment environment for foreign investors, while trying out preferential FDI policies to be implemented later in the rest of the country. Finally, there was the reformers’ strategic consideration of reducing possible political resistance from the conservatives against market-oriented economic reforms in order to carry out the overall economic reform scheme more smoothly and effectively.


4.4 China’s liberalisation: A focus on overall growth, not enclaves

The preceding discussion makes it clear that the SEZs in China were not an experimental approach to increasing exports. Instead they were the vanguard of an
alternative market-based growth strategy that took advantage of FDI and the cultural and geographical proximity of strong market economies like Hong Kong and Taiwan. The commitment to this alternative strategy can be judged from the fact that SEZ policies were expanded to other areas even while the original SEZs had relatively poor export performance, when exports grew slowly and output was redirected to the domestic market. In fact, in 1984, when the policies were expanded to the fourteen coastal open cities, Shenzhen exported only 20 per cent of its output. Even today, as seen in Appendix 4, the SEZs do not have a high level of net exports, though they do corner a large proportion of the FDI. The geographical spread of SEZ policies ensured that the provinces around the SEZs provided an essentially similar investment environment. Indeed, much of the export boom came from them and not directly from the SEZs. The share of TVEs (which are located in the DTA) in total exports grew from 10.9 per cent in 1987 to 32.6 per cent in 1994.49 As provinces such as Guangdong began to show signs of congestion, the growth process spread beyond them. This spread was facilitated by the regional approach to infrastructure development. These strategies—(a) choosing a large established area that leveraged existing infrastructure, (b) exploiting natural locational and cultural affinities such as proximity to Taiwan and Hong Kong and (c) unbundling infrastructure development from the development of the SEZ—ensured that investments were market-oriented, reduced the risk of stranded investments as a result of special locational privileges and ensured that the growth is more reflective of China’s underlying comparative advantage. This market-orientation, coupled with China’s high savings and investment rates, has made it the success it is today.

5. **DO SEZS MAKE SENSE?**

5.1 No, they don’t

The answer is no; SEZs do not make sense as a stand-alone initiative. This applies *a fortiori* to de novo SEZs since they carry the additional risk of stranded investments. Private ownership of a de novo SEZ could actually foster an interest group to lobby against wider liberalisation so that their investments do not become stranded, very much in the manner of the power sector today, where investors in IPPs and the financial institutions that have lent to them strenuously continue demanding escrows, unmindful of its effect on fundamental and necessary reform needed, i.e. privatisation of electricity distribution. Investments in de novo SEZs therefore implicitly assume that the generalised liberalisation of the economy will not occur for the foreseeable future. In a social cost–benefit analysis undertaken for a successful SEZ like Shenzhen, the primary benefits arose from the externalities associated with employment, i.e. the social benefit of providing employment at wages
that are higher than the opportunity cost of labour. A private SEZ owner cannot appropriate this benefit, unless it is allowed to impose a tax on labour incomes in the SEZ. The other components of private SEZs’ revenue are infrastructure services and real estate. It is curious that such greenfield power, water and road projects that propose to sell to a currently non-existent population could be deemed viable, when private infrastructure projects that propose sales to currently existing consumers do not seem to get off the ground. As to the real estate provision, the Chinese experience has been to allow private real estate development, which led to development being phased in on a needs basis and limited the risk to a specific project rather than extending it to the development of the entire area.

This note contends that the SEZs have not been successful in isolation in any country, barring perhaps the odd exception of Mauritius (which, like China, benefited from its Hong Kong connection and a providentially favourable access to the EU sugar market). Wherever they have played even a small part in the successful growth of a nation, they have been accompanied by a number of other supportive policies, such as in Korea. The Chinese experience, as described above, is an experiment, not with second-best liberalisation but with widespread liberalisation, where the SEZs symbolised only the first step of China’s overall open door policy. As Box 27.5 above describes, the SEZs were driven by political, cultural and strategic aims. The need to establish a laboratory can be better appreciated when one realises that when the SEZs were announced, in 1979, Deng Xiaoping had just made a comeback after the fall of the “Gang of Four”, and a number of sceptics remained in the party hierarchy.

5.2 But, SEZ-type policies do
The Economic Survey 2001 point outs “the success of SEZs in India would, therefore, critically depend upon the degree to which domestic regulations, restrictions and infrastructure inadequacies are eliminated in these zones”. This is incomplete. The SEZs can be a “success” only if they are an integral start to an overall liberalisation policy, and as such “domestic regulations, restrictions and infrastructure inadequacies” need to be eliminated not only in the 10 sq km, but also in a progressively wider area. At the outset, perhaps only “domestic regulations [and] restrictions” can be eliminated given the limited resources available to remove “infrastructure inadequacies”, though even here much can be done if one concentrates on getting more out of existing infrastructure. Thus, while SEZs, especially the de novo variety, do not make sense, SEZ-type policies do. This section summarises the key steps that need be taken if the government decides to adopt such an approach, i.e. implement SEZ-type policies over a relatively large geographical area, as in China.
5.2.1 Five feasible steps

• First, the focus of the policy needs to move from “augmenting infrastructure facilities for export production” to a policy that is focused on overall growth and employment. Exports would follow as a natural consequence as investors exploit a favourable investment climate to enter foreign markets, and can be further encouraged with additional incentives. With eight months of reserves and a relatively well-functioning foreign exchange market, one needs to move away from focusing on the trade balance and move to attracting FDI, generating employment and enthusing domestic entrepreneurs to enter foreign markets.

• Second, with the shift in focus to growth, the size of the area over which SEZ-type policies are applied needs to take a quantum jump and use existing infrastructure. This is amply demonstrated not only in China, which focused its SEZs around the existing centres of Hong Kong and Taiwan, but also in India, where SEEPZ, MEPZ and NEPZ, around the existing metros have been relatively successful among the EPZs. Together, the two imply that SEZ-type policies should be made applicable around existing cities such as Mumbai, Chennai and Delhi. Most SEZs around the world are near the coast, and inland locations like Delhi have to overcome this initial handicap by improving their access to ports. In such an approach, the districts such as Chennai (174 sq km), and Mumbai City and Suburban (603 sq km) could be SEZs to start with, and one could declare groups of districts such as Thane, Raigad and Pune (33,000 sq km) as Free Open Areas. This will reduce the amount of additional infrastructure investment needed and ensure “more bang for the buck”.

• Third, it is important to realise that it is not possible to provide efficient infrastructure services in the public sector, and it is thus important to move to private provision of infrastructure services even if the financing remains public. This would involve, for example, private telephony, which is already permitted, privatisation of electricity distribution in the area where SEZ-type policies are applied, and at the very least, privatisation of the operation and maintenance of road and water networks. Of these, privatisation of electricity distribution is perhaps the most critical. Despite the hiccups in the power reform process, privatisation of electricity distribution is likely to be viable if the SEZ area is centred on an existing urban industrial area.

• Fourth, a more liberal labour policy should form a part of the new SEZ-type policies along with a more transparent mechanism that allows unviable firms to close down. The government has been talking of introducing radical labour reforms and exit policies for some time now. The area over which SEZ-type policies are applied could be a useful testing ground for such labour reforms.
and exit policies, starting perhaps with a contractual system along the lines of China, with a set of pre-approved provisions. Investors do not like to lock themselves into a situation from which they cannot extricate themselves, and without this, it is unlikely that significant growth in formal sector employment will take place or much FDI will be attracted.

• Finally, administrative obstructionism needs to give way to a transparent process based on scrutiny of financial accounts instead of monitoring physical material according to input-output norms. This would be necessary if SEZ-type policies are applied over a large geographical area since it is not possible to rely on “fence controls”. The system currently used for bonded EOUs could be used as a basis and simplified further in such a way that a firm obtains prompt reimbursements of actual customs or excise duty paid for export related sales and pays applicable excise duties for domestic sales to a single common designated authority. Such a move to a “fiscal bonding” arrangement away from the current “physical bonding” regime would also conform to WTO guidelines because the duties reimbursed would be based on actual duties paid and pre-empt any countervailing action against exports under the SCM. It would also achieve a level playing field with other domestic producers for sales to the DTA. This would however imply a more sophisticated administrative regime, which the government may not be confident of implementing. Moving to administrative transparency from administrative obstructionism is a difficult change to implement, perhaps even more difficult than labour reforms, but without it, the situation will soon return to square one. It is time that we used our software expertise to address this complex task and a beginning can be made in the large but limited areas where SEZ-type policies are applied. Even if only one area implements such a system, the benefits will soon be evident for other areas.

6. **Conclusion**

Small fenced-in SEZs are a way of providing a country with basic industrial infrastructure that many, especially smaller, developing countries often lack. Obviously, if the policies and the infrastructure of SEZs were beneficial for their limited areas, they would be equally beneficial for the rest of the country, unless the government is constrained in extending these benefits. To that extent, fenced-in SEZs are essentially the second-best strategy to more widespread liberalisation, and the consensus of considerable research on their empirical effectiveness is that their welfare implications are often ambiguous. SEZs have been successful only if they presaged or were developed in conjunction with an overall liberalisation policy.
While SEZs, especially the de novo variety, do not make sense, SEZ-type policies do. In China, there was a need to establish a laboratory to experiment with and demonstrate the success of market-oriented policies to a country that had abjured such a route for two generations. It would be ironic if we, in India, after fifty years of a market economy need to demonstrate its benefits again to ourselves through small fenced-in SEZs. “Domestic regulations, restrictions and infrastructure inadequacies” need to be eliminated not only in a limited 10 sq km, but also in a wider area. While resource constraints may initially restrict the provision of world-class infrastructure to limited geographical areas, much can be done if one concentrates on getting more out of infrastructure that is already there in our existing urban and industrial areas. But removal of domestic regulations and restrictions does not require resources; it requires broad-based political will, a commitment to growth and employment. It is time we realised that there are no substitutes for this basic ingredient. Our challenges are greater. The time for Band-aid fixes like SEZs is gone. They are opiates providing temporary distractions from the true problems. It is time our policies recognised this reality and responded to it.
## APPENDIX 1

### Box 27.6: SEZs approved and under implementation

<table>
<thead>
<tr>
<th>Name of the SEZ</th>
<th>Name of promoter</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>New</strong></td>
<td></td>
</tr>
<tr>
<td>1. Positra SEZ</td>
<td>Gujarat Positra Port Infrastructure Limited, Ahmedabad</td>
</tr>
<tr>
<td>2. Nanguneri SEZ</td>
<td>Tamil Nadu Industrial Development Corporation, Chennai</td>
</tr>
<tr>
<td>3. Bhadohi SEZ</td>
<td>Secretary, Small Scale Industries &amp; Export Promotion, Govt of UP, Lucknow</td>
</tr>
<tr>
<td>4. Kanpur SEZ</td>
<td>Secretary, Small Scale Industries &amp; Export Promotion, Govt of UP, Lucknow</td>
</tr>
<tr>
<td>5. Dronagiri SEZ</td>
<td>Secretary, Trade Commerce and Mining Dept, Govt of Maharashtra, Mumbai</td>
</tr>
<tr>
<td>6. Kakinada SEZ</td>
<td>Principal Secretary (Industries), Govt of AP, Hyderabad</td>
</tr>
<tr>
<td>7. Paradip SEZ</td>
<td>Secretary (Industries), Govt of Orissa, Bhubaneswar</td>
</tr>
<tr>
<td>8. Gopalpur, SEZ</td>
<td>Secretary (Industries), Govt of Orissa, Bhubaneswar</td>
</tr>
<tr>
<td>9. Kulpi SEZ</td>
<td>Principal Secretary, Commerce and Industries Dept, Govt of West Bengal, Kolkata</td>
</tr>
<tr>
<td>10. Indore SEZ</td>
<td>Principal Secretary, Commerce and Industries Dept, Govt of Madhya Pradesh, Bhopal</td>
</tr>
<tr>
<td><strong>Converted</strong></td>
<td></td>
</tr>
<tr>
<td>11. SEEPZ</td>
<td>Development Commissioner, SEEPZ, Andheri (East), Mumbai</td>
</tr>
<tr>
<td>12. Kandla SEZ</td>
<td>Development Commissioner, Kandla SEZ, Gandhidham, Kachchh</td>
</tr>
<tr>
<td>13. Kochi SEZ</td>
<td>Development Commissioner, Kochi SEZ, Kakkanad, Kochi</td>
</tr>
<tr>
<td>14. Surat SEZ</td>
<td>Development Commissioner, Surat SEZ, Surat</td>
</tr>
</tbody>
</table>

### Table 27.2: Employment creation in selected EPZs

<table>
<thead>
<tr>
<th>Countries</th>
<th>Year of first EPZ</th>
<th>Year of</th>
<th>Number of workers employed in EPZs</th>
<th>Labour force of the country</th>
<th>Per cent of EPZ to national employment</th>
<th>New entry into work force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominican Republic</td>
<td>1968</td>
<td>1992</td>
<td>142,000</td>
<td>3,014,280</td>
<td>4.71%</td>
<td>76,880</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1996</td>
<td>164,639</td>
<td>3,344,704</td>
<td>4.92%</td>
<td>59,044</td>
</tr>
<tr>
<td>Jamaica</td>
<td>1976</td>
<td>1994</td>
<td>14,148</td>
<td>1,237,000</td>
<td>1.11%</td>
<td>23,000</td>
</tr>
<tr>
<td>Mauritius</td>
<td>1971</td>
<td>1995</td>
<td>80,466</td>
<td>470,816</td>
<td>17.10%</td>
<td>8,192</td>
</tr>
<tr>
<td>El Salvador</td>
<td>1976</td>
<td>1991</td>
<td>6500</td>
<td>1,942,850</td>
<td>0.33%</td>
<td>63,860</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1996</td>
<td>50,000</td>
<td>2,377,180</td>
<td>2.10%</td>
<td>52,890</td>
</tr>
<tr>
<td>Philippines</td>
<td>1972</td>
<td>1991</td>
<td>43,858</td>
<td>25,339,500</td>
<td>0.17%</td>
<td>606,100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1992</td>
<td>60,000</td>
<td>25,960,000</td>
<td>0.23%</td>
<td>620,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1994</td>
<td>91,860</td>
<td>28,151,210</td>
<td>0.32%</td>
<td>643,220</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1997</td>
<td>183,709</td>
<td>30,881,340</td>
<td>0.59%</td>
<td>1,402,750</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1983</td>
<td>1996</td>
<td>37,533</td>
<td>60,839,672</td>
<td>0.06%</td>
<td>955,675</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1971</td>
<td>1990</td>
<td>98,900</td>
<td>7,007,900</td>
<td>1.41%</td>
<td>193,910</td>
</tr>
<tr>
<td></td>
<td>law</td>
<td>1996</td>
<td>196,774</td>
<td>8,451,692</td>
<td>2.32%</td>
<td>606,748</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>1990</td>
<td>60,000</td>
<td>6,814,200</td>
<td>153,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>1970</td>
<td>1991</td>
<td>21,910</td>
<td>11,020,400</td>
<td>0.20%</td>
<td>198,000</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1966</td>
<td>1990</td>
<td>80,000</td>
<td>8,432,000</td>
<td>0.95%</td>
<td>33,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1997</td>
<td>57,016</td>
<td>9,400,000</td>
<td>0.60%</td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>1965</td>
<td>1992</td>
<td>500,000</td>
<td>32,805,256</td>
<td>1.52%</td>
<td>1,446,990</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1997</td>
<td>898,786</td>
<td>37,739,544</td>
<td>2.38%</td>
<td>643,532</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1972</td>
<td>1992</td>
<td>15,000</td>
<td>1,214,040</td>
<td>1.24%</td>
<td>30,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1996</td>
<td>47,972</td>
<td>1,333,800</td>
<td>3.59%</td>
<td>17,940</td>
</tr>
<tr>
<td>Honduras</td>
<td>1976</td>
<td>1991</td>
<td>19,000</td>
<td>1,822,380</td>
<td>1.00%</td>
<td>67,280</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1996</td>
<td>61,162</td>
<td>2,094,444</td>
<td>2.92%</td>
<td>59,004</td>
</tr>
<tr>
<td>Togo</td>
<td>1995</td>
<td>1996</td>
<td>4,000</td>
<td>1,724,500</td>
<td>0.23%</td>
<td>51,410</td>
</tr>
</tbody>
</table>


a) all employment numbers are approximates.

### Table 27.3: Impact of EPZs in select sub-Saharan African countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year as of</th>
<th>Employment creation</th>
<th>Number of firms</th>
<th>Foreign exchange earnings or export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Namibia</td>
<td>Nov 1996</td>
<td>approx &gt; 2000</td>
<td>6 out of 11 firms have started production</td>
<td>n.a.</td>
</tr>
<tr>
<td>Togo</td>
<td>1996</td>
<td>Approx. 4000</td>
<td>29 firms</td>
<td>n.a.</td>
</tr>
<tr>
<td>Senegal</td>
<td>1990</td>
<td>600</td>
<td>10 firms</td>
<td>Approx. US$14.7 mn</td>
</tr>
<tr>
<td>Kenya</td>
<td>1996</td>
<td>n.a</td>
<td>14 zones (including) EPZs, FTA and industrial zones</td>
<td>n.a.</td>
</tr>
<tr>
<td>Cameroun</td>
<td>1995</td>
<td>2567 direct 1027 indirect</td>
<td>16 EPFs</td>
<td>Projected nominal exports: 416 BF (US$0.924 bn)</td>
</tr>
</tbody>
</table>

*Source:* Information on Kenya from WEPZA 1996 *International Directory of Export Processing Zones and Free Trade Zones*, published by the Flagstaff Institute. Note that not all zones are functional or active.

### Table 27.4: Impact of EPZs in select countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Year as of</th>
<th>Employment creation</th>
<th>Number of firms</th>
<th>Foreign exchange earnings or export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico</td>
<td>1992</td>
<td>500,000</td>
<td>1200 firms in 353 zones</td>
<td>US$4.2 bn of export value added. 8% of Mexican income; 2nd after oil revenues as generator of foreign currency</td>
</tr>
<tr>
<td></td>
<td>1995</td>
<td>614,025</td>
<td>2033</td>
<td></td>
</tr>
<tr>
<td>Jamaica</td>
<td>1996</td>
<td>16,804</td>
<td>3 zones operational; (56 firms)</td>
<td>Approx. gross exports: US$235.4 mn; approx. net exports: US$28.90 mn</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>1990</td>
<td>60,000</td>
<td>144 firms</td>
<td>US$437 mn (in 1990) = 23% of total gross national exports; 44% of total gross national manufactures exports</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1995–96</td>
<td>37,533</td>
<td>96 firms (2 zones)</td>
<td>US$310.50 mn gross export US$62.96 mn net export</td>
</tr>
<tr>
<td>El Salvador</td>
<td>1991</td>
<td>6,500</td>
<td>14 firms (1 zone) 208 firms</td>
<td>US$85 mn in exports</td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td>50,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 27.4: Impact of EPZs in select countries (contd...)

<table>
<thead>
<tr>
<th>Country</th>
<th>Year as of</th>
<th>Employment creation</th>
<th>Number of firms</th>
<th>Foreign exchange earnings or export</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>1991</td>
<td>43,211</td>
<td>4 zones</td>
<td>US$580 mn (in 1990) = 7% of national gross exports; 16% of national gross manufacture exports; US$244.80 mn net exports US$46.13 mn net exports</td>
</tr>
<tr>
<td></td>
<td>1994</td>
<td>91860</td>
<td>4 zones</td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1992</td>
<td>15,000</td>
<td>109 firms</td>
<td>US$125 mn in exports</td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td>47,972</td>
<td>9 zones (‘95)</td>
<td></td>
</tr>
<tr>
<td>Honduras</td>
<td>1991</td>
<td>19,000</td>
<td>49 firms</td>
<td>US$95 mn in exports</td>
</tr>
<tr>
<td></td>
<td>1996</td>
<td>61,162</td>
<td>9 zones</td>
<td></td>
</tr>
<tr>
<td>Jordan</td>
<td>1996</td>
<td>10,000</td>
<td>3 zones</td>
<td>Approx. gross exports; US$444.4 mn approx. net exports: US$97.6 mn</td>
</tr>
<tr>
<td>Indonesia (1 out of 2 zones reporting)</td>
<td>1996</td>
<td>98,000</td>
<td>Nusantara bonded zone: 168 firms</td>
<td>Approx. gross exports: US$12 mn approx. net exports: US$8.4 mn</td>
</tr>
<tr>
<td>Vietnam (2 out of 4 zones reporting)</td>
<td>1996</td>
<td>7,142</td>
<td>EPZ Massda and Tan Thuan EPZ 40 firms</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EPZ/EOU</th>
<th>SEZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need to have a minimum export performance (EP) or Net Foreign Exchange Earning as Percentage of Exports (NFEP)</td>
<td>Only Net Positive Foreign Exchange Earning over a period of five years</td>
</tr>
<tr>
<td>Export and import are subject to customs examinations</td>
<td>No routine examination by customs of export and import cargo</td>
</tr>
<tr>
<td>Duty free material to be utilised over one year</td>
<td>Duty free material to be utilised over five years</td>
</tr>
<tr>
<td>Duty is fully recovered in case of failure to achieve required NFEP under Custom Act</td>
<td>Duty to recovered in case of failure achieve positive NFEP under Custom Act to be in proportion to shortfall</td>
</tr>
<tr>
<td>FIPB approval required</td>
<td>100% FDI investment through automatic route available</td>
</tr>
<tr>
<td>Reservation policy of SSI sector applicable</td>
<td>No cap on foreign investment for SSI reserved items and exemption from industrial licensing requirement for items reserved for SSI sector.</td>
</tr>
<tr>
<td>No exemption from custom/excise duty for import/domestic procurement of goods for setting up of units</td>
<td>Exemption from custom/excise duty for import/domestic procurement of goods for setting up of units.</td>
</tr>
<tr>
<td>Attestation of development commissioner is required for import of capital goods</td>
<td>All imports on self-certification</td>
</tr>
<tr>
<td>Export proceeds to be realized and repatriated in 6 months.</td>
<td>Export proceeds to be realized and repatriated within 12 months</td>
</tr>
<tr>
<td>Retention of 70% of exports earning in EEFC accounts</td>
<td>Retention of 100% of exports earning in EEFC accounts</td>
</tr>
<tr>
<td>Ceiling on DTA sales limited to 50% of exports but at 50% of customs duty</td>
<td>No ceiling on DTA sales by SEZ units but subject to full customs tariff</td>
</tr>
<tr>
<td>Subcontracting facility not available to jewellery units also</td>
<td>Subcontracting facility available to jewellery units also but not for precious stones</td>
</tr>
<tr>
<td>Procedural simplification for operations like record keeping, inter-unit transfer, subcontracting, disposal of obsolete material and waste and scrap</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** http://sezindia.nic.in/sezappa.htm
### Table 27.5: Trade in China’s five SEZs in the first five months of 2001

<table>
<thead>
<tr>
<th>SEZ</th>
<th>Area (sq km)</th>
<th>Pop. (mn)</th>
<th>Total foreign trade turnover (US$)</th>
<th>Exports (US$)</th>
<th>Imports (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Xiamen</td>
<td>1516 (131)</td>
<td>1.2</td>
<td>3.1 bn (6.9%)</td>
<td>1.9 bn (5.4%)</td>
<td>1.2 bn (9.3%)</td>
</tr>
<tr>
<td>2. Shenzhen</td>
<td>2021 (327.5)</td>
<td>3.5</td>
<td>13.8 bn (13.1%)</td>
<td>6.6 bn (12.2%)</td>
<td>7.1 bn (14%)</td>
</tr>
<tr>
<td>3. Zhuhai</td>
<td>1266 (121)</td>
<td>0.6</td>
<td>3.5 bn (29.4%)</td>
<td>1.2 bn (15.4%)</td>
<td>2.3 bn (38.5%)</td>
</tr>
<tr>
<td>4. Shantou</td>
<td>8935 (52.6)</td>
<td>3.9</td>
<td>0.95 bn (-42.5%)</td>
<td>0.38 bn (-66.6%)</td>
<td>0.57 bn (8.4%)</td>
</tr>
<tr>
<td>5. Hainan</td>
<td>—</td>
<td>—</td>
<td>0.55 bn (14.4%)</td>
<td>0.33 bn (15.7%)</td>
<td>0.22 bn (12.4%)</td>
</tr>
</tbody>
</table>

**Source:** The trade figures are from the General Administration of Customs. The area figures relate to the province. Area of the SEZ is provided in parenthesis.

**Urbanisation China’s SEZs**

- Zhuhai (Guangdong)
- Shenzhen street heading out of the railway station and Hong Kong border crossing
- Xiamen, Fujian
- Shantou (Guangdong) skyline
### Table 27.6: Infrastructure projects with private participation in China

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Province</th>
<th>Sponsor</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Guangzhou–Shenzhen–Zhuhai Super highway</td>
<td>Guangdong</td>
<td>Hopewell</td>
<td>1992</td>
</tr>
<tr>
<td>2</td>
<td>Shenzhen–Huizhou Expressway</td>
<td>Guangdong</td>
<td>NWI</td>
<td>1993</td>
</tr>
<tr>
<td>3</td>
<td>Guangzhou City Northern Ring Road</td>
<td>Guangdong</td>
<td>NWI</td>
<td>1994</td>
</tr>
<tr>
<td>4</td>
<td>Gaoyao Roadway</td>
<td>Guangdong</td>
<td>NWI</td>
<td>1994</td>
</tr>
<tr>
<td>5</td>
<td>Wuhan Airport Expressway</td>
<td>Hubei</td>
<td>NWI</td>
<td>1995</td>
</tr>
<tr>
<td>6</td>
<td>Shantou Bay Bridge</td>
<td>Guangdong</td>
<td>CKI</td>
<td>1996</td>
</tr>
<tr>
<td>7</td>
<td>Hui–Ao Roadway (Hui–Ao Section)</td>
<td>Guangdong</td>
<td>NWI</td>
<td>1996</td>
</tr>
<tr>
<td>8</td>
<td>Greater Beijing Region Expressway</td>
<td>Hebei</td>
<td>Bechtel, Provincial Highway Corp.</td>
<td>1996</td>
</tr>
<tr>
<td>9</td>
<td>Sichuan Ring Road</td>
<td>Sichuan</td>
<td>NWI, CKI</td>
<td>1996</td>
</tr>
<tr>
<td>10</td>
<td>Chengdu–Nanchong expressway</td>
<td>Sichuan</td>
<td>NWI</td>
<td>1996</td>
</tr>
<tr>
<td>11</td>
<td>Meiguan expressway</td>
<td>Guangdong</td>
<td>Road King, Shenzhen Expressway</td>
<td>1996</td>
</tr>
<tr>
<td>12</td>
<td>Qijiang Highway</td>
<td>Guangdong</td>
<td>Road King</td>
<td>1996</td>
</tr>
<tr>
<td>13</td>
<td>Xunan Highway</td>
<td>Henan</td>
<td>Road King</td>
<td>1996</td>
</tr>
<tr>
<td>14</td>
<td>Jihe Expressway</td>
<td>Guangdong</td>
<td>Road King, Shenzhen Expressway</td>
<td>1996</td>
</tr>
<tr>
<td>15</td>
<td>Shen–Shan Expressway</td>
<td>Guangdong</td>
<td>CKI</td>
<td>1996</td>
</tr>
<tr>
<td>16</td>
<td>Shenyang DaBa Road</td>
<td>Liaoning</td>
<td>CKI</td>
<td>1996</td>
</tr>
<tr>
<td>18</td>
<td>National Highway #107 (Shenzhen)</td>
<td>Guangdong</td>
<td>Shenzhen Expressway</td>
<td>1997</td>
</tr>
<tr>
<td>19</td>
<td>Tanshan–Jintang Road</td>
<td>Hebei</td>
<td>CKI</td>
<td>1997</td>
</tr>
<tr>
<td>20</td>
<td>National Highway #107 (Zhumadian)</td>
<td>Henan</td>
<td>CKI</td>
<td>1997</td>
</tr>
<tr>
<td>21</td>
<td>Yichang Yiling–Yangtze Bridge</td>
<td>Hubei</td>
<td>CKI</td>
<td>1998</td>
</tr>
</tbody>
</table>

#### Power Generation

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Province</th>
<th>Sponsor</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shajiao B</td>
<td>Guangdong</td>
<td>CEPA (Hopewell, now Southern En., local govt)</td>
<td>1987</td>
</tr>
<tr>
<td>2</td>
<td>Shajiao C (Guangdong Guanghope)</td>
<td>Guangdong</td>
<td>CEPA (Hopewell, now Southern En., local govt)</td>
<td>1993</td>
</tr>
</tbody>
</table>
Table 27.6: Infrastructure projects with private participation in China (contd...)

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Province</th>
<th>Sponsor</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Shantou Changahi</td>
<td>Guangdong</td>
<td>CKI</td>
<td>1996</td>
</tr>
<tr>
<td>4</td>
<td>Tangshan</td>
<td>Hebei</td>
<td>Sithe Energies, AIG Fund, GIC Singapore, local govt</td>
<td>1996</td>
</tr>
<tr>
<td>5</td>
<td>Xiangchi-AES Hydro Power</td>
<td>Hunan</td>
<td>AES Chingen, China Hunan Cili EPC</td>
<td>1996</td>
</tr>
<tr>
<td>6</td>
<td>Weihai</td>
<td>Shandong</td>
<td>AES Chingen</td>
<td>1996</td>
</tr>
<tr>
<td>7</td>
<td>Henan</td>
<td>Henan</td>
<td>Combined Energy (Denver), Henan Power Bureau</td>
<td>1996</td>
</tr>
<tr>
<td>8</td>
<td>Fushun Power Plant</td>
<td>Liaoning</td>
<td>CKI</td>
<td>1997</td>
</tr>
<tr>
<td>9</td>
<td>Anhui</td>
<td></td>
<td>United Engineering Singapore</td>
<td>1997</td>
</tr>
<tr>
<td>10</td>
<td>Jingyuan</td>
<td>Gansu</td>
<td>Meiya Power Corp. (CEA/AIF Fund), local govt</td>
<td>1997</td>
</tr>
<tr>
<td>12</td>
<td>Shandong Zhonghua Power</td>
<td>Shandong</td>
<td>China Light and Power, EDF</td>
<td>1997</td>
</tr>
<tr>
<td>14</td>
<td>Jiangmen West River Power</td>
<td>Guangdong</td>
<td>CEA Asia, City of Jiangmen</td>
<td>1997</td>
</tr>
<tr>
<td>15</td>
<td>Hefei Lake</td>
<td>Anhui</td>
<td>AES Chigen, Anhui Liyuan Electric, Hefei mun. govt</td>
<td>1997</td>
</tr>
<tr>
<td>16</td>
<td>Sichuan Fuling Aixi Power Co.</td>
<td>Sichuan</td>
<td>AES Chigen, Sichuan Fuling Banxi Colliery</td>
<td>1997</td>
</tr>
<tr>
<td>17</td>
<td>Fujian-1</td>
<td>Fujian</td>
<td>New World Power, China Chang Jiang Energy</td>
<td>1997</td>
</tr>
<tr>
<td>18</td>
<td>Nanjing City</td>
<td>Jiangsu</td>
<td>Coastal Power Prod’n, local govt</td>
<td>1997</td>
</tr>
<tr>
<td>19</td>
<td>Wuxi</td>
<td>Jiangsu</td>
<td>AES Chigen, China Natl Aero-Engine, Wuxi Power</td>
<td>1997</td>
</tr>
</tbody>
</table>
Table 27.6: Infrastructure projects with private participation in China (contd...)

<table>
<thead>
<tr>
<th>No.</th>
<th>Project</th>
<th>Province</th>
<th>Sponsor</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>Laibin B</td>
<td>Guangxi</td>
<td>EDF, GEC Alsthom</td>
<td>1998</td>
</tr>
<tr>
<td>21</td>
<td>Donguan</td>
<td>Guangdong</td>
<td>Sithe China (Sithe, AIG Fund, GIC Singapore), local govt</td>
<td>1998</td>
</tr>
<tr>
<td>22</td>
<td>Rizhou</td>
<td>Shandong</td>
<td>China Power Investment, Shandong Huaneng, Siemens</td>
<td>1998</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Dachang Water Treatment Plant</td>
<td>Shanghai</td>
<td>Bovis Asia Pacific, Thames Water, local govt</td>
<td>1996</td>
</tr>
<tr>
<td>2</td>
<td>Donguan Qiaotou Water Plant</td>
<td>Guandong</td>
<td>CKI, local govt</td>
<td>1998</td>
</tr>
<tr>
<td>3</td>
<td>Shenyang (Shifosi) Water Plant</td>
<td>Liaoning</td>
<td>CKI, local govt</td>
<td>1998</td>
</tr>
<tr>
<td>4</td>
<td>Chengdu #6</td>
<td>Sichuan</td>
<td>Generale des Eaux</td>
<td>1998</td>
</tr>
</tbody>
</table>

Notes

1. See Robert Sinclair Export Processing Zones: An Ingredient for Successful Liberalisation, Syracuse University, May 2001, on the presence of Free Trade Zones in the Roman Empire. The modern version of SEZs is commonly acknowledged to have started with Shannon International Airport in Ireland in 1959, though it is contended that Puerto Rico was effectively an EPZ earlier. India followed soon after, setting up an SEZ in Kandla, Gujarat, in 1965. As noted later, in many countries today, notably Mauritius and China, firms now benefit from the incentives similar to those offered in such zones without being physically fenced in. By the 1990s, one estimate (Chen, X., 1995, “The Evolution of Free Economic Zones and the Recent Development of Cross-national Growth Zones,” International Journal of Urban and Regional Research, vol. 19 [December], 593–621) counted over 900 zones in 90 countries. Mexico alone was reported to have over 350 such zones. Another estimate by the OECD (Trade, Employment and Labour Standards—A Study of Core Worker’s Rights and International Trade, Paris 1996) estimated that there were about 500 zones in 73 countries.

2. See Dorsati Madani, “A Review of the Role and Impact of Export Processing Zones”, World Bank, August 1999, which is a detailed review of studies on EPZs. Employment generation is frequently the main benefit from EPZs, and they are likely to be more successful when strong backward linkages are developed. This creates demand for intermediate goods and services, enhances the viability of industrial and service sectors in the DTA and improves the host nation’s labour and managerial skills. Usually, SEZs can be expected to automatically increase employment unless the production in them
displaces the production in the DTAs. This would happen if firms relocate their existing plants from other areas in the country into the SEZ. The increased efficiency of production in an SEZ may result in lower employment, but better productivity would also reduce cost. If the reduced cost and prices generate sufficiently higher demand for the product, this may compensate for the initial fall in employment. This is true both for exports and for sales into the DTA.

3. Strictly speaking, the net generation of foreign exchange does not represent any benefit for the host economy, unless the official exchange rate is overvalued and firms in the EPZs are required to deposit their receipts with the central bank. If this is the case, the social value of a unit of foreign exchange is higher than the official rate, and the deposit of receipts with the central bank constitutes a form of taxation. The calculation of the net benefit from the generation of foreign exchange then requires a difficult estimation of its shadow price.

4. Generally, the concept of agglomeration effect, which can be both positive and negative, refers to savings or benefits derived from the clustering of activities external to the “firm” and are therefore part of “external economies”. These can be further distinguished such as (a) agglomeration effects associated with the agglomeration of population and the resulting infrastructure facilities, labour pool and quality of life (urbanisation economies), and (b) agglomeration effects resulting from the clustering of industrial activities (industrialisation economies) and effects which result from the agglomeration of specific activities which favour specialised facilities, labour pools, vocational training, political lobbies, etc. (localisation economies).

5. Some incentives can also be seen as reduction in restrictions, depending on the benchmark, such as duty reductions compared to a zero-tariff regime.

6. Resource-seeking FDI that builds on extraction of raw materials is of relevance to an SEZ only to the extent that value can be added to the raw material through processing in the SEZ before export.

7. There may be a net foreign exchange benefit even for sales to the DTA, if goods imported from other areas are replaced by lower-cost production in the SEZ, which is then sold to the DTA.

8. However, relocation is still a possibility for goods with low import tariffs but high transport costs (for the final output, but not the input) under a regime that permits unlimited sales into the DTA, if the SEZ is close to a consumption centre and foreign firms relocate to save transport costs and take advantage of its relatively investor-friendly environment. Producers should be able to reduce prices based on savings in transportation costs to the extent that they will produce goods that are currently being imported from a distant production base.

9. An excellent exposition of the nature of the administrative regime that EPZs function under can be obtained by perusing the Comptroller and Auditor General’s (CAG) report on “Review of Export Processing”, which can be downloaded from http://
Do "De Novo" SEZs Make Sense?


11. For example, during the holiday years, companies operate at a preferential corporate tax rate. When corporate taxpayers have a choice, they have incentive to shift income into a company enjoying the tax holiday and take more deductible expenses in another company they may own that must pay taxes. They would prefer to have the taxpaying company incur interest costs on borrowed finance and the tax holiday company to be financed with equity. In fact, the tax holiday company could hold debt in the non-holiday company. The non-holiday company can deduct interest, while the tax-holiday company earns the interest tax-free. There are reported instances where companies in Indian EPZs have closed down at the end of their tax holiday period only to reappear under another name in the same EPZ. One such example, cited in “Export Processing Zones in India” (available at http://www.sardi.org/EPZ.htm), is the case of Vastra Apparels in the Madras EPZ, which reportedly closed down, dismissed its workers and reopened as Rudra Apparels.

12. In Mauritius, employers had greater flexibility in discharging workers in the EPZs. There was no severance allowance or advance notification of retrenchment, and it allowed more flexible rules for working overtime. Further, minimum wages for women was fixed at lower levels and two-thirds of the workers in the EPZ sector were women.

13. East Asian zones seem to have stronger linkages as compared to zones in Latin America. In the Masan Zone of Korea, for example, the zone administration gave technical assistance to local suppliers and sub-contractors. In Taiwan, under government guidance, personnel from firms in the zones were placed at potential suppliers’ factories to offer advice in production methods and quality control. As a result of this effort, domestic value added to the Masan zone in Korea increased from 27.8 to 52.2 per cent between 1971 and 1979. In Taiwan, local supplies increased from 8 per cent of total imports to 46 per cent between 1969 and 1979. Masan also permitted out-processing. In 1976, there were 94 out-processing firms employing some 4518 workers outside the zone (or 15 per cent of zone employment). By 1988, 56 out of the 73 zone firms had engaged 525 domestic firms for out-sourcing processes. These 525 employed 16,686 workers, equivalent to half of the entire Masan zone work force. This very successful backward linkage permitted increased employment and exports as well as transfer of technology.


Research, October 1998: 36. It goes on to list centralised management, conceptual limitation, infrastructure deficiencies, firm-level operational constraints and multiple objectives (such as development of backward regions) as factors inhibiting the performance of EPZs.

16. Usually only around 25 per cent to 50 per cent of the amount permitted for sales into the DTA (less than 5 per cent of exports in any zone) is used and less than 10 per cent of the units use the sub-contracting facility, mostly in MEPZ and CEPZ.

17. According to the Ministry of Commerce, over the period 1992–93 to 1996–97, a total of Rs 7577 crore in customs duty was foregone on imports into the EPZs (which could also be testimony to the high rates of duty on imported goods). In comparison, these SEZs had net exports (f.o.b. exports less c.i.f. imports as reported by the units) of Rs 4680 crore in the same period. The actual foreign exchange realised is often less than the reported f.o.b. value. This aspect is not even monitored by the Ministry of Commerce. The CAG’s review of 101 test units revealed an under-realisation of Rs 106 crore as per the RBI’s records. A simple extrapolation of this statistic to the 513 units would indicate that the extent of under-realisation would be around 10 per cent.


19. The development of the SEZ itself may generate strong agglomeration economies that could act as a countervailing effect that offsets this distortion. For a firm in the SEZ, this increased cost may be offset for a while as a result of SEZ subsidies, but it would impact the competitiveness of the economy in the long run, as the production structure is distorted away from the optimum, which would reflect in the firm’s own competitiveness as the SEZ’s subsidies fall away.

20. This is based on Rajeev Ahuja, “Export Incentives in India within WTO Framework”, ICRIER, July 2001.

21. In 1968, when Mauritius gained its independence from Great Britain, it was a sugar cane economy, with a high-level of unemployment. In 1970, the government decided to diversify its economy by promoting tourism and creating an EPZ, the first on the African continent. It was unusual in the sense that rather than being limited to a specific geographical area, it covered the whole island. All that a company needed to do to benefit from its advantages (lower taxes, exemption from customs duty and tax on dividends, the freedom to transfer profits, etc.) was to produce principally for export, similar to India’s EoUs. The EPZ began to develop on a larger scale only in the 1980s as investors from Hong Kong relocated their garment factories, apprehending trouble after the Chinese takeover in 1997. From 1980 to 1990, jobs in export processing industries rose from 21,000 to 90,000. See Samuel Grumiau “After the Miracle” Trade Union World, March 1999.

22. Actually, the reserve levels are not unnaturally high. According to the latest IMF Article IV consultations, China had reserves of $168.9 and US$214.7 billion of imports (about 9.5 months of imports), while India had reserves of US$38 billion and US$55.4 billion
of imports (about 8.25 months of imports). Chinese foreign exchange reserves grew with the unification of the exchange rate in 1994. They more than doubled in 1994 and rose by over 40 per cent in 1995, until by the end of May 1998, they had crossed US$140 billion.

23. There is some question as to China’s actual FDI levels. In general, about 70 per cent of FDI inflows into China are equipment and technology (see the United Nations World Investment Report 1995, p. 59), whose valuation has often been questioned, among others, by the Chinese authorities. The motives behind over-valuation include a larger share of dividends for the foreign investors than for the Chinese partners, resulting from the higher equity share of foreign investors, lower taxes arising from larger capital expenditures and depreciation credits and more management control. Over-valuation reduces tax revenues for the government, as well as the share of revenues accruing to the local partners in joint ventures, who are often local government entities. For dealing with the problem of over-valuation, the State Administration for Import and Export Inspection and the Ministry of Finance jointly promulgated the Administrative Procedures for Appraising Foreign Invested Property in early 1994 and began to monitor more closely the fulfilment of contractual commitments with respect to the actual value and quality of equipment in FDI projects.

24. Current tax revenue comprises compulsory, unrequited, non-repayable receipts collected by central governments for public purposes. It includes interest collected on tax arrears and penalties collected on non-payment or late payment of taxes. It is shown as a net of refunds and other corrective transactions. Current non-tax revenue includes requited, non-repayable receipts for public purposes, such as fines, administrative fees, or entrepreneurial income from government ownership of property, and voluntary, unrequited, non-repayable current government receipts other than from governmental sources. This category does not include grants, borrowing, repayment of previous lending, or sales of fixed capital assets or of stocks, land, or intangible assets, nor does it include gifts from non-governmental sources for capital purposes. Together, tax and non-tax revenue make up the current revenue of the government. Data on government revenues and expenditures are collected by the IMF through questionnaires distributed to member governments and are as presented in the IMF’s Government Finance Statistics Yearbook.

25. Foreign Invested Enterprises are Chinese–foreign equity joint ventures, Chinese–foreign contractual joint ventures and wholly foreign-owned enterprises established in the PRC.

26. The fourteen coastal cities are Dalian, Qinghuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai. A treaty port is a port opened to foreign trade by a treaty. The usage of the term is usually confined to ports in those countries that had formerly strongly objected to foreign trade or attempted altogether to exclude it and is used especially in reference to Japan and China. They had admitted trade with the West in the sixteenth century but soon reversed themselves, with China shutting off all trade until the opening of Guangzhou in 1834. The Treaty of Nanjing (1842), which restored peace after the first
of the Opium Wars, provided for five treaty ports—Xiamen (one of the SEZs), Guangzhou, Fuzhou, Ningbo and Shanghai. In all, 69 Chinese treaty ports that were finally opened on the seacoast or on large rivers and zones were established for foreign residence that enjoyed extraterritoriality—privilege of immunity from local law enforcement enjoyed by certain aliens. The system of treaty ports finally disappeared in China in 1946. In these coastal open cities, there are many ETDZs, such as Guangzhou ETDZ, Zhanjiang ETDZ and Nansha ETDZ. The focus is on developing hi-tech industrial production and bringing in advanced technology. They are usually located a short distance from the major city centres, offering an abundant supply of land for setting up new operations and for later expansion. They usually offer superior infrastructure and access to facilities.

27. Coastal Economic Open Areas cover a large area along the southern coastline of China. They have similar incentives and local authorities may approve foreign investment up to a higher amount. They may also approve foreign exchange and foreign currency loans up to a higher level.

28. The Pudong New Area is the focus of the effort to produce for the international market. The designated space is a triangular area adjacent to and east of the central city, stretching from the east bank of the Huangpu River to the southwest of the Yangtze Estuary and covering over 522 square kilometres. Planned for a three-phase development, Pudong is designed to relieve the spatial pressure on old Shanghai. It already contains China’s largest free-trade zone, a fully operational export processing zone, a high-technology development zone, the new administrative centre for the Shanghai municipal government and a large number of new residential communities. The modern facilities—and the concessions—in Pudong have already attracted many businesses. Baoshan Steel Corporation, China’s largest steel conglomerate, has put up a facility. The largest department store in Asia has been built here, with investment from the Japanese retail giant Yaohan. And a US$2 billion General Motors facility has been turning out Buick cars, the second major joint auto production line in Shanghai. Pudong also provides Shanghai with a new central business district (CBD) that can house a variety of business activities and, most importantly, financial and business services that are the backbone of other major world cities.

29. This is also true of Taiwan. One of the most common operating strategies for entrepreneurs in Taiwan is “OPTS”—taking Orders from abroad in Taiwan, Processing in mainland China, shipping and Transfer in Hong Kong, and Sales abroad. This allows entrepreneurs to enjoy the preferential treatment provided by China’s government as well as the favourable trade status accorded by the developed countries to China.

30. Based on Stephen Morgan’s presentations at the University of Adelaide.

31. In the 1970s, Mauritius was offered the choice between access to the EU market at the then high world price with limited quota and access at a lower domestic EU price but with higher guaranteed quotas. It chose the latter. The larger quantity of access and higher domestic EU prices, resulting from pressure by the domestic EU producers’ lobby, generated large rents for Mauritius.
32. More than 184,000 enterprises involving Hong Kong interests are registered in the mainland, representing over 54 per cent of all overseas-funded projects. 90 per cent of such companies investing in the mainland have an annual turnover of less than US$30 million, falling into the range of small- and medium-sized enterprises. See US Dept. of Commerce’s Trade Information Center’s briefs on Hong Kong at http://www.trade.gov/td/tic/ and “Hong Kong, China in Transition” by Aasim Husain, Finance and Development, September 1997.

33. These outward processing arrangements, i.e. the export of raw materials or semi-manufactures from or through Hong Kong to China, with contractual agreements for the subsequent re-import of the processed goods to Hong Kong, designed specifically to live within global trade rules of origin, so that where necessary, enough work is done in Hong Kong to qualify for the “Made in Hong Kong” label.

34. Other major investors in Guangdong were from Taiwan, the US, Japan, the EU and Southeast Asia. Foreign enterprises play an increasingly important role in Guangdong’s economy. Their exports in 1998 accounted for 48.4 per cent of all exports by FIE from China and 51 per cent of the province’s total. Foreign investments in Guangdong are mainly engaged in manufacturing industries including computer accessories, computers, biological products, mechanical and electrical products, refined chemistry, toys, garments and hardware. In recent years they have increasingly been channelled into infrastructure, agriculture, property and capital-and-technology-intensive projects. Hong Kong’s investment is mainly involved in electronics, toys, garments, shoes, plastic, computers and accessories, commerce, food catering, materials warehousing, distribution, real estate, and other infrastructure development projects.

35. According to the Hong Kong Census and Statistics Department, at end of 1998, 33 per cent of Hong Kong’s outward direct investment to China (at market value) was in manufacturing, 28 per cent in investment holdings, real estate and various business services, and 11 per cent in communications services. A number of businesses are localising, such as a Hong Kong cookware manufacturer, who in addition to replacing the managerial staff hired in Hong Kong at their factory in Shenzhen with professionals hired locally, plans to procure stainless steel from within China instead of importing it from Germany to maintain competitiveness.

36. The Shanghai Urban Construction Investment and Development Company was formed in 1992 to mobilise, allocate and manage funds for urban construction. It has entered into concessions with non-state enterprises to operate the bridges and tunnels across the Huangpu River. It has also established a number of subordinate entities, mainly in charge of water supply, which are listed on the Shanghai Stock Market. In 1996, the funds mobilised by the company accounted for about 90 per cent, of Shanghai’s total urban infrastructure revenue. The city, employers, and employees all contribute through a newly established public reserve fund to finance housing purchases over time. Since 1998, all banks have been able to supply mortgages to qualified homebuyers on behalf of the public reserve fund. In addition to new home purchases, many people have bought
property or use rights to the homes they were assigned under the old welfare housing system, and some also trade such rights on the secondary housing market to acquire better housing. In contrast with Beijing, where industrial activities are being concentrated in the outer suburbs, a large proportion of Shanghai’s industrial base still remains in the central city districts. To solve problems associated with fragmented industrial land use, Shanghai has largely relied on relocating factories from the central city to the new industrial districts available for expansion. Between 1991 and 1998, about 12,000 work units as well as 400,000 households were moved from downtown to the city’s outskirts. The issuing of domestic construction bonds also has been growing steadily, capturing the high level of household savings.

37. The foreign exchange retention system was introduced in 1978 to enhance exporting enterprises’ incentive to export. After exporting enterprises had sold all their foreign exchange earnings to the government at the official rate, the government allowed these enterprises as well as local governments to keep a certain amount of foreign exchange. If they wanted to use the retained foreign exchange, they could use renminbi to buy it back from the government according to the prevailing exchange rate, as long as the use of the foreign exchange fell within the confines of regulation. As the official exchange rates were overvalued, the right to buy back foreign exchange at the official rates in effect further devalued the domestic currency. Foreign trade corporations thus had an incentive to expand their exports, even though the average cost of generating foreign exchange earnings was higher than the official exchange rate. In 1979, the retention rate for exports handled by the local government was only 40 per cent of earnings above the level of exports achieved in 1978. In 1985, the retention rate was raised to a minimum of 25 per cent of total export revenues. In 1991, it was possible to retain 80 per cent of total export revenues, while the central government reserved the right to purchase at the swap rate of 30 per cent of the foreign exchange earnings. See Sonia Wong “China’s Export Growth: Its Past and Future” HKCER Letters, Vol. 51, July 1998

38. By comparison, per capita income in Hong Kong was US$26,502. Furthermore, in China, some of the negative effects that accompany such location concentration, such as in-migration and pressure on infrastructure facilities, are administratively addressed through migration restrictions. Travelling to the SEZs requires permission from governmental authorities at the county level or higher for those from the rest of the Pearl River Delta or China. Relocating to the SEZs to live and work is even more restricted, largely through the regulation of housing permits. Even so, there are a large number of temporary residents in the coastal provinces.

39. Some rural labourers shifted to forestry, animal husbandry, sideline production and fisheries sectors. A large number entered township enterprises, thus creating a group of labourers who left the land but not the home. Others migrated to urban areas, which not only satisfied the need for labour force for some economic sectors in the urban areas, but also provided channels for some poverty-stricken areas to export labour force so as to obtain necessary funds for their own development.
40. Township and village enterprises (TVEs) are a mix of collectively and privately owned enterprises in the rural areas. These TVEs operate outside the state plan and largely without funds from state banks and, therefore, are subject to quite rigorous market competition and hard budget constraints.

41. Their main reasons, in the order of importance, were the need for higher income, job security, individual fulfilment and personal taste.

42. By the end of 1995, 60.96 million employees had signed labour contracts, making up 41 per cent of the total employed, and by the end of 1996, the employees in some cities and regions all signed labour contracts. Long-term workers hired before the introduction of contractual work are still implicitly regarded as lifetime employees. Naturally, the proportion of such workers will shrink over time as permanent workers retire and are replaced with contractual ones. With the SOE sector accumulating sizeable losses, one would expect the wages of SOE workers to fall relative to those in the more profitable private sector. In China, this is not what seems to have happened in recent years. The main reason would seem to be the persistence of the soft budget constraint, which has enabled state enterprises to raise wages and/or benefits even with poor financial performance.

43. The employing unit may revoke a labour contract with an advance notice of 30 days when no agreement on modification of the labour contract can be reached through consultation by the parties involved when the objective conditions taken as the basis for the conclusion of the contract have greatly changed so that the original labour contract can no longer be carried out.

44. This varied between SEZs. In Shantou SEZ, investors were given a 3-year tax holiday, followed by a 50-per cent tax reduction for another 4 years, and then a 20-per cent reduction of the regular rate. In Zhuhai SEZ, investors were exempted from local taxes for 5 years starting from the first profit-making year. More broadly, as Chinese government spending is a remarkably low 14 per cent of the GDP (compared with 33 per cent in India), China can maintain very low tax rates on an average throughout the economy. In China, for example, an individual taxpayer earning US$4000 pays a 10 per cent marginal tax rate, compared to a 30 per cent marginal tax rate on the same income in India.

45. The alternative options included domestic sales of sophisticated products, foreign exchange adjustment across ventures, reinvestment of local profits in export enterprises, purchase and sale of domestic products, direct assistance from local governments, balancing foreign exchange over time through local currency loans, import substitution, etc. This became less binding after the establishment of swap centres in 1985. See Chen Chunlai, “The Evolution and Main Features of China’s Foreign Direct Investment Policies”, Working Paper No. 97/15 University of Adelaide, 1997.

46. Under the 1984 reforms, about 60 per cent of exports fell under a mandatory plan, an additional 20 per cent were assigned as value targets to the provinces and the remainder
were non-plan exports. Given the large share of mandatory exports, most export transactions were routed through designated FTCs so that it is likely that even with these reforms, there was no close systematic relationship between prices and export volumes. The 1988 reforms were a major step in increasing the responsiveness of exports to relative prices, and export volume growth increased to about 20.5 per cent from an average of 12.5 per cent in the past five years. After the reforms of 1994, export volumes increased at a rate of 31.9 per cent.

47. A series of laws and regulations relating to FDI were adopted after 1991, including the Foreign Investment Enterprise and Foreign Enterprise Income Tax Law, the Copyright Law, the Software Protection Regulations, the Patent Law Amendments, the Trademark Law, the Corporation Law, the Regulatory Provisions of Foreign Banks, the Securities Exchange Law, the Banking Law, and the Foreign Exchange Control Regulations.


49. The TVE export data are measured in yuan, while total export data are measured in dollars and converted using the official exchange rates. TVEs’ share of exports before 1994 is hence overstated because of the multiple exchange rate system in effect to the end of 1993. If we use the swap exchange rate to convert total export earnings to yuan, then the TVE share in 1987 (when the swap rate had a 40 per cent premium over the official rate) is 7.8 per cent, making the subsequent TVE export growth even more spectacular. See Jeffrey D. Sachs and Wing Thye Woo “Understanding China’s Economic Performance”, Development Discussion Paper No. 575, Harvard Institute for International Development, March 1997.


51. A recent study of Indian industry (Somik Lall, Zmarak Shalizi, and Uwe Deichmann: “Agglomeration Economies and Productivity in Indian Industry” World Bank Working Paper No. 2663, Washington July 2001) found that that access to markets through improvements in inter-regional infrastructure was an important determinant of firm-level productivity. However, due to congestion of existing infrastructure in urban areas, benefits of locating in these areas did not appear to offset associated costs.

52. Kundra (2000) cited above argues strongly for a move away from the current “physical bonding” to a “fiscal bonding” regime. An appropriate system could be set up with a common network and unique identification numbers, such as the PAN. A crosscheck can be designed by ensuring that domestic producers selling to the beneficiary firm provide the PAN of the beneficiary firm while claiming refunds. This would electronically become an instant debit on the beneficiary firm’s tax account, unless it is redeemed by export sales made by the beneficiary firm. A random percentage audit of actual physical production parameters could also be included.
1. CURRENT STATE OF HEALTHCARE IN INDIA

Healthcare in India is being hailed as the next big business opportunity. The reasons cited are several: a large and growing middle class with rising income levels, changing disease profiles with a move towards non-communicable, lifestyle diseases, increase in coverage of health insurance and demand levels that far outstrip supply of services.

The healthcare industry today is over Rs 100,000 crore (5 per cent of GDP) and currently employs over 60 lakh people. It is one of the largest and fastest growing industries in India and is expected to continue to grow at 12–13 per cent per annum. Yet, in comparison to global standards, it is still not large enough, given the needs of our rapidly growing population. In fact, India does not meet even the basic WHO standards (number of beds, average bed space, etc.), indicating plenty of scope for the growth and development of this sector.

In the past, the bulk of healthcare infrastructure in India has been provided by the public sector. The government provides the majority of beds in the country, even though the private sector owns over 60 per cent of the hospitals. While the infrastructure provided by the government includes primary health centres as well as larger secondary and tertiary hospitals, the main focus of the government is on providing primary healthcare.

Although the government has made considerable investments in the provision of public healthcare, the quality of government-provided healthcare is very poor. Today, most rural India, given the choice, would opt for private sector services, even if it means paying out of the pocket to go to smaller clinics or nursing homes, which may or may not be accredited.
This is substantiated by the fact that over 60 per cent of healthcare spending in India is captured by the private sector, mainly by medium-sized hospitals and nursing homes. This indicates a growing need not just for healthcare services, but more specifically private healthcare services, which are perceived to be of higher quality.

If healthcare is expected to grow rapidly, the private sector will have to play a large role in this growth. The private sector has taken an increasing interest in the healthcare segment in the last few decades. Presently, although there are over 150 corporate hospitals in India, the most prominent being Apollo Hospitals, Fortis Healthcare, Escorts and Kovai Medical Centre, a large share of the market is captured by several smaller hospitals and nursing homes, making it an extremely fragmented industry.

Healthcare faced a wave of fresh investment in the 1980s as hospitals were awarded industry status and several private promoters turned towards banks and financial institutions to finance their new ventures. However, many of these projects turned into NPAs as several of these large hospitals struggled to succeed, performing below expectations. A study conducted by the Economic Times indicates that of over 25 listed hospitals, only 5 hospitals have a net margin of over 10 per cent, and 11 hospitals are in the red, and some have already shut down.1

As a result, hospital financing today is almost a non-starter, since banks and financial institutions have turned wary of this sector. It is important to understand the factors that hamper industry growth and more specifically why these projects have failed to perform, before undertaking any new investments in the sector.
2. **Reasons for Stagnation and What is Needed for Growth?**

There are three main reasons that the private healthcare industry has not fully exploited its potential. First, due to low insurance penetration, most spending on healthcare services is out-of-pocket expenditure. This has restricted access to services making it impossible to achieve a critical mass of patients. Secondly, the lack of standardisation of services, poor information base and ineffective monitoring have led to low quality, high levels of fraud and corruption, making it difficult for the sector to grow. Third, misallocation of investments and low efficiency of existing hospitals have impeded effective performance.

2.1 **Low health insurance penetration**

It is currently estimated that the coverage of health insurance is between 10 to 15 per cent of the population. This includes beneficiaries covered under several government schemes such as ESIS, CGHS, Army and the Railways. Individual cover is much lower at less than 1 per cent.

The private health insurance business is also currently unattractive in India due to several reasons. Firstly, health insurance players are clubbed with other general insurance players and have the same capital requirements, although the risk profile is different. At present, players need to have a capital requirement of Rs 100 crore which is high by international standards and makes entry into this business a financially unviable proposition. A more reasonable level of capital required would be Rs 30 crore, which would allow these businesses to operate profitably. Secondly, the lack of an information base makes it difficult to assess patient risk effectively. Thirdly, due to the poor claims processing ability of the public sector players, there is low trust among consumers. Most large international health insurers such as Cigna, BUPA and Aetna have either left the country or are waiting before they enter the market.

Mediclaim, GIC’s scheme for individuals, covers approximately 7 million people, or 0.75 per cent of the total population, and its premiums today total over Rs 700 crore. Mediclaim currently offers a single product, which only covers hospitalisation, and requires up-front payment at hospitals by the consumer. Despite its aggressive growth, Mediclaim has low penetration due to low awareness, pre-existing conditions and other exclusions, lack of provider network, poor claims-processing capabilities and inflated claims by providers. Currently there are a few third party administrators (TPAs) in the market such as Paramount Healthcare, Sedgwick Parekh and Apollo Health Plan that mainly serve as marketing agents for Mediclaim and help corporates design medical plans. The government is in the process of licensing TPAs to act as agents on behalf of insurance companies to increase coverage by addressing deficiencies in claims processing and to reduce costs.
Box 28.1: The proposed role of third party administrators (TPAs)

TPAs are expected to benefit all parties involved by providing better service to policyholders and administrative cost reduction for insurers. Through TPAs, insurers will be able to outsource their administrative activities, including settlement of claims at a cost. It may be noted that the insurers will pay TPAs, so policyholders will benefit at no extra cost. Once the policy has been issued, all the records will be passed on to the TPA and all the correspondence of the insured will be with the TPA. The TPA will maintain databases of policyholders and issue them identity cards with unique identification numbers and handle all the post-policy issues including claim settlements.

Presently TPA licenses are issued to render health services. By tying up with the providers, and insurers, the TPAs will be able to offer hospitalisation services on a cashless basis. Below is a brief overview of the activities of TPA:

- All the records of insurance policies of an insurer will be transferred to the TPA. TPA may issue identity cards to all the policyholders.
- In case of a claim, on informing the TPA, the policyholder will be directed to a hospital where the TPA has a tied-up arrangement. The policyholder will also have the option to join any hospital of his choice, but payment will then be on a reimbursement basis.
- TPA will issue an authorisation letter to the hospital for the treatment. TPA will track the case of the insured at the hospital and at the point of discharge, all bills will be sent to TPA.
- TPA will pay the hospital and send all the documents necessary for consideration of claims, along with bills to the insurer, and the insurer will reimburse the TPA.

Low coverage of health insurance results in most people paying out of pocket for health services, which has restricted the growth of the healthcare sector. The potential for growth of health insurance is enormous, and even in the most conservative scenario, the coverage of health insurance could grow to cover over 10 per cent of the population by 2010, garnering premium incomes in the range of Rs 10,000–15,000 crore.\(^3\) The government needs to take effective measures for this growth to come about, and should follow the examples of some other countries (Appendix 1). Key changes necessary for the growth of health insurance are:

- Regulatory changes to open the market for private health insurance
- Wider range of product offerings catering to individual needs
- Setting of benchmarks and standards to facilitate risk assessment

2.2 High capital investments leading to poor financial performance

Providing in-patient healthcare is a capital-intensive business. The capital required depends on the bed size of the hospital and the type of technology and equipment used. Tertiary hospitals with large numbers of beds, and very sophisticated technology require the highest levels of investment.
Large corporates are mainly interested in the tertiary care sector, which has high capital requirements. With the exception of a few, none of these hospitals have performed well financially. There are a few reasons for this:

**High investment and operating costs**

The current level of investment costs and operating costs are very high making it almost impossible for an average hospital to perform effectively. A recently conducted study\(^4\) shows that for a 200-bed tertiary care cardiac hospital with an investment cost of Rs 50 lakh per bed, and an operating margin of 20 per cent, the NPV is actually negative. Even reducing investment costs by 20 per cent to Rs 40 lakh per bed will only make the hospital NPV 0. It is only with reduction in investment costs coupled with reduction in operating costs,\(^3\) that the NPV actually turns positive (Appendix 2). Apollo Hospitals, one of the few hospitals that have consistently performed well, has managed to keep its operating costs low.

**High debt-servicing levels**

Due to the high investment cost requirements, several corporates turned to banks and financial institutions for financing and leveraged themselves considerably. As the debt-service levels for most of these hospitals became unmanageable, they were unable to meet their obligations. This was compounded by the fact that institutions financing these loans for the first time had estimated short gestation periods and most lenders initially expected to recover their money within five years. Due to both the factors mentioned above, most hospital projects became NPAs on lenders’ balance sheets.

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**Figure 28.2: Three main types of healthcare providers**

<table>
<thead>
<tr>
<th>Tertiary care facility</th>
<th>Secondary facility</th>
<th>Primary care facility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services</td>
<td>Services</td>
<td>Services</td>
</tr>
<tr>
<td>• Primarily inpatient services</td>
<td>• Inpatient and outpatient services</td>
<td>• Only outpatient</td>
</tr>
<tr>
<td>• Single speciality or multi-speciality</td>
<td>• Multidisciplinary</td>
<td>• Provides consultative services</td>
</tr>
<tr>
<td>• Complex procedures with sophisticated equipment</td>
<td>• Simple surgeries using basic equipment</td>
<td>• Mainly treating infectious diseases</td>
</tr>
<tr>
<td>Bed size</td>
<td>Bed size</td>
<td>Bed size</td>
</tr>
<tr>
<td>• 200–500 beds</td>
<td>• 50–200 beds</td>
<td>• 0 beds</td>
</tr>
<tr>
<td>Investment required</td>
<td>Investment required</td>
<td>Investment required</td>
</tr>
<tr>
<td>• High levels of capital investment</td>
<td>• Medium investment required</td>
<td>• Low investment required</td>
</tr>
<tr>
<td>• Costs are in the range of Rs 4–50 lakh per bed depending on technology used</td>
<td>• Costs range about Rs 20–40 lakh per bed</td>
<td>• Often a clinic with a few GPs or even one</td>
</tr>
</tbody>
</table>

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\(^1\)\(^2\)\(^3\)\(^4\)
Hospital financing in the last few years has become a difficult proposition, and has negatively impacted the growth of the sector.

Promoter reputation
One of the main problems with hospital performance is that promoters have often failed to meet their financial obligations, and furthermore, several promoters have siphoned money out of the projects, leaving creditors with no recourse.

The capital-intensive nature of the business leads to high interest and depreciation costs, and in addition, hospitals are burdened with high fixed costs such as salaries and electricity charges. Given the high capital costs, in order to be successful, hospitals must manage their operational efficiency, streamline their processes and consolidate procurement in order to be financially viable.

2.3 Absence of standards and poor quality control
Today, there are no minimum standards for healthcare providers. There is a lack of national regulation mandating registration of all medical establishments. As a result, several unregistered, unaccredited clinics operate and offer low quality medical services to the public. Due to poor monitoring mechanisms and poor enforcement of existing regulations, these clinics are allowed to operate unchecked for several years.

In addition, the lack of patient information and medical databases leads to patients being treated ineffectively and inaccurately. Insurance providers are also hesitant to enter a market where patient information is not accurate enough to enable them to assess risk appropriately. There is an urgent need to:

• define basic standards on a national level
• prescribe compulsory registration and adoption of these standards by all providers
• monitor and enforce standards at the local level

The current monitoring and enforcement efforts are very ineffective and should be entrusted to local bodies that have the involvement of both the government and private providers, with substantial financial autonomy through registration fees and legal empowerment. While this effort may be spearheaded by the central government as in Brazil or the US, support and involvement of local bodies is essential.

3. Significant future growth potential
At current utilisation rates, it is estimated that a minimum of 750,000 extra beds will be needed to meet the increased demand for healthcare services. This
will result in a market size of Rs 320,000 crore by 2012. Even with a base case scenario, this will require an additional investment of Rs 100,000–140,000 crore in the next ten years. Since the government will only be able to spend a third of this amount, private investment needed is in the range of Rs 70,000–100,000 crore. Despite the constraints mentioned above, several corporates have started providing healthcare services in the last few years, and it is estimated that the private sector will need to add several thousand tertiary care beds every year. The focus of current investments is on the multi-speciality tertiary care and cardiac facilities, where most of the future demand is expected. However, there are other specialties that can be considered either on a stand-alone or speciality basis. In terms of planning future investments, it is important to keep in mind the key changes expected in the sector.

### 3.1 Changing disease profile

India is moving towards reducing its share of infectious diseases such as malaria and tuberculosis, and a higher share of non-communicable diseases, commonly known as lifestyle diseases such as cancer, cardiac and neurological diseases. This is in line with trends experienced in other developing countries.

![DALY profile of India](image)

**Figure 28.3: India moving towards a higher degree of non-communicable diseases**

(1) These include diabetes mellitus, nutritional/endocrine disorders, neuropsychiatric disorders, cardiovascular diseases, respiratory diseases, digestive diseases, diseases of the genito-urinary system, musculoskeletal disorders

(2) These include tuberculosis, STDs, HIV/AIDS, diarrhoeal diseases, meningitis, hepatitis, malaria, tropical diseases, nutritional deficiencies

*Source:* US FDA, IMS Health, WHO—Global Burden of Disease
In addition, currently over 60 per cent of private spending in India is on outpatient care, and mainly on treatment of acute and infectious diseases. As infectious diseases come under control through vaccination and effective medication, the share of outpatient care will reduce. The next couple of years will see an increasing focus on inpatient spend, in line with trends experienced in other developing countries such as Korea and Brazil.

Cancer and heart diseases will drive growth in the inpatient market, with accidents and maternity still playing a large role, whereas outpatient spending will see increased treatment of lifestyle diseases such as diabetes, respiratory and musculoskeletal diseases (Appendix 3). Any new investments in capacity should include facilities for these areas, in order to ensure sustainability through high occupancy levels.

![Figure 28.4: By 2012 private spending will move towards increased inpatient spend in India](image)


### 3.2 Growing tertiary sector

While the overall market is expected to grow considerably, the tertiary sector is expected to grow more rapidly due to an increase in complex inpatient diseases such as heart disease or cancer, leading to a demand for additional tertiary beds. The tertiary sector usually involves a high degree of speciality and complexity and the success of any player in this sector will to a large extent depend on the technology and equipment used, doctors employed, patient loyalty and investment management.
Investments in state-of-the-art, sophisticated cardiac care, neurological and cancer care facilities are expensive and difficult to sustain. While a speciality cardiac facility can bring in large cash flows, low occupancy levels have a large adverse impact on financial viability, which in turn affects finances available for other specialities. New models such as the hub and spoke model, pooling and franchising (that will be discussed later), will make it easier to distribute costs and reach an extended patient base.

4. **FINANCIAL ANALYSIS OF THE HOSPITAL BUSINESS**

Hospitals are capital-intensive projects, and it is important to understand how the costs and revenues work in this business. While the financials for each hospital will vary depending on the size, specialities and location, there are some basic components that can be assumed on an average for the industry.

4.1 **Cost structures**

The overall capital costs to build a hospital range from Rs 20–50 lakh per bed, the lower range being for primary basic hospitals, and the higher range applying to super-speciality hospitals where technology and equipment cost is very high. The costs can be split up into project costs and operating costs, and can be broken down in the following way:

**Capital costs**

- **Land and building development costs**
  
  This is usually in the range of 30–40 per cent of project costs. The importance of land costs varies with location and is of special relevance in metros and major cities where land acquisition rates are very high. Most of the time in such situations, land is offered at a concessional rate by the government.

- **Equipment costs**
  
  Equipment costs range anywhere between 30 per cent and 70 per cent depending on the type of equipment purchased. MRI and cardiology equipment are the most expensive at Rs 6–10 crore and Rs 3 crore respectively, followed by CT Scans, Heart lung machines and operating tables (Appendix 4).

- **Operating costs**

  - **Interest costs**
    
    Interest costs for most corporate hospitals are in the range of 5–10 per cent of sales, depending on what stage of funding the hospital is in. In the initial stages, the interest costs are very high and can escalate rapidly if there is a delay in project
implementation. Hospitals with debt equity ratio of more than 1.5 to 1 will find it very hard to meet their debt service obligations.

**Depreciation costs**
These costs also range from 5–10 per cent of sales depending on the type of technology used and the equipment purchased. Machinery depreciates over a period of five years and as a result, high utilisation levels become essential to the success of any venture. Often hospitals over-invest in state-of-the-art equipment when it is not needed. Consolidating procurement and sourcing and managing inventory effectively can result in considerable savings for the hospital.

**Salaries and fees**
Salaries and fees together account for over 35 per cent of sales. While salaries are fixed costs, consultants’ fees can be linked to the operations making it a variable component. Again, high occupancy levels are key to ensuring that the fixed labour costs do not eat into profitability.

**Operational overheads**
Overheads can run into 4–5 per cent of sales, the highest component being electricity consumption. Using newer technologies and designing facilities to maximise natural light can reduce these overheads.

**Raw material costs**
While these typically account for approximately 25 per cent of sales, there are several ways to manage these costs. These would include aggregating purchase volumes to obtain better prices, managing inventory effectively and altering current sourcing strategies.
In order for hospitals to succeed, they must manage their operating costs effectively to be able to service their debt obligations and still be profitable.

**4.2 Revenues**
In addition to managing costs, hospitals must also ensure a steady stream of revenues to reduce the burden of fixed costs and to generate the required rate of return. In-patient care generates the most revenues for hospitals, and within this the main areas of revenue generation include diagnostic laboratories, operation theatres and the pharmacy, which together account for between 60–65 per cent of total revenues.
When one considers financing a hospital, it is important to understand the key factors that determine revenue generation potential.
Occupancy levels

Given the high fixed cost component, high occupancy levels are essential for any hospital project to succeed. Most well-managed hospitals operate at occupancy levels of over 80 per cent and are considered to be operating at full capacity. In order for occupancy levels to be high, a hospital needs to have:

- good reputation
- well-reputed and renowned doctors
- strong referral network
- corporate clients
- preventive health check-ups

Higher occupancy alone may not necessarily provide greater revenues, as revenues are a combination of occupancy, type of treatment and average length of stay for a patient.

Average length of stay

The bulk of the revenue is generated within the first 72 hours of a patient’s stay. Internationally, the best hospitals have an average length of stay of about 3.5 days. Therefore, it is imperative to have a high turnaround of patients, to maximise revenue generation from each patient. Shorter patient stay can be achieved through

- better management of beds
- minimally invasive surgeries that have shorter recovery periods
- improvement of technology and equipment to carry out day-care surgeries

Type of treatment

Among the specialities, cardiac care is the highest revenue generator, followed by orthopaedics, neurology and oncology as key therapeutic categories. Diagnostic labs, which carry out health check-ups and investigations are also major revenue earners. In addition, a hospital should have a mix of surgical and medical patients with the balance tilting towards the former. Higher utilisation of intensive care facilities also leads to higher revenue generation.

The hospital business is difficult given the magnitude of capital costs and slim operating margins. Currently, most corporates that are entering the healthcare spectrum are investing in the tertiary sector, building large-scale super-speciality hospitals where the capital costs are very high. When considering an investment in this area, it is important to understand the risks and opportunities in these hospitals.
5. INVESTING IN LARGE TERTIARY HOSPITALS

5.1 Background
The last few years have seen the birth of many new tertiary hospitals promoted by corporates such as Ranbaxy, Wockhardt, Max Healthcare, etc. These hospitals have mainly been set up or are being set up in metros or large cities, with state-of-the-art facilities and renowned doctors.

As mentioned before, the tertiary sector is expected to grow rapidly in the next few years, due to the changing disease profile. The CII–McKinsey study estimates that it will grow by a minimum of 15 per cent CAGR to reach a total addressable market size of Rs 30,000–40,000 crore by 2012. This represents a huge opportunity for investors.

However, historically, as described earlier in Section 2 of the paper, several of these hospitals have not been successful, and have shut down. Today, the success of these hospitals will depend on the ability of the management to keep debt service levels low, keep operating margins high, and attract high-income patients who are willing to pay for quality services.

5.2 Critical success factors
Tertiary hospitals must ensure provision of quality healthcare on all fronts.

High quality talent
Hospitals would need to hire reputed doctors, either high-profile Indian educated surgeons/specialists or NRI doctors who have returned to India. Besides the doctors, the nurses and the support staff should be well trained and have adequate experience.

Cost management
The hospital should manage costs effectively to be able to keep operating margins above 25 per cent. Such hospitals need to ensure adequate economies of scale and consolidation of procurement costs for materials.

Financial management
Given the huge capital costs required to set up the hospitals, it is essential to price services to be able to recover these initial investments. While raising funds for building and equipment, it is important to ensure that a low debt equity ratio is maintained, as higher debt equity ratios make it hard to raise funding.

Customer relationships
The most critical success factor of any tertiary hospital is the ability to develop customer relationships. The hospital must have a large-enough-paying patient population to recover the investment costs. A strong referral network with GPs,
linkages with secondary care facilities and links with corporate health plans will help to drive revenue growth. Since the richest 15 per cent will account for over 50 per cent of private healthcare spending over the next few years, it is necessary to orient the facilities towards this patient group.

One of the ways to mitigate the risk of developing and maintaining a loyal patient pool would be to have feeder networks, otherwise known as the “hub and spoke model”.

5.3 “The hub-and-spoke model” and pooled services

The “hub-and-spoke model” is a means of ensuring efficient and high quality provision of specialist services in select locations, while at the same time improving access to general service functions over a larger area. Under this model, highly specialised services are provided by a tertiary hospital at a certain location known as a “hub”, and lower complexity services are provided through a network of smaller primary care centres that refer patients to the hubs for more complex services. Apollo Hospitals set up four primary centres in Chennai after building a large tertiary care hospital. Max Healthcare is focusing on preventive healthcare at its Dr Max Clinics by making consumers aware of their healthcare needs for early detection of ailments.

The smaller centres/hospitals act as a feeder service to the tertiary hospital. This helps to increase utilisation in the tertiary hospitals that have made large investments in high-technology equipment and specialised doctors. The objective of setting up hubs and spokes is to reduce the average number of days of in-patient stay at the hubs, recover investment costs and maximise patient turnover for specialist services.

A similar model is the idea of pooling services, where hospitals are outsourcing speciality departments to other hospitals and doctors with proven track records. An example of this is Faridabad’s Sunflag Hospital, which has its cardiac unit run by Noida’s Metro Heart Institute, ophthalmology under the CFS and urology under North Point. This helps not only in managing costs by focusing on core competencies, but also results in a more efficient capacity utilisation by reducing the need for multiple investments at different locations.

Critical success factors

- State-of-the-art equipment and well-established doctors in the main hub
- Large network of satellite hospitals/primary care centres relatively close by
- High concentration of paying customers in the area
- Long-term agreements between smaller hospitals and the main hub
- Promoter of the main hospital has a proven track record
The hub and spoke model will help to enhance the revenue-generating ability of the tertiary hospital, giving it a better chance to cover its fixed costs and be profitable.

5.4 Financing considerations
Given the risks and critical success factors mentioned above, it is apparent that managing and running these hospitals effectively is a difficult proposition, and very few promoters have been consistently successful in this business. When one considers financing a tertiary hospital, it is necessary to keep a few key criteria in mind:

• The debt equity ratio of the hospital should not exceed 1.5:1; otherwise debt obligations will be unmanageable.
• The operating margins should be in the range of 25–30 per cent consistently, and should not be decreasing over time.
• In the case of a new hospital, one can look at operating margins of other hospitals owned by the promoter.
• The promoter should have a strong track record of successfully managing hospitals and servicing debt obligations, and should have experience in the healthcare business.
• Any equity investment should only be made if there is a potential exit option, either through the equity market or a strategic investor.
• There should be a large network of feeder services/smaller hospitals/GP referrals.
• They should be located in areas where income levels are high to ensure paying patients.

Most promoters in the past have been unable to operate these hospitals successfully and have eroded their operating margins, making it difficult for them to service their debt obligations. Within the evolving healthcare scenario there are some newer models that are emerging that are not as capital-intensive and are quicker to execute.

6. Few alternative business models
The healthcare services spectrum is fairly large and encompasses several business models. The most lucrative business models for investors include those that have low capital requirements, the ability to attract a large number of paying patients and numerous avenues for revenue realisation. Here we consider a few models along these lines.

6.1 Franchising and private management
One of the largest constraints in setting up new hospitals is the high level of capital required to acquire land, and build and develop the new facility. This is an especially
Investing in Private Healthcare in India

An acute problem in metros and big cities where the cost of land acquisition is extremely high. At the same time, there are currently several hospitals in large cities, including government-run hospitals, which are largely under-utilised or highly inefficient due to low quality of equipment and doctors, poor management and outdated facilities, and as a result, are performing poorly.

One way to address this inefficiency would be to have a successful private healthcare player with a proven track record refurbish and manage these facilities for a fee. This would reduce the need for high capital investment in building a brand new facility, as the private sector player would only have to raise enough money to refurbish and upgrade the existing facilities. There are several ways in which this can be structured:

<table>
<thead>
<tr>
<th>Description</th>
<th>Franchisee model</th>
<th>Fully-owned hospitals</th>
</tr>
</thead>
</table>
| Description | • Corporate provides its brand name and management expertise  
• Fixed fee or revenue sharing agreement exists between hospital owner and franchiser  
• Quality control  
• Consistent customer experience  
• Ability to create “brand pull”  | • Private sector corporate buys out existing promoter either partially or completely  
• Refurbishes the hospital and takes over management  
• Accurate evaluation of hospital  
• Ability to manage productivity and efficiency  
• Ability to attract patients |

**Figure 28.5: Two models can be considered**

Franchising is an attractive investment for several reasons. Firstly, the capital costs are lower than that of building a new hospital. Secondly, if the promoter has a good track record in managing hospitals, the risk of failure is reduced. Thirdly, the new management will be able to apply pooled sourcing with its other hospitals to reduce materials costs. In the franchising model, since the promoter may lack complete control over all operations and maintenance, managing and ensuring quality may be an issue.

**Critical issues that need to be considered**
- Current financial position of the hospital (debt equity ratio, bad debts, outstandings)
Reasons for operational inefficiency
Track record of new management company
Need to control quality
Management fees linked to performance

6.2 Clinical diagnostic centres
In India, diagnostic centres or labs provide diagnostic services for physicians, smaller healthcare facilities, doctors, corporates and insurance companies. They can also provide joint services with hospitals to operate diagnostic outpatient departments and specialised diagnostic clinics.

Until recently, patients were forced to go to three or four labs for all the tests. Today, a patient need not face this problem as diagnostic labs are equipped to provide all facilities under one roof. Most of the high-end labs perform routine and special tests including lab tests, radiology, scanning, etc., and lab medicine includes various specialities like pathology, microbiology, genetics and immunology. Some of the more sophisticated labs even include CT scans and MRIs. Many major hospitals are currently placing high importance on laboratory medicine, as it is a major revenue earner.

The combination of low capital costs, low overheads and high equipment utilisation make this an attractive business model for investors. Diagnostic centres are often part of corporate healthcare efforts such as Apollo Health Clinics and thereby benefit from an additional guaranteed patient base. Large chains of diagnostic centres are also able to realise benefits in sourcing and procurement as compared to stand-alone hospital centres.

However, there are several risks as well. Mushrooming of diagnostic labs run by lab technicians and unqualified people are issues of grave concern today. The absence of a regulatory body is one of the reasons for the growth of numerous pathology labs of dubious quality in the country, as diagnostic labs can be opened anywhere by anybody. Also, existing labs will face competition with the entry of MNCs into the market.

Critical success factors

- Accredited staff and management
- High-tech equipment and high technology usage
- Stringent quality control of processes and procedures
- Strong relationships with doctors, smaller hospitals and insurance companies for ensuring adequate referrals
- Extensive client base including corporates, consulates, immigration and visa authorities
6.3 Resort hospitals and medical tourism

As medical costs skyrocket in the developed world, certain developing countries such as India have immense potential for what is now being called “medical tourism”. This refers to treating foreign patients in Indian hospitals, at a fraction of the cost they would incur abroad or providing services to patients from countries which have very poor medical facilities and are able to pay from their own pockets.

The recently released CII–McKinsey study on healthcare says medical tourism alone can contribute Rs 5,000–10,000 crore additional revenue for upmarket tertiary hospitals by 2012, and will account for 3–5 per cent of the total healthcare delivery market.

In comparison to most developed countries such as the UK or the US, treatments like those for dental problems or major procedures like bypass surgery or angioplasty come at a fraction of the cost in India. For example, cardiac surgery in India costs one-tenth compared to the costs in the US.

**Box 28.2: Case study of Bumrungrad Hospital in Thailand**

The Tourism Authority of Thailand (TAT) is giving a big push to medical tourism, packaging vacations with hospital visits. Cheap, world-class facilities and technology combined with Thai hospitality are at the heart of the marketing effort.

Bumrungrad hospital in Thailand started in the 1980s and today over 25 per cent of its patients come from overseas. Last year, over 2,00,000 foreigners visited the hospital, about half of whom live outside Thailand. With 554 beds, luxurious environment and aggressive marketing, Bumrungrad now dominates Thailand’s medical tourism business.

The hospital caters to foreigners with a “concierge” service, that handles services such as airport transportation, accommodation, travel requirements and banking needs. Bumrungrad has made a deliberate effort to maintain the look and feel of a luxurious hotel, and has a coffee shop, several fast-food franchises and a food court to enhance patient care.

While these services make patients and their families comfortable, they also look great on tourist brochures and the hospital is included in several tour packages. Patients can come on vacation and get their hips or knees replaced at the same time. Bumrungrad is constantly targeting new markets such as Japan, the Middle East and Southeast Asia where people are paying out of their own pocket and lack access to quality facilities.

The CEO of Bumrungrad Hospital feels that the medical tourism business in Thailand will grow rapidly, and takes the example of Japan, when he says, “It would be cheaper for Japan to provide healthcare for its elderly in Thailand, cheaper for the retirees to set up houses here, and private hospitals would benefit as well.”

Apollo Hospitals has already tapped into this market and attracts several residents from Middle Eastern countries, where medical care is poor or non-existent. Escorts
is in the process of arranging travel and lodging facilities for its overseas patients. In less than two years, Escorts has doubled its number of overseas patients from 675 in 2000 to around 1,200 till date this year. “Almost 10 per cent of our patients come from Sri Lanka, Bangladesh, Nepal and West Asia,” says Naresh Trehan, Executive Director of Escorts.8

The current market for medical tourism in India is small and is mainly limited to patients from the Middle Eastern and South Asian economies. However, it could grow rapidly if the industry re-orientates itself to attract foreign patients.

Growth of this sector requires commitments by the government to build infrastructure for hospitals, create speciality tourist packages to include medical treatment and promote hospital accreditation and standardisation. The hospitals would have to provide state-of-the-art facilities and improve the quality of in-patient care and service to make the overall experience attractive to foreign tourists.

6.4 Ambulance and emergency services

This model envisions setting up a network of ambulances to provide emergency services for hospitals. Under this model, the hospital would provide the emergency centre facility and outsource their ambulance services to a private player, who would provide these services to a network of hospitals.

The ambulance service would operate as a “hospital on wheels”, having trained personnel (including doctors and paramedics) aboard to treat emergency victims, fully equipped and capable of beginning emergency care at the site of the incident and through the journey to a hospital. These ambulances would have standardised services, and would be equipped with basic life-saving equipment required before reaching the emergency room, and so the investment costs would be relatively low. These could either be focused in a certain region/location, or could cover a broader area through a large network of ambulances. There are several ways of structuring these services. One option would be for the hospital to outsource its entire ambulance needs paying either a fixed fee or a usage-based fee or a two-part tariff for the ambulance services. The other option would be to operate as an independent private provider and have patients pay for the service themselves.

Apollo Hospitals and Morepen Labs Ltd have taken the initiative of launching a national network of emergency services. Both have come forward to provide the initiative, infrastructure and finances required to build the nucleus of a national network.

While Apollo has provided infrastructure in the form of an emergency centre and trained personnel to treat the emergency victims, Morepen has contributed some funds to meet the set-up costs, according to sources from Apollo Hospitals. The ambulance services they offer are free of cost for the patient. This network will be
further extended to other hospitals over time, based on their willingness to maintain standards and quality of care.

**Critical success factors**
- Providing high-quality services at an affordable cost
- Substantial network of hospitals signing up to use these services
- Ability to build awareness among local communities
- Well-trained and highly-qualified emergency personnel

The investment costs required are low, as they are in the range of Rs 18 lakh per ambulance. Developing a network of ambulances will be an attractive investment option for investors who are looking for projects with lower capital costs and lower risk-profile.

7. **Conclusion**

India still lags behind most other countries in healthcare provision, and is still battling several deficiencies including high infant mortality rates, low density of doctors, low per capita spending on health and a huge shortage of hospital beds. Given the current state and capacity of the healthcare sector in India, there is no doubt that it needs significant additional investment in the next few years to be able to meet the overwhelming demand for health services.

Across the world, government spending on healthcare is decreasing and the same is true of India. Majority of the new investment will have to come from the private sector. Most corporates have ambitious plans for this sector, and are building large tertiary hospitals in various cities across India to meet the growing demand. However, unless health insurance coverage expands to cover a large percentage of the population, the number of patients who can afford such services will remain small, directly affecting the viability of these hospitals, which need high occupancy levels to sustain themselves. In order to propel this sector forward, the private sector needs to adopt a unified approach where the providers and insurance companies work together to chart out a future growth strategy for the sector.

As we have learned earlier in the paper, investments in large hospitals can be extremely risky, and there are a few critical factors worth noting before making an investment decision. The promoter must have a proven track record in the sector, ability to service financial obligations, the potential to build brand loyalty and continuously attract patients, and a long-term interest in the sector to ensure the success of the hospital.

However, this is not the only avenue for private investment. There are several alternative models emerging that could be more attractive for private sector
investments. Smaller models, which do not require high capital investments, are much safer bets and are likely to generate quicker returns on funds deployed. Diagnostic centres, emergency services, smaller primary care clinics that feed into larger hospitals are all areas that will grow rapidly, offering several opportunities for investors.

NOTES
5. Operating costs can be reduced through consolidated purchasing, improved supply chain and inventory management and elimination of unnecessary equipment.
7. The data in this section is compiled from interviews, conference papers and the *Economic Times* study.
9. India’s per capita spending (US$98) is much lower than that of other developing countries like Korea (US$720), Brazil (US$450), Thailand (US$340) and China (US$140). Source: Lotus Consultancy Services, “India Snapshot: Healthcare Industry”, September 2002.
10. The WHO estimates that India needs to add a minimum of 80,000 beds a year for the next five years to meet even the basic demands of its population.
APPENDIX 1

Coverage increased across all levels from 1993 to 1997

Key features of reforms

Health reforms were redistributive in nature

- Tax base used to finance the new system is proportional
- Since many families were previously uninsured, insurance acted as a negative income tax

Coverage increased from 23% to 57% with the largest gains among the poor

Reforms encouraged alternate provider payment systems allowing consumer choice while providing effective regulation

Figure 28.6: After health reforms in 1990, the proportion of individuals with insurance doubled in Colombia

Source: Literature and press search

Use of different types of prepayment for different segments

- Social insurance: Korea, Thailand
- Private insurance: Brazil
- Social insurance: Korea
- Community insurance: Thailand
- Government: Brazil
- Social insurance: Korea
- Government cover: Brazil

Coverage has been significantly increased

<table>
<thead>
<tr>
<th></th>
<th>Per cent of population covered</th>
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<tbody>
<tr>
<td>1970</td>
<td>1990</td>
</tr>
<tr>
<td>Korea</td>
<td>13% 96%</td>
</tr>
<tr>
<td>Brazil</td>
<td>40% 94%</td>
</tr>
<tr>
<td>Thailand</td>
<td>2% 60%</td>
</tr>
</tbody>
</table>

Figure 28.7: Brazil, Thailand and Korea have significantly increased coverage of health insurance

### Table 28.1: Most private sector models are NPV-negative, need to significantly manage operating costs

<table>
<thead>
<tr>
<th>Key assumption</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>• 200-bed hospital with 4 OTs and 2 cath labs</strong></td>
<td>Investment cost Rs 50 lakh per bed</td>
<td>Reduction in investment costs by 20% to Rs 40 lakh per bed</td>
<td>Reduction in investment costs by 20% to Rs 40 lakh per bed</td>
</tr>
<tr>
<td><strong>• 80% utilisation level</strong></td>
<td>Operating margin 20%</td>
<td>Operating margin 20%</td>
<td>Reducing operating costs and improving operating margins to 28%</td>
</tr>
<tr>
<td><strong>• Ramp-up of revenues over first three years of operation</strong></td>
<td>NPV – Rs 13 cr.</td>
<td>NPV 0</td>
<td>NPV Rs 33 cr.</td>
</tr>
<tr>
<td><strong>• WACC of 17%</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>• Debt equity 1:1</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>• Depreciation 10%</strong></td>
<td></td>
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<tr>
<td><strong>• 10-year NPV</strong></td>
<td></td>
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<tr>
<td><strong>• Inflation of 9% for revenues and costs</strong></td>
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<td></td>
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<tr>
<td><strong>• NPV calculated using discounted future cash flow model</strong></td>
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</tbody>
</table>

APPENDIX 3

Figure 28.8: Outpatient spend will be dominated by lifestyle diseases


Figure 28.9: Cancer and heart diseases will drive the growth of the inpatient market

1. BACKGROUND AND INTRODUCTION

The National Water Resource Council adopted the National Water Policy in September 1987 (NWP 1987), which was the first comprehensive policy statement of the Government of India (GOI) on water. The NWP 1987 reflected the GOI’s attempt to establish a national consensus on an overall framework for state-level operations in water and aimed at promoting better allocation, planning and management. The policy, inter alia, proposed an integrated basin-oriented approach, water-conserving irrigation crop patterns and technologies, participation of beneficiaries in water management, and increase in price of water.

Although the policy was a step in the right direction, it had made a number of compromises to achieve consensus. For example, it advocated planning for a hydrological unit, such as a basin, but stopped short of suggesting river basin agencies, which could potentially erode the powers of the states. Similarly, a few issues were omitted because they were contentious. In any case, the policy remained no more than a set of general propositions which were largely unimplemented.

Following the recommendation of the National Commission for Integrated Water Resource Development (1999), a review of the NWP 1987 was undertaken. In April 2002, some proposed amendments were approved by the NWRC, and the new NWP 2002 came into being. According to the GOI, the review was necessary because of the issues and challenges that emerged in the development and management of the water resources since the announcement of the first policy in 1987.

It is true that some of the current concerns and issues are of relatively recent origin. But this raises an important question. Does the NWP 2002 sharply articulate the
emerging issues and does it reflect current thinking? For example, traditionally, there has been overemphasis on administrative mechanisms for allocation of water, subsidy-based approaches to water provision, supply-side solutions to water scarcity and excessive role of government. Does the new policy move away from these approaches and toward price-based mechanisms, financial autonomy of service providers, demand-side management and facilitating the role of government?

Secondly, it needs to be recognized that the NWP 1987 failed to address the issues that it had set out to address, mainly because it could not be translated into action through supporting legislation and institutional reforms. Reforms in water, a ‘state subject’, can be implemented primarily through state-level actions. Very few states, however, have adopted policies of their own in line with the NWP or set action agendas for improving water management. (Tamil Nadu, Orissa, Rajasthan and UP have formal state water policies, while Andhra Pradesh has an irrigation sector policy.) Inertia on the part of state governments and fear of incurring political costs have played a part. But, more importantly, the non-implementation can be attributed to the absence of clarity of vision and approach of the NWP 1987 as well as its failure to emphasize appropriate incentives and institutional frameworks.

Clearly, there is a need to frame a policy statement which is clear, credible and focused in terms of both its objectives and strategies. Such a statement can encourage states to accept the facilitating role of the central government and also to adopt policies responsive to their respective needs and in line with the principles of the NWP. Keeping this in view, this paper aims at providing a basis for revision of the NWP 2002 (which explicitly provides that it 'may be revised periodically as and when need arises').

Section 2 of the paper critically examines the NWP 2002 in the context outlined above. It also outlines in brief the direction and strategy that the NWP needs to follow. The subsequent sections (2 to 9) discuss some selected issues and the way they need to be addressed, keeping in view the current thinking: inter-basin linking (3), sustainable use of groundwater (4), pricing of water and water services (5), private sector participation (6), water markets (7), water quality (8) and canal irrigation reforms (9).

To ensure that the NWP 2002 does not meet the same fate as the NWP 1987, close monitoring would also be necessary in addition to appropriate revisions. A clear timetable has to be outlined for states to declare their policies and action plans, and an institution has to be identified at the central government level which would be responsible for coordinating with states and monitoring their progress. These initiatives, although necessary for the success of the NWP, are outside the scope of this paper.
2. CRITIQUE OF THE NATIONAL WATER POLICY 2002

2.1 Rationale and philosophy

2.1.1 Need for a national policy

Although the section on the need for a national water policy (para 1.1 to 1.10) includes a discussion on the rationale for a water policy, it glosses over the question of why there should be a national policy when water is predominantly a state subject. There are two important justifications for a national policy. First, it would motivate states to frame their respective policies, with the national policy acting as a set of broad directives. Second, it would provide a framework for addressing issues that have bearing on more than one state. The logic is that the central government should have primary responsibility for ensuring the quality and consistency of water, and provision of water services, that affect the well-being of people in more than one state, while state governments should provide services that can vary between states to suit local needs without disrupting national development policies.

2.1.2 Objectives, targets and scope

The policy needs to clearly state its key objectives, which could include: shifting focus from development and augmentation of water to its management; adopting river basins as the basis for water management; expanding the scope of protection to all waters, i.e. surface water and groundwater; stopping unsustainable exploitation; streamlining legislation; seeking greater participation by the private sector and getting the prices right. Further, specific targets need to be set up wherever necessary. These targets are preferably in line with the UN Millennium Declaration, which urges endorsement of the World Water Forum Ministerial Conference’s target of cutting by half before 2015 the proportion of people without access to safe and affordable water. (The UN report also calls for a ‘Blue Revolution’ which would increase agricultural productivity per unit of water, while improving management of watersheds and flood plains.) Finally, the scope of the policy also has to be clearly defined. Indeed, it may be a good idea to rename the policy as National Policy for Water and Water Services.

2.1.3 Guiding philosophy

Given the growing resource crunch of the government and widespread inefficiencies in the water sector, the overarching philosophy guiding the NWP should be to progressively reduce the role of the government to that of facilitator, while expanding the private space for decisions relating to planning, design, construction, conservation, allocation, etc. Accountability has to be well established, and correct incentives have to be offered to stakeholders to take long-term views on investment, maintenance and use. There is also a need to recognize the need for a diverse approach
to different sub-sectors, such as irrigation, urban domestic use, industry and rural drinking water, since the main problems and constraints vary from one sub-sector to another. The NWP lacks such a philosophy. It seeks to perpetuate the government’s predominant role in the water sector. Although there has been mention of a participatory approach and private sector participation, they do not form the cornerstone of the policy. The policy seeks people’s participation in what essentially are government-initiated, government-managed processes.

2.2 Sustainability

2.2.1 Financing

It is well known that the investment requirements of the water sector are far in excess of what is currently available. Yet the NWP makes only passing reference to it by noting that, ‘water charges should be such that they cover at least the operation and maintenance charges of providing the service initially and a part of the capital costs subsequently. These rates should be linked directly to the quality of service provided (para 11)’. An operationally more useful approach would have been to recognize that pricing be oriented to full cost recovery and to envisage a broad timetable for it to happen. Linking user charges with quality can be handled appropriately only by an independent regulator (see below) and not by government agencies. Further, the NWP should recognize informal financing as an option, whereby private citizens contribute time, money and technical expertise to build and maintain community infrastructure. In Gujarat, the AKRSP has taken some informal financing initiatives.

2.2.2 Regulation

Independent regulation is an important precondition for private sector participation. The draft NWP needs to be changed to provide for independent regulators who would act as catalysts for reform by isolating tariff-setting from political influence and by removing arbitrariness in setting service standards, and would also help usher transparency, accountability and consumer-orientation into the sector.

2.2.3 Incentives

There are a number of statements that reflect wishful thinking, without any attempt to create incentives that would help achieve the desired outcomes. For example, the NWP says, ‘Time and cost overruns and deficient realization of benefits characterizing most water related projects should be overcome by upgrading the quality of project preparation and management’ (para 6.7). This is a naïve perception of what is essentially an incentive problem. The policy fails to address the question as to whether the project implementing authorities have any incentives to improve
the investment efficiency under the current government-managed system. If not, how are the incentives to be established?

Similarly, the NWP appropriately recognizes that, ‘Irrigation being the largest consumer of fresh water, the aim should be to get optimal productivity per unit of water. Scientific water management, farm practices and sprinkler and drip system of irrigation should be adopted wherever feasible’ (para 9.5). Here again, individuals would adopt such practices only if they have an incentive to do so and not because of government preaching. Appropriate pricing of irrigation facilities and irrigation water is critical in this context. It is doubtful as to how far the national policy, which does not recognize water as an economic good, can go in this direction.

2.2.4 Ecological sustainability

In several states in India, underground water levels have been falling at an alarming pace. It is widely recognized that power and diesel subsidies have contributed to overexploitation of groundwater and thereby to reducing ecological sustainability, and that such development hurts the poor the most. Yet, the NWP has failed to make a strong pitch for a gradual phase-out of such subsidies. Further, while the NWP lists a large number of conservation measures (para 16.2), it fails to highlight the role of community management in rainwater harvesting. (A small beginning has been made with the help of NGOs in a few, isolated places.) To increase the productivity of rainfed land, rainwater needs to be harvested and stored where it falls. This calls for local water management, which can be best done through community participation. In this context, the Prime Minister’s remark ‘every village should earmark five per cent of its area for creation of community water bodies’ in his speech at the National Water Resources Council meeting (1 April 2002) should be incorporated in the NWP.

2.3 Allocation

2.3.1 Priorities

The NWP establishes clear-cut priorities in allocation of water between different uses, ranging from drinking water to ecology to navigation (para 5). Thus, irrigation has been given priority over hydropower, and hydropower over ecology, and so on. Clearly, drinking water (which should be interpreted to include water for cooking and washing) being a basic need, should be given topmost priority in all circumstances. But there is little point in prioritizing other demands on water.

2.3.2 Water markets

An important challenge in India is to establish formal water markets that can expand the scope of trading and make inter-sectoral transfer of water on a voluntary basis
possible. These markets are important especially for the urban sector, which faces acute shortages but has not been able to access water from the irrigation sector. Formal water markets can augment urban water supply at low cost and relatively quickly. The GOI and the World Bank in their report ‘Inter-sectoral Water Allocation, Planning and Management’ (1999) recommended pilot water markets at select locations. The concept will get a boost if the NWP reiterates the recommendation. So far, only Chennai Metro has successfully accessed the groundwater market in neighbouring areas (discussed later).

2.4 Participation

2.4.1 Role of local governments

The NWP appears in some ways to be a compromise resulting from the central government trying to curb attempts by state governments to expand their role. The policy, however, does not discuss the role and functions of the third tier of the federal structure (urban local bodies and gram panchayats), even though the 73rd and 74th Amendments to the Constitution have accorded a substantial role to local bodies in water management.

2.4.2 Community participation

NWP 2002 recognizes the need for community participation, but appears to have a poor understanding of it, as is evident from its statement: ‘… the involvement and participation of beneficiaries and other stakeholders should be encouraged right from the project planning stage itself’. Clearly, the policy assigns a peripheral role to communities, including those who may be displaced, for example. It envisages that the government ‘encourages’ participation, possibly by consulting the affected people. The right approach instead is to outline a collaborative framework, where communities are recognized as primary stakeholders and participate in important decisions such as location and financing, which have distributive implications.

3. INTER-BASIN LINKING

3.1 Rationale and developments

The rationale for inter-linking of rivers is to provide both inter-spatial and inter-temporal transfers of water. There are large disparities in the availability of water between different river basins. Per capita utilisable water availability based on the 1991 population varies from 182 m³ in the Sabarmati basin to 2500 m³ in the Mahanadi basin and 3082 m³ in the Narmada basin (National Commission for Integrated Water Resources Development, 1999). Inter-linking projects are envisaged
to transfer water from surplus basins to deficit basins. Further, many rivers in India have floods in the monsoon, but dry up in summer. The linking projects are expected to serve as a flood-control measure by allowing flood waters to be collected and stored in several reservoirs in the monsoon, and as protection against droughts by allowing transfers of the reserved water to water-stressed regions in the summers.

The idea of inter-linking rivers is not a novel one. The National Water Development Agency (NWDA), which was set up in 1982 to carry out detailed studies and prepare feasibility reports, identified thirty river links and prepared feasibility reports for six such links. Doubts, however, were raised about efficacy. Further, many basin states expressed divergent views about the NWDA studies and feasibility reports. As a result, there could be no further progress, and the idea was nearly abandoned.

Recently, a Supreme Court decree prompted by public interest litigation has revived the idea. The court held that inter-linking rivers would not only give relief to drought-prone areas but also be an effective flood-control measure and hence decreed (on 31 October 2002) that the rivers of India be linked within ten years. Following the Supreme Court decree, the GOI has set up a task force with the aim of working out the modalities and establishing consensus among the states for completion of the river-linking project. A strong commitment to this project appears to have suddenly built up at the central government level. In November 2002, the Prime Minister expressed in Parliament the central government’s willingness to take up inter-linking of rivers on a ‘war footing’. According to him, resources and political will would not be lacking. Even the leader of the opposition welcomed the GOI’s proposal.

3.2 Some relevant questions

3.2.1 Is this a legitimate exercise of judicial activism?

The Supreme Court decree does not appear to be a legitimate exercise of judicial activism (Iyer 2002). First of all, as judicial activism aims at protecting some form of human/constitutional rights, its exercise to ensure larger water supplies could have been justified in the context of drinking water, a necessity for sustenance of life. Drinking water, however, is only a small part of the total water needs; the bulk of the water demand, which can be potentially met by inter-linking of rivers, arises in the irrigation sector. Therefore, the direction for linking of rivers cannot really be termed as judicial activism. Secondly, the Supreme Court could have directed the state to ensure that the right to drinking water is not denied, but it is not up to the Court to direct how that right is to be ensured. Linking of rivers is only one of the many ways in which the future drinking water demand can be met. Thirdly, had the river-linking project been an accepted idea languishing only for want of action,
a direction to accelerate action may seem a legitimate exercise of judicial activism. However, while the idea is an old one, there have always been doubts about its efficacy and practicability.

3.2.2 Is it a feasible idea?

Some of the proposed links have international implications. Under the India–Bangladesh Treaty of December 1996 on the sharing of the Ganga waters, India has undertaken to protect the flows arriving at Farakka, which is the sharing point. How will a diversion of waters from the Ganga to the southern rivers be consistent with this? States are not willing to accept that they are surplus states. For example, in the context of the National Water Development Agency’s study regarding the possibilities of linking the peninsular rivers (Mahanadi–Godavari–Krishna–Pennar–Cauvery), Orissa and Andhra Pradesh do not agree that there is a surplus in the Mahanadi and the Godavari respectively. Further, when even neighbouring states within the same basin cannot agree upon sharing of waters (e.g. the Cauvery), is it realistic to assume adequate consensus among states for smooth long-distance inter-basin transfers? What if an upstream state refuses to release water?

The technical challenges are bound to be enormous. Every inter-basin transfer must necessarily involve overcoming the natural barrier between basins (which is what makes them basins) by lifting or by tunnelling through or by a long circuitous routing around the mountains. Big dams, reservoirs and conveyance systems will need to be built.

The project would involve exceptionally large capital investments and energy costs. According to the government, the project would cost an estimated Rs 5,60,000 crore, which is ten times the size of the NHDP. Plan outlays are barely adequate even for the completion of projects already undertaken. Against this background, it may not be feasible to find resources for new major projects, such as undertaking river-linking.

3.2.3 Is it desirable?

The major inter-basin transfers raise unique problems requiring special considerations. In particular, they

- Incur large social costs (displacement/rehabilitation problems) and can potentially disrupt regional economies.

- Result in environmental effects that are generally associated with large water development projects. Further, they can facilitate exchange of biota which may threaten ecosystems by introducing undesirable species.

- Augment flows in one watershed at the expense of the other, which may result in serious inter-jurisdictional conflicts.
3.3 Assessment

It is difficult to escape the conclusion that the Supreme Court’s direction in this case was not a defensible instance of judicial activism. Given the grand scale on which it has been envisaged, the project in its entirety is neither feasible (technically or financially) nor desirable. The inter-linking project would undoubtedly stimulate demand in the economy and create huge employment opportunities on a scale much higher than the current highway project being undertaken by the NHAI, but policy makers need to recognize that the consequences (costs and benefits) of river-linking projects are poorly understood.

3.4 Way forward

• There is a need to advocate caution in opting for major inter-basin transfers. It may be worthwhile to endorse less disruptive alternatives such as water conservation through extensive harvesting (wherever feasible) and effective demand management through improved efficiency in water use, so as to minimize the need for supply-side solutions.

• Even if inter-linking of rivers comes to occupy centre stage of managing water scarcity, it may not yield results in the next five to seven years. During the interim period, drought-prevention strategy needs to focus on water conservation and demand management.

• The task force should not consider merely the ‘modalities’ of the ‘linking of rivers’ but also the soundness of the idea. If inter-basin transfers become unavoidable, it may be a better idea to pursue only the viable links, rather than treating the whole project as a fait accompli.

• Guidelines need to be developed for assessing inter-basin transfers in cooperation with states.

• The GOI needs to develop with the state governments concerned a mutually acceptable referral system to ensure that state licensing of small-scale transfers of water (local arrangements or containerized transfers) between jurisdictions take into account federal interests respecting environmental protection, international commitment, navigation and requirements of central hydel power stations.

4. Sustainable Use of Groundwater

Groundwater is an increasingly important source of water for drinking and irrigation. It currently accounts for about 40 per cent of total irrigation in the country. In the past, it has played a key role in achieving food security. In the coming decades, an increasing part of incremental demand would have to be met by groundwater.
4.1 Extent and nature of groundwater depletion

Overextraction and associated quality problems are emerging in many areas, as groundwater pumping has acquired unsustainable proportions. Out of 5165 blocks in the country, 247 were dark or overexploited (that is, blocks where the stage of water development exceeds the annual replenishable resource) in 1995 (see Table 29.1). Although comparable data is not available for more recent years, it is common knowledge that the groundwater situation has since got worse. Overextraction has led to failure of wells, necessitating deeper wells and higher pumping costs. In many coastal areas, it has led to deterioration in quality due to salinity ingress. In Pondicherry, for example, saltwater intrusion has been about six kilometres. On the other hand, large areas, particularly in the command areas of major and medium irrigation projects, suffer from waterlogging (2.5 mha), soil salinity (3.1 mha) and soil alkalinity (0.2 mha). These estimates were made by the Working Group on Problem Identification in Irrigated Area in 1991. Here again, in view of the absence of effective remedial measures, it is reasonable to expect that things have since got worse.

Table 29.1: Groundwater overexploited blocks

<table>
<thead>
<tr>
<th>State</th>
<th>Number of blocks</th>
<th>Overexploited</th>
<th>Level of groundwater development (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Punjab</td>
<td>118</td>
<td>62</td>
<td>53</td>
</tr>
<tr>
<td>Haryana</td>
<td>108</td>
<td>45</td>
<td>42</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>236</td>
<td>45</td>
<td>19</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>384</td>
<td>54</td>
<td>14</td>
</tr>
<tr>
<td>Gujarat</td>
<td>218</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Karnataka</td>
<td>175</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>895</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>309</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other states</td>
<td>2722</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Total</td>
<td>5165</td>
<td>247</td>
<td>—</td>
</tr>
</tbody>
</table>

**Note:** Unit in Andhra Pradesh is mandal; in Gujarat, it is taluka and in Maharashtra, it is watershed. 1104 mandals in Andhra Pradesh are equivalent to 309 blocks, 184 talukas in Gujarat are equivalent to 218 blocks, and 1503 watersheds in Maharashtra are equivalent to 366 blocks. The total includes equivalent blocks in three states.

**Source:** Groundwater Resources of India, Central Ground Water Board, 1995

The major victims of overexploitation are small and marginal farmers, who suffer because of two reasons. Firstly, these farmers generally own open wells and do
not have the wherewithal to deepen their wells when they go dry. Secondly, of late, cheap borewell technology is available, which makes investment in borewells farm-size neutral and thereby encourages small farmers to invest substantially on borewells. Such investments become unviable in the event of well failure. Besides, the poor quality of technology, albeit at lower capital costs, is resulting in high maintenance costs and uncertainty in water supply.

4.2 Issues and way forward

4.2.1 Power and credit subsidies
The situation of overextraction and the resultant environmental degradation is partly a consequence of poor policies relating to groundwater, such as incentives for groundwater development (subsidized credit), and for groundwater exploitation (subsidized power or diesel). While these policies helped promote groundwater development in the regions where development was below potential, they have led to overexploitation of the resource in fragile resource regions.

From the point of view of ecological sustainability and equity, the appropriate policy is to phase out power subsidy for pumpsets and credit subsidies for digging wells in water-stressed regions. If, however, a state government decides to continue with subsidies, it can target subsidies better by paying in cash to identified small and marginal farmers. A withdrawal of subsidies to rich farmers, who have the resources to use water-saving irrigation technologies (such as sprinklers), would induce them to adopt these technologies. An additional measure could be to subsidize sprinklers.

4.2.2 Flaws in the regulatory approach
Under the current laws, there are no quantitative limits on groundwater withdrawal. This provision, together with the one on tying land rights to water rights, has serious equity implications because it allows larger farmers to have a disproportionate claim over water, since they have higher pumping capacity and deeper tubewells. Even the regulatory approaches have reinforced this, as they focus on well spacing and depth norms. These norms take effect only when a farmer applies for loan or well permit and electricity connection. As a result, it has been effective only for resource-poor farmers.

Restricted power supply has given some respite, but its effectiveness has been reduced by greater pumping capacity, multiple wells and diesel pumps. Even though diesel is a relatively energy inefficient fuel, many farmers in eastern UP—an estimated
80 per cent—have switched to diesel pumpsets because of the poor power situation. Further, restricted power often entails unreliable supplies and hence leads to poor irrigation efficiency, since farmers do not get power when they need it. The right approach, therefore, is to:

- Establish withdrawal limits (see 7.4.2)
- Eliminate well spacing and depth norms
- Change fiscal incentives (as discussed in 4.2.1)
- Make efforts to improve reliability of power

4.2.3 Lack of conjunctive management of surface water and groundwater

Clearly drawn-up systems of conjunctive management are rarely found in India, even though it is widely recognized that coordinated management of surface water and groundwater systems yields larger benefits than their respective management in isolation. Conjunctive management can potentially take advantage of the natural storage provided by the aquifers at little or no cost and with little evaporative loss. During periods of extended drought, groundwater provides reliable supplies and substitutes surface water. This form of water management can help obviate the need for prohibitively expensive and often mindless projects involving inter-basin water transfers, which are currently being contemplated.

Traditionally, one reason for the absence of conjunctive management has been the lack of understanding of hydrology and poorly developed models of groundwater–surface water interaction. In recent decades, however, modelling to investigate optimal schemes of management has advanced substantially worldwide. In India too the Central Ground Water Board (CGWB) has conducted pilots in twelve command areas where the main problem is waterlogging. The board has developed sophisticated mathematical models which suggest the optimal combination of groundwater and canal water use, taking into account hydrological factors, cropping pattern, costs of extraction, etc. Similar models are necessary for water-stressed regions too, which the board has yet to develop. States need to make use of the improved understanding of hydrology and modelling while planning the development of groundwater resources.

Secondly, strong bureaucratic divisions among organizations involved with surface and groundwater impede conjunctive management. There are not only geographic divisions but also issues over fragmentation of decision-making among multiple agencies. These divisions have to be overcome at all levels of government—central, state and local.
4.2.4 Recharging groundwater (rainwater harvesting)

Groundwater recharge has received some government policy attention only recently. Recharge can be natural (from rainfall on surface or surface supplies) or artificial. In urban areas, because of extensive asphalting, the scope for natural recharge has fallen. In a few cities in India, there have been attempts to create incentives for artificial recharge. In Indore, for example, a six per cent property tax rebate is given to those who instal rainwater harvesting in their own house. These initiatives are aimed mainly at increasing groundwater supplies; the cost-saving (for municipalities) aspect of rainwater harvesting—on account of reduced load on stormwater drainage—does not appear to be widely recognized.

In rural areas, government initiatives are even rarer. In fact, the government has viewed groundwater development as a substitute for tanks, which are the main agents of replenishment, possibly to shift the financial burden to private entities (on whom rests the main responsibility for groundwater irrigation). The Centre for Science and Environment (CSE) has suggested that India can trade irrigation of relatively small areas for drought-proofing over vast areas. It has offered evidence that diverting rainwater to a large number of small water-harvesting structures in a catchment captures and stores more rainfall, and closer to communities, than a large reservoir downstream. This strategy is certainly appropriate for communities in semi-arid India, where not even enough drinking water is available throughout the year. The CSE has estimated that the average area needed per village to capture sufficient water to meet every household’s drinking and cooking water requirement for India as a whole is only 1.14 ha/village in a normal year and double that in a drought year!

5. Pricing of water and water services

5.1 Problem

The failure to treat water (and water services) as an economic good has led to circularity between rising demand and inadequate supply. When water is demanded at prices below supply costs, consumers do not provide enough revenue to expand or strengthen water supply systems and tend to be inefficient in water use. From the producers’ point of view, low water prices fail to provide any incentives to improve the systems, technically or institutionally. (This is true of all water sub-sectors excepting industry as is outlined below). Consequently, users feel deprived of what they perceive as a need, simply because water demand has been derived substantially independent of their willingness to pay for it (see Box 29.1).
Box 29.1: Consumers’ willingness to pay

There is a widespread view that tariff rationalization entails high political cost. Implicit in this view is the perception that people are not willing to pay. A number of studies have provided evidence to the contrary.

- **In Dehradun, in 1996**, consumers were willing to pay more than twice the prevailing tariff. Average households were willing to pay up to Rs 4.50 per cubic metre for continuous water supply as compared to the prevailing rate of Rs 2.00 per cubic metre for the existing intermittent supply. What is more, the study revealed that, on average, households were already paying up to Rs 10 per cubic metre in ‘coping costs’ arising from irregularity and unreliability of supply.

- **In Baroda, in 1995**, households with incomes below Rs 1,500 per month were willing to pay up to Rs 275 per annum for a reliable service (as against prevailing payments of about Rs 43). Wealthier families with monthly incomes between Rs 4,500 to 6,000 were willing to pay up to Rs 440 (as against prevailing payments of around Rs 200).

To sum up, there is evidence to suggest that people are already paying much more than the official tariff rate through informal channels and coping strategies, and would be willing to pay the government even more provided service quality improves. If policymakers can establish this, they should be able to (i) revise tariff to capture the potential revenue source and (ii) plan future investment keeping in mind what people really need.

*Source:* Water and Sanitation Program, South Asia and Department for International Development, 1999

### 5.1.1 Surface irrigation pricing

Although surface irrigation is a major source of demand for water, accounting for about 60 per cent of total irrigation use (about 48 per cent of total water use), almost all states set charges at very low levels and have tended to keep them unchanged for several years (see Table 29.2). Further, water rates are not volumetrically based. This system has led to: (a) weak incentives for farmers to conserve and use; (b) no incentive for the Irrigation Department to improve services; and (c) high state subsidies.
Table 29.2: Water rates for principal crops and year of revision (September 1999)

<table>
<thead>
<tr>
<th>States</th>
<th>Water rates (Rs/ha)</th>
<th>Last revision</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rice (Kharif)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>494</td>
<td>494</td>
<td>1997 w.e.f. July 1996</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>–</td>
<td>–</td>
<td>– No water rates levied</td>
</tr>
<tr>
<td>Assam</td>
<td>141</td>
<td>281</td>
<td>1993</td>
</tr>
<tr>
<td>Bihar</td>
<td>175</td>
<td>150</td>
<td>1995</td>
</tr>
<tr>
<td>Gujarat</td>
<td>125</td>
<td>110</td>
<td>1981</td>
</tr>
<tr>
<td>Haryana</td>
<td>113</td>
<td>91</td>
<td>1998</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>24</td>
<td>15</td>
<td>1977</td>
</tr>
<tr>
<td>J &amp; K</td>
<td>20</td>
<td>11</td>
<td>1976</td>
</tr>
<tr>
<td>Karnataka</td>
<td>87</td>
<td>54</td>
<td>1985</td>
</tr>
<tr>
<td>Kerala</td>
<td>99</td>
<td>62</td>
<td>1974</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>198</td>
<td>247</td>
<td>1992</td>
</tr>
<tr>
<td>Punjab</td>
<td>–</td>
<td>–</td>
<td>Water free of charge</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>37</td>
<td>NA</td>
<td>1962</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>287</td>
<td>287</td>
<td>1995</td>
</tr>
</tbody>
</table>

Source: Planning Commission

5.1.2 Groundwater pricing

Groundwater development is almost entirely in the private domain. Although there are no charges for use of groundwater per se, its extraction entails some cost. In that sense, groundwater pricing is indirect. For electric pumpsets, charges are levied on a flat basis per month in proportion to the horsepower of the pumpset. As the marginal cost is zero, most farmers tend to use water inefficiently. Pumpset owners typically pay about 20 to 25 per cent of the cost of supply; in some states, power is given free of cost to farmers. In addition to imposing huge fiscal costs on state economies, these policies and practices have led to unsustainable exploitation of groundwater.

5.1.3 Domestic water pricing

Rural domestic water supply is heavily subsidized, and its management is highly centralized. In urban areas also, tariff does not even cover O&M costs (see Table 29.3). Pricing is often linked to average ratable value of properties, as there is little metering. Public sector water utilities, which are responsible for domestic supplies, do little to
control loss in distribution and transmission (typically 30 to 50 per cent). Clearly, domestic water pricing policies do not promote efficiency in consumption or supplies.

**Table 29.3: Cost recovery in urban water supply**

<table>
<thead>
<tr>
<th>Municipal corporation</th>
<th>%</th>
<th>Municipal councils</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gwalior</td>
<td>26</td>
<td>Bhind</td>
<td>38</td>
</tr>
<tr>
<td>Patiala</td>
<td>75</td>
<td>Bathinda</td>
<td>39</td>
</tr>
<tr>
<td>Faridabad</td>
<td>22</td>
<td>Ambala</td>
<td>54</td>
</tr>
<tr>
<td>Jamnagar</td>
<td>132</td>
<td>Bharuch</td>
<td>32</td>
</tr>
<tr>
<td>Allahabad</td>
<td>87</td>
<td>Munger</td>
<td>59</td>
</tr>
</tbody>
</table>

*Notes:* Revenue receipt includes water tax, water cess, water charges, connection charges, bulk supply and other; Revenue expenditure includes salary and wages, electricity, consumables and repairs

*Source:* NIUA draft report ‘Water Supply and Sanitation’ by Mrs Usha Raghupati

5.1.4 *Industrial water pricing*

Generally, industries are subject to water metering and volumetric charging. Typically, the price of water for industrial use is three to seven times that for domestic use. This is done to cross-subsidize domestic consumers. In many cases, industries have responded by digging wells to extract water for self-consumption.

5.2 *Impediments*

The persistence of this policy has meant that in several cases freshwater availability has fallen below basic minimum requirements (and not simply in comparison to demand levels at low price). This is well known, but little is done to remedy the situation. The main obstacle to tariff rationalization is a lack of political will. This is exacerbated by the fact that there is no separate regulatory institution; operational and regulatory functions are bundled together and vested with state governments. This arrangement has given rise to two major difficulties: (a) tariff setting is politicized and (b) deterioration in service standards is tolerated.

5.3 *International experience and best practices*

The ‘best’ tariff design for a community and situation is one which strikes the most desirable balance among the objectives that are important to that community. Objectives of tariff setting typically include efficient allocation, fairness, generation of sufficient and stable revenue, equity, promotion of conservation and ecology, and efficiency in production and use. Some of the best (international) practices relating to tariff setting are outlined below.
5.3.1 Full-cost pricing

Best practices in tariff-setting usually reflect the User Pays and Polluter Pays principles. By 2010, member states of the EU, under Article 9 of the Water Framework Directive, have to ensure that (a) water pricing is an incentive for efficient use and thereby contributes to environmental objectives, and (b) there is an adequate contribution in each water use toward cost recovery. (The latter implies that cross-subsidization between sectors should be avoided.) The wording ‘adequate’ has been problematic and has given wide room for interpretation. (The application of full-cost recovery and the Polluter Pays principle will be on the basis of an economic analysis for each river basin district, to be completed by 2004.) Following opposition from some member states, however, member states have been allowed to exempt certain water uses (e.g. irrigation) from full-cost recovery provided all deviations from full-cost recovery prices are explicit and the reasons for resorting to exemption are reported under the river basin management plan. Together with the detailed economic analysis of water uses in the river basin, this is expected to put pressure on governments to allow subsidized prices provided the general public agrees to pay for the external costs of these (exempted) activities.

In practice, enforcing full-cost pricing across Europe has not been possible, especially in agriculture. In the Netherlands, England and Wales, farmers do not get any subsidy; in most other countries, capital costs for supplying irrigation water are covered through public budgets. Lately, however, there has been a tendency to increase the farmers’ contribution.

5.3.2 Groundwater abstraction charge

In many countries (Canada, France, Japan, Hungary, Mexico, Poland, etc.), groundwater abstraction charges are levied. The abstraction charge depends on the type of use—consumptive or non-consumptive—and industry-type. In some countries (Belgium, Finland, France), an environmental premium is included in the abstraction charge.

5.3.3 Bulk water pricing

In bulk water pricing, two major strategies—rate of return (ROR) regulation and price cap regulation—have been followed. Under the ROR system (USA), the regulator reviews the utility’s costs and sets a fair rate of return to control monopoly power. Under price cap regulations (UK), on the other hand, the water utility’s future price increases are capped by the formula \( PI - X \), where \( PI \) is the price index and \( X \) is the share of cost savings to be passed on to the customers. In recent years, regulators in many countries have switched to price caps from ROR regulation because of the pitfalls of the latter (such as the heavy-handed nature of regulation, scope for increased use of capital even when it is not consistent with least-cost production, etc.).
5.3.4 Retail pricing

Several OECD countries (for example, Australia, Finland, Denmark and the UK) with successful water pricing schemes charge two-part tariff. The fixed element protects suppliers from demand fluctuation, and the variable element charges the consumers according to their consumption levels and therefore encourages conservation. In developed countries, application of two-part tariff (based on volumetric charges) has been possible because all service connections are metered.12

Many countries charge increasing block tariff (IBT) structure, which is a refined version of two-part tariff. This allows the utility to provide a lifeline to the poor at below cost and charge higher prices for use beyond this minimum volume. This tariff system is acclaimed as it improves equity and enhances the access of the poor to water.13

5.3.5 Wastewater pricing

In the household sector, the best practice for wastewater (variable) charge has been a fixed per cent of the water bill. It is (appropriately) assumed that wastewater generated by a household is directly proportional to the household’s water consumption level. As for fixed charge, utilities hardly distinguish between the two-service components in their bills, since it is the same utility which provides both services. In the industrial sector, however, water consumption levels do not represent a good proxy for wastewater disposal costs, since the type of effluent varies from company to company. Utilities in the USA, the UK, Germany, Italy, etc., use an effluent charge based on pollution content in water. In countries where industrial sewage treatment costs have risen significantly, industries have switched to self-treatment, effluent reuse and recycling.

5.4 Way forward

5.4.1 Set up independent regulatory body

To isolate tariff-setting from political influence, it is essential to set up an independent regulatory body quickly, say within a year. The ‘Guidelines for Successful Public-Private Partnerships’ circulated by the Department of Urban Development has recently suggested that an empowered state reform team could initially play the main role in getting state and local governments to implement sector reforms. It also suggests that an independent state regulator be established when the first PSP contract is concluded. This recommendation needs to be reviewed, as without an independent regulator, it would be very difficult to conclude even the first PSP contract.14 The key functions of the regulator would be to:

• Serve as a guarantor of service quality level consistent with a basic standard of living15
• Ensure that price charged to water users is based on full costs of water
• Ensure that service providers do not exploit customers
• Increase awareness of citizens and get them more closely involved
• Internalize the externalities associated with adverse effects from wastewater on environment and from poor quality drinking water on health
• Provide mechanism for sustainable aggregate water use, which would entail, inter alia, prevention of overexploitation and misallocation of raw water supply.

**Box 29.2: Water regulation in Manila**

Operations of the Manila Waterworks and Sewerage System (MWSS), the Manila water utility, were privatized in 1997 through the award of two 25-year water utility concession contracts (one for the east zone and the other for the west zone). The privatization aimed at:

• Improving water services in terms of availability, pressure and quality
• Providing sewerage and sanitation services
• Promoting customer satisfaction
• Providing affordable water tariff

A Regulatory Office was created pursuant to the concession agreement, which was entered into by the Republic of Philippines through MWSS, the Manila Water (MWCI) for the east zone concessionaire and the Maynilad Water Services (MWSI) for the west zone concessionaire. The main functions of the Regulatory Office are to monitor achievement of service obligation targets and to determine water tariff. Five years after privatization, there has been a significant improvement in delivery of services by both concessionaires as can be seen in the table given below.

<table>
<thead>
<tr>
<th>Service indicators</th>
<th>Prior to privatization</th>
<th>Concessionaires</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Manila Water</td>
<td>Maynilad Water</td>
</tr>
<tr>
<td>Population served (million)</td>
<td>7.3</td>
<td>3.9</td>
<td>5.5</td>
</tr>
<tr>
<td>Connections (‘000s)</td>
<td>780</td>
<td>428</td>
<td>602</td>
</tr>
<tr>
<td>Water production (in MLD)</td>
<td>2800</td>
<td>1725</td>
<td>2400</td>
</tr>
<tr>
<td>Service coverage</td>
<td>67%</td>
<td>89%</td>
<td>85%</td>
</tr>
<tr>
<td>Water availability (hrs/day)</td>
<td>17</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Staff/1,000 connections</td>
<td>8.5</td>
<td>3.6</td>
<td>4.3</td>
</tr>
</tbody>
</table>
There is perhaps a need to make a distinction between economic regulation and resource regulation. The resource regulator should be entrusted with the last responsibility stated in the preceding paragraph—i.e. providing a mechanism for sustainable aggregate use—while the rest may be carried out by the economic regulator. The resource regulator can be set up at the river-basin level. The jurisdiction of this regulatory agency may involve one or more states.

The economic regulatory authority, on the other hand, should be set up at the state level. Although this is against the spirit of decentralization, it needs to be recognized that the regulatory authority at the local government level would be ineffective for two reasons.

First, at the local government level, there is lack of specialized skills in finance, engineering and accounting necessary for effective regulation and, second, there is a possibility of regulatory capture. (Of course, local governments in big cities, where such skills are available, can carry out the economic regulatory functions such as contract regulation, safeguarding against exploitation of consumers and handling consumer complaints). To begin with, the economic regulator at the state level may function as a window in the office of the electricity regulator. This would help tap the expertise of the power regulators in tariff setting. As PSP gathers momentum, a separate regulatory body may be set up.

5.4.2 Adopt principles for tariff setting

Although theoretically the best option is to use estimated opportunity costs as a guide to setting water charges, in practice, immediate adoption of opportunity-cost pricing may be politically difficult. Given the current level of cost recovery and the significance of financial sustainability of operations, pricing to ensure financial sustainability would be a good beginning.

The basis for tariff-setting as well as the required operational initiatives is given below.

* Pricing needs to be oriented to full-cost recovery or at least O&M cost recovery. It would be pragmatic to have a gradual approach by attempting progressively larger recovery over years. An essential prerequisite is to discover true costs of service provision of a specified standard, since costs at present reflect very poor service standards and negligible maintenance. For this purpose, some pilot projects may be necessary. Over time, as more information becomes available, comparative or yardstick competition can be adopted for tariff setting.

* Tariff setting has to be only on a volumetric basis. This implies that meters need to be installed at all service connections. The predominant systems of water and wastewater taxes linked to annual rental value of properties as well
as the area and crop-based water charges for surface irrigation have to be gradually phased out. In case of wastewater, charges need to be linked to the water bill in the domestic sector, but must reflect cost of treatment in the industrial sector.  

- Cross-subsidies need to be reduced to reasonable limits within the shortest possible time span. In the urban areas, a practical solution is to freeze the industrial and commercial tariffs, which are currently at very high levels, until costs catch up.

- Cost estimation needs to reflect an efficient level of operation to ensure that tariffs that are based on these costs do not reflect inefficiency of service providers. Initially, the tariff has to be based on the existing level of T&D loss but, over time, it would reflect progressively reduced loss levels.

- Tariffs would be revised every two years to reflect change in costs.

5.4.3 Services to poor for domestic consumption

In water and wastewater sectors, services to the poor can be substantially improved if subsidies are well targeted. It may not be feasible to provide exclusive service connections to households in slum areas. So, the current system of provision through public stand posts needs to continue, although stand posts need to be metered and some user charges must be collected on a volumetric basis. Under such a system, equity considerations can be best met by subsidized uniform (and not increasing block) tariff and access charges. To reduce transaction cost of collection, three or four consumer representatives could be made responsible for revenue collection in any given slum area from the households benefiting from stand post water. Public or private operators need to be obligated to provide a minimum specified quantity of water through stand posts. Whether they meet their obligation can be verified from the consumer groups. Alongside tariff reforms, it is important to improve quality of service provision through stand posts, which is currently very unreliable and inadequate.

6. Private sector participation (PSP)

6.1 Need for and scope of PSP

The rationale for privatization in the water sector is no different from that in other infrastructure sectors, namely the deteriorating physical and financial conditions of the sector, growing investment backlog and fiscal constraint of almost all state governments. Even the scope for PSP in water derives from the same possibility as in other infrastructure sectors, namely unbundling. Unbundling allows the private
sector to provide some of the services more efficiently and the public sector to maintain its role in areas such as protection against monopoly power, negative externalities, under-provision of ‘public goods’ and overuse of ‘open access’ water. Here, a distinction needs to be made between PSP and market forces, although both play a role in better management and allocation of water services. While PSP is more relevant in the case of water utilities (which generally involve inefficiencies in management), water markets are the appropriate strategy in areas where the main issue is inefficient water use.

As for water utilities, competition can be introduced through one or more of four routes—product market competition, yardstick competition, competition for the market and competition to supply inputs—all of which require private sector participation (see Box 29.3). Water markets have been discussed in a separate section.

Box 29.3: Introducing competition in utility market

Product market competition can be achieved through (a) installation of competing networks, (b) retail competition, or (c) common carriage competition. Introducing competing networks is not a serious option as it implies losing scale economies. Retail competition can be introduced by allowing consumers to self-supply (by digging their own wells) or to buy water from any operator (such as private tankers). Common carriage competition in water involves competing firms sharing the same network. The Office of Water Services (OFWAT) in the UK, for example, allowed in 1995 new utilities to supply large consumers in an incumbent’s interconnected system in a defined area by paying a fee. Although there have been a few such cases, the threat of competition has led several water companies in the UK to lower tariff ranging from 1 to 25 per cent (Webb and Ehrhardt, 1998). Common carriage competition has not yet found much acceptability.

Yardstick competition is important (among geographically separated suppliers) in the utility market, because of the natural monopoly features. Success of yardstick competition depends on existence of adequate number of comparable agents and diversity of ownership. In the UK, comparative unit cost information is used in quantitative analysis by the regulator to help make decisions about the potential for cost reductions in the price cap formula.

Competition for the market involves awarding the right to operate in a given area to the company that makes the best offer in terms of quality and cost of service. The competition could be for concession or for improvement in operations and management of existing assets. Under this route, attracting private companies may be easy, but maintaining competitive pressures during the life of the contract (through a credible threat of expelling) is difficult. Much depends on the appointing authority’s ability to maintain regulatory pressures. One of the best known examples is the French gestion delegée. In France, a private company may (a) have complete
responsibility for operating a water system and financing necessary investment at its own risk (‘concession’), (b) do O&M, with a public authority responsible for investment (‘affirmage’) and (c) receive a flat fee for management, without any responsibility for investment (‘gerance’).

Allowing competition in supply of inputs can be useful, provided sufficient competition exists between input suppliers (e.g. for billing and revenue collection, electricity and maintenance of infrastructure). In the public sector, this is quite common. For example, EU legislation has imposed competitive procurement on member states’ public sectors.

6.2 PSP in India

There have been only a few attempts to involve the private sector in water utilities so far, although a number of PSP options are available, such as service contracts, BOT contract and management contract for O&M. There has been success in some areas and failure in others (see Box 29.4). PSP in the irrigation sector is also limited and generally restricted to contracting of construction activities and some maintenance activities by irrigation departments. For successful implementation of a PSP option, it is important to ensure that the preconditions exist. Preconditions include stakeholder support and political commitment, tariff rationalization, and information base about the system and regulatory framework.

Box 29.4: PSP in water utilities in India

A few cities in India have attempted PSP options in the water sector. The focus has been on bulk water supply on a BOT basis. To date, there have been some 23 BOT-based projects, most of which have been unbankable or delayed, since such an approach does not address the real issue (i.e. problems with distribution). Adding more bulk supply without improving existing distribution, with continuing gross subsidization of water, increases the financial burden on the local bodies.

Other PSP options have also been tried, including service contracts (Chennai), local body financing through municipal bonds (Ahmedabad) and joint sector company to finance and implement the project (Tirupur). The Chennai experience has been most encouraging. The Chennai Metropolitan Water Supply and Sewerage Board has signed service contracts with private operators for O&M of two sewage treatment plants and 70 out of 119 city sewerage pumping stations. The cost saving as compared to the estimated costs under board management has been in the range of 33 to 40 per cent.

6.3 Key issues and way forward

6.3.1 Shift focus to distribution and move gradually

In the utility market, the Indian experience clearly suggests that focus needs to be shifted from bulk water supply (currently under government initiative) to improved
management of distribution systems. PSP can help improve distribution systems through controlling unaccounted for water, improving billing and collection and saving energy costs. The other lesson is that management or O&M contract is the way forward in the short run.

The progression toward concession-type contracts would have to be gradual, depending on policy changes and evolution of a rational tariff structure. To begin with, a state can have O&M contracts for all its sewage treatment plants and sewage pumping stations. After the regulatory framework is in place, which could take up to two years, short-term O&M contracts for distribution (including billing and collection) can be given to private parties. Over time, as more information about the system is gathered, the regulatory system gets strengthened and greater political commitment is mobilized in favour of private participation, and long-term concessions can be attempted in distribution as well as bulk supply.

6.3.2 Introduce competition in construction

Contracts for construction of waterworks, sewage treatment plants (STPs), etc. are usually awarded by municipalities to parastatals of the respective states (such as Maharashtra Jal Parishad). Even though municipalities are free to award construction contracts to any private firm, they usually prefer the parastatals because of their proximity to the respective state government. To overcome this problem, and at the same time use the experience of the parastatals, states need to de-integrate their respective parastatals into four or five companies and reduce their stake to minority. This way, municipalities can potentially gain from competition among these companies.

6.3.3 View PSP in broader context

Taking a cue from the recent success of the road sector, there should be an attempt to expand the scope of PSP from just construction to service provision. Further, given the complementary role that private groups such as WUAs, NGOs and the general public can play in private irrigation projects, it is necessary to have a broader view of PSP (rather than only the private corporate sector) which includes these groups and put together collaborative frameworks (see Table 29.4). In a build, own, operate system, for example, the successful bidder can utilize the specialized services of consulting and contracting firms. Similarly, it may be easier for irrigation companies to plan and construct a project, but it is a real challenge to organize water delivery to and effect cost recovery from numerous farmers. To perform these unfamiliar tasks, irrigation companies can rely on WUAs. In addition, WUAs and the general public can participate in financing of irrigation schemes through water bonds.
Table 29.4: Major private players and participation configurations

<table>
<thead>
<tr>
<th>Main groups</th>
<th>Sub-groups</th>
<th>Participation configurations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private corporate sector</td>
<td>Irrigation companies</td>
<td>Build, own, operate system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build, own, sell system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Build, own, transfer system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lease, own, operate system</td>
</tr>
<tr>
<td>Consultancy outfits</td>
<td>Engineering consultancy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Managerial consultancy</td>
<td></td>
</tr>
<tr>
<td>Contracting firms</td>
<td>Main contracting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subcontracting</td>
<td></td>
</tr>
<tr>
<td>WUAs</td>
<td>Turnover system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water bond system</td>
<td></td>
</tr>
<tr>
<td>NGOs</td>
<td>Formal organizations</td>
<td>Legal/technical services</td>
</tr>
<tr>
<td></td>
<td>Informal/local organizations</td>
<td>Organizational services</td>
</tr>
<tr>
<td>General public</td>
<td>–</td>
<td>Contribution via water bond</td>
</tr>
</tbody>
</table>

Source: ‘Irrigation Privatization in India’, by Maria Saleth, EPW, June 26, 1999

7. **Water markets**

It is well known that markets increase economic efficiency by allocating resources to their most valuable uses. Therefore, one way to change the incentives so that water users support the reallocation of water and to achieve a more efficient allocation of water is through water markets. Markets allow water users to buy and sell water, thus changing the whole incentive structure and breaking the logjam of water pricing reforms.

7.1 **Water markets in India**

The water markets that exist in India are informal and are limited to localised water trading between adjacent farmers and the practice is quite common especially for groundwater (see Box 29.5). Although found in many parts of India, they are widespread in Gujarat, Punjab, Uttar Pradesh, Tamil Nadu, Andhra Pradesh and West Bengal, and are most developed in Gujarat. The extent of area irrigated through water markets varies across regions as well as over time depending on a number of factors such as rainfall, groundwater supply, cropping patterns, and the cost and availability of electricity.
Box 29.5: Characteristics of water markets in India

Mainly driven by surplus supply. Most water sales do not involve any reduction in irrigation by sellers (Saleth 1999). Sellers are usually large farmers owning deep wells and large capacity pumpsets, and the buyers are usually small farmers without wells or pumpsets.

Monopoly power. Buyers often do not have a choice because of low density of wells, compounded by uneven topography and potential for seepage losses (Shah 1993), which gives sellers a degree of monopoly power. Monopoly power helps sellers not only in raising prices but also in compromising the quality of service they offer.

Influenced by social factors. Social factors and agrarian relations sometimes determine the development of water markets. For example, in Bihar it has been found that it is the water buyers’ position in the social network, particularly their social proximity to sellers—rather than their ability to pay—that determines their access to water (Wood 1995).

Widely varying terms of payment. Terms of water payment vary widely and differ by crop and by season. Payments can be made through cash transaction or non-cash contracts. Cash payments are made on the basis of time, volume or area irrigated. Non-cash contracts typically take the form of sharecropping (i.e. seller collects water rent in the form of a share of the buyer’s output).

7.2 Advantages
First, groundwater markets are important for agricultural production and distribution of water. According to one estimate, water markets are providing water to about 6 million ha or 15 per cent of the total area irrigated by groundwater (Saleth 1992). Second, these markets promote equity as they provide those without wells access to groundwater for irrigation. This improves the equity of resource distribution, because it is the smaller farmers who do not own tubewells. Third, groundwater markets raise efficiency, as the opportunity to sell groundwater can make it profitable for farmers to invest in wells even if their own holdings are too small to use the full pumping capacity. Also, they reduce water tables in areas of waterlogging.

7.3 Concerns
Causes depletion. There is a growing concern over groundwater overexploitation resulting from water markets. Given that these markets draw on an open access resource, it is not surprising that farmers have a reason to ignore the scarcity value of groundwater. The zero or near-zero marginal cost of pumping encourages farmers to use their wells at close to full capacity. (In large parts of northern India, pumping is not a problem; it actually improves crop-growing conditions by lowering the water table to below the root zone.)
Lowes farm income. Over time, the cost (of deepening wells) and price rise as groundwater level declines. Higher energy costs and excessive well investment mean lower net income for farmers. Thus, informal markets can exacerbate the depletion problem.

Creates monopoly rents. Monopoly rents hurt buyers who are often resource-poor farmers. Monopoly rents arise because of (a) physical limits of groundwater supply, (b) conveyance costs and (c) crop-sharing rather than cash-based type of contracts.

7.4 Way forward
In India, there has been no explicit policy statement in favour of water markets. At the same time, though there is no legal basis for informal markets to exist and function, the state has followed a policy of non-interference vis-à-vis such markets. Regulations have mainly aimed at ecological sustainability, but have largely failed. Under such a policy and regulatory regime, informal markets have grown and served a useful purpose, although sometimes with negative side effects. The way forward comprises two strategies.

7.4.1 Introduce formal water markets
In relatively water-scarce regions and/or where large-scale users are involved, it is better to create formal water markets (see Box 29.6). In formal markets, water rights are clearly and universally assigned, with legal validity for freely negotiated sale of these rights in contrast to informal markets, where there is no clear assignment of rights.

The international experience in formal water markets has been encouraging (Chile, Western United States, Australia and Mexico). In Chile, secure, transferable water rights were established through a Water Code in 1981. Water rights in Chile are now separate from land ownership and can be freely bought, sold and mortgaged like any other piece of real estate. Water rights are subject to the general system of real estate title registration and are protected as private property under the Constitution. About 20 per cent of water needs in Chile are met through water markets.

In California (western United States), the Model Water Transfer Act for California provides a detailed framework for institutional reforms in water markets. The act endorses voluntary water transfers and acknowledges the importance of protecting other parties who might be adversely affected by water transfers. In California as well as other states of western United States, such as Utah, Arizona, Colorado and
Nevada, there are several examples of water trading between agricultural and urban users. For example, under an agreement, the Metropolitan Water District (MWD) in Southern California is already acquiring 106,000 acre-feet of water per year for 35 years from the Imperial Irrigation District (IID). The water comes entirely from increase in water-use efficiency through techniques such as lining irrigation canals or replacing them with pipes to reduce waste.

**Box 29.6: Benefits of formal markets**

- Formal markets allow water transfers *on a large scale and also between sectors*. For instance, farmers instead of producing low-value, water intensive crops might sell water to a neighbouring city if it fetches them a higher price.

- With large-scale inter-sectoral transfers, it is possible to postpone or *avoid construction of costly hydraulic infrastructure*. La Serena City (Chile), for example, was able to meet its water needs by purchasing water rights from farmers, and this was attained at much less cost as compared to building a dam.

- Since property rights are well defined in formal markets, *trading can be regulated*. Regulation can lead to better resolution of the negative side effects of trading, such as aquifer depletion or monopoly creation or equity issues.

- Formal markets, based on an explicit water rights system, can help potential investors and water companies gain *secure, long-term access to water*, which is one of the important prerequisites to attract private investment into the water sector.

- In a formal water market regime *small farmers and the poor can gain water rights*, which would empower them and can serve as additional collateral.

- Finally, informal markets generate neither any *fiscal revenue* for the government nor funds and incentives for investment in infrastructure, while formal markets do.

In India, the only instance of an attempt to formalize water markets is found in Chennai, Tamil Nadu. To ensure adequate supplies, the Chennai Metropolitan Water Supply and Sewerage Board (Chennai Metro or Metro) in the last two summers has been purchasing water through contracts (35 to 40 million litres per day or about one-tenth of its total supply) from farmers in the neighbouring areas. This has been facilitated by the Chennai Metropolitan Area Groundwater
(Regulation) Act 1987, which regulates commercial exploitation of groundwater in Chennai and two neighbouring districts (Kanchipuram and Tiruvalupuram), but permits groundwater sale to Chennai Metro. Farmers pump water through pipes to sumps of Chennai Metro, which pays the farmers for water and also bears the power cost. (All the supplies by farmers to the Metro are metered.) Although Chennai Metro’s water purchases, which entail inter-sectoral transfers through written contracts and with legal backing, are a step in the right direction, this initiative falls far short of a ‘formal water market’ for the following two reasons. First, no formal water rights are created and second, farmers do not have the option to sell water to anyone other than Metro.

To introduce formal water markets in India on a wide scale, states need to take the following initiatives.

**Manage surface water on a river basin basis**

Indian law treats all surface water as state property. This has serious ramifications for inter-state water development and allocation. The fragmentation of basins by state boundaries and lack of cooperation between them is a critical issue. In the absence of legal clarity on what the shares of individual states are, each state has argued for as large a share as possible. It is therefore important to introduce necessary legal arrangements to facilitate the management of water on a river basin basis. This is necessary regardless of whether water markets are contemplated or not (from the viewpoint of conjunctive management).

**Clarify legal position on individual usufructuary rights for surface water**

There is a lack of clarity on individual usufructuary rights for surface water, as the legislation has failed to devise a system for providing secure, defensible and enforceable surface water rights. Unless surface water rights are better clarified and in favour of individuals, conflict and litigation will grow in the future and formal water markets will not be possible. The failure to clearly define surface water rights in favour of individuals, however, need not prevent states from introducing and fostering groundwater markets.

**Separate rights to groundwater from rights to land**

Under the law of riparianism applicable in India, ownership of groundwater accrues to the owner of the land above. By virtue of these laws, groundwater is ‘attached like chattel’ to land property and cannot be transferred separately from the land to which it is attached (Singh 1992). This has constrained the potential for inter-sectoral allocation. For example, a municipality is not authorized to have
access to groundwater from the neighbouring farms without purchasing those farms. To establish an active water market, rights to water use must be authorized separately from land.

**Establish limits for withdrawal of groundwater**

Groundwater withdrawal limits are necessary in the context of not only ecological sustainability but also water markets. Under the current system, sellers can get a payment from the very group whose water rights get infringed by the seller’s activities (Saleth 1994). Furthermore, in a theoretical sense, efficient operation of a market is critically dependent on the prior existence of an effective legal institution of property rights establishing the initial resource endowments of individuals. To ensure ecological sustainability, collective withdrawal limits are necessary (for WUAs, for example) keeping in view the annual recharge. Individual limits can subsequently be set up. WUAs can be responsible for enforcement of these limits as part of self-regulation.

**Take the necessary operational initiatives**

In addition to creating enabling legal and institutional frameworks, a number of operational initiatives such as initial allocation of rights, assignment of new rights, protection of third party rights and creation of conflict-resolving institutional mechanism have to be taken to ensure smooth implementation of a water trade regime. The transition can take several years, partly because water allocation often evokes emotional response and partly because of opposition from those who stand to gain from the status quo. One way of designing and implementing tradable water rights is to follow the steps adopted by countries that have successfully established formal water markets (e.g. Chile). Of course, states have to make necessary changes to suit their specific needs.

7.4.2 **Facilitate efficient informal water markets**

In relatively water-abundant regions with numerous small-scale water-users, it is better to encourage creation of informal, but efficient markets. If this can be done, many (potentially high) costs of establishing and enforcing water rights can be avoided. As a first step, state governments should explicitly legalize water trades. Secondly, to address the depletion problem, the number of wells and volume of pumping within a specified unit would have to be agreed upon. This would be unrealistic unless there is strong support in the irrigation community for pumping restrictions and strict enforcement. Water-user associations can garner this support more effectively than the government. Thirdly, the government can help the WUAs by providing information related
to pumping restrictions, which necessarily has to be region-specific. Finally, WUAs can help promote trust and cooperation among the association members, which would lower the transaction costs, including conveyance costs, and make markets more competitive.

8. Water Quality

8.1 Nature and extent of problem
The quality of water has remained abysmally low in large parts of the country. In many areas, where the designated best-use status of water is drinking or bathing, the water is fit only for irrigation. The three important sources of water pollution are agricultural run-off (containing pesticides, inorganic fertilizers, etc), industrial effluents and urban sewage. The main source of pollution varies from region to region depending on the dominant economic activity.

Urban areas have a disproportionately large impact on surface water pollution. For example, Delhi accounts for only 2 per cent of Yamuna’s catchment area, but 80 per cent of its pollution load. The wastewater treatment capacity, wherever it exists, is typically well below the wastewater generated and carried by the sewerage system. Even this capacity is not being fully utilized for a number of reasons (see Box 29.7). As a result, untreated water often flows into the rivers.

The adverse impact of unsafe water on health continues to be large and widespread. People who do not have access to piped drinking water are particularly vulnerable to water-related diseases. Piped water is generally subject to some (but not adequate) treatment before being pumped. The quality regulations are not strictly enforced. In any case, water often gets recontaminated in the distribution network since the pipes are generally old, undermaintained and have developed cracks. Each year, about 30.5 million Disability Adjusted Life Years are lost due to illness and death attributable to poor water quality, sanitation and hygiene. A disproportionately high burden of ill health falls on poor people since they are exposed to greater health risks, both at home and at work. Being malnourished, they are more prone to illness and slower to recover.

8.2 Major issues and way forward

8.2.1 Safe water system (SWS) at point of use
Currently, most available strategies and technologies to make water safe to drink are unaffordable and inaccessible to low-income households, particularly those without piped water supply. (Even piped water gets contaminated during
transmission.) The Indian National Family Health Survey (1998/99) reports that 68.4 per cent of Indian households do not purify water by any means (rural 75.3 per cent), and the most common measure used for some purification (filtering of water through cloth) is one of the least effective.

Although the water treatment and distribution networks have so far been largely ineffective in controlling water-borne diseases, they can be strengthened only in the long run. Given the gravity of the situation, there has to be a short-run strategy that focuses on safe water systems (SWS) at point-of-use. At present, individual households need information, education and access to water treatment options within their reach. A point-of-use safe water system (disinfection and storage) made accessible and affordable to low-income households, combined with targeted behaviour change messages, has the potential to greatly reduce incidence of waterborne diseases. NGOs are best suited to usher in behavioural change through pilots that involve some residents in the pilot areas as volunteers. The gains from these initiatives would translate into better health profiles, higher productivity and lower (public and private) spending on curative healthcare.

8.2.2 Targeting of wastewater subsidies

Almost all users of flush toilets and its sewerage system are the rich in urban areas; yet, the sewerage system is subsidized in the name of the poor. The rich get subsidy through another means. Budgetary provisions fund the river action plans, which aim at controlling pollution of rivers due to domestic sewage disposal. The cost of the expensive sewage treatment plants (STPs) is not recovered from the rich. It is, therefore, necessary to separate the accounts of water and wastewater—although the two segments need to be operated by the same entity—and ensure that the wastewater segment generates enough internal resources for the expansion of the sewage system and sewage treatment.

As for the poor, a vast majority of whom do not have flush toilets, expanding access to the central sewage system is not the right solution. A sensible approach is to focus on public latrines and low-cost sanitation for the poor.

8.2.3 Flaws in the river action plans

In India, river action plans have been used as a key instrument in controlling river water pollution. These initiatives include, inter alia, construction of STPs. An evaluation of the Ganga Action Plan Phase I shows that the current river action plans are grossly inadequate (see Box 29.7).
Lack of funds
The GAP Phase I, which aimed at checking the pollution of the Ganga, got completed in March 2000, although the original deadline was March 1990, causing substantial cost overrun. This happened mainly because of lack of timely funding. The original plan was to treat only 875 million litres of sewage a day (MLD) in these plants out of the 1345 MLD estimated to be flowing into the river in 1985. Since then, the volume of sewage has nearly doubled, while the plan could meet only 35 per cent of the target or 305 MLD.

Poor design
In 2001, the Central Pollution Control Board (CPCB) and the state pollution control boards, inspected 35 STPs built under GAP I, while preparing a report for the Supreme Court. The inspection revealed that some plants were ‘underloaded’, i.e. did not have enough sewage to treat, and some were ‘overloaded’, i.e. they had too much to treat. Many already needed upgradation.

Weakness in operation
Operation and maintenance was found to be poor. Firstly, there is lack of funds, particularly in Bihar and UP, and shortage of qualified and trained staff. Secondly, regular monitoring of plants or staff is not being done. Lack of uninterrupted power supply is another major problem.

In addition to the flaws indicated in the box, there is also an ownership issue. Urban local bodies (ULBs), which are responsible for operations of STPs, had no financial stake under GAP I, as the GOI provided all the funds for capital works. Further, for construction, ULBs continue to depend on parastatals, which do not involve ULBs in the design, location, etc. of STPs. As a result of all these factors, ULBs never felt responsible for the upkeep of STPs. (The parastatals, operating as a monopoly, have little incentive to produce quality work.) Many times, ULBs do not have enough funds to finance even the O&M costs, with the result that assets created under the river action plans are poorly utilized.

Moving forward, the following initiatives need to be taken:

- There is a need to reduce reliance on river action plans as pollution abatement initiative. Focus needs to shift to decentralized treatment systems (see below).
- ULBs need to have financial stake in what they are responsible for. Under GAP II, the central government finances 70 per cent of the cost, while
ULBs are responsible for the rest. This is a step in the right direction. However, many ULBs do not have the funds even for the 30 per cent of capital costs. ULBs need to seriously explore the option of annuity contracts—that put together construction and maintenance of STPs—with private parties. Payments for this\(^{24}\) (30 per cent capital costs and O&M costs) can be made entirely out of user charges. A wider consultation with ULBs will motivate them to view STPs as part of their achievements. This approach would address the ownership problem as well as the resource constraint.

*Parastatals need institutional change.* As stated earlier, their monopoly needs to broken and they need to be privatized. They can be potential bidders for the annuity contracts and their experience can be utilized. Regardless of whether ULBs opt for annuity contracts or not, they would gain from privatization of parastatals.

### 8.2.4 Reliance on centralized wastewater treatment system\(^{25}\)

There has been an excessive reliance on the centralized sewage treatment system in urban areas. The conventional system suffers on three main counts. First, the volume of sewage becomes very large as the city grows. Second, sewage has to be carried over a long distance, as the sewage treatment plants are generally located outside the cities. Third, grit accumulates over time and obstructs the flow. As a result of all these, both the capital costs as well as the energy costs related to pumping tend to be high. Most urban local bodies are not in a position to afford these high costs. Furthermore, in most urban areas, the sewerage system is old and crumbling and cannot take any additional load.

State governments and urban bodies, therefore, need to recognize the need for decentralized wastewater treatment (DWT), which involves management of wastewater as close as practicable to where it is generated and to where its potential beneficial reuse is located. In addition to low costs, DWT has the following advantages:

* Cost-effective treatment technology
* Treatment processes tailored to the wastewater stream from each separate subsystem
* Progressive construction possible as modules
* A management process that involves people
9. **Canal Irrigation Reforms**

Although the focus in this section will be on surface irrigation systems, some of the issues discussed below apply to groundwater as well.

### 9.1 Problems and constraints

There has been an excessive bias towards area expansion. Since 1951, the major- and medium-surface schemes have expanded more than three-fold, while groundwater irrigation, largely through private investment, has grown more than seven-fold. This has enabled higher land productivity as compared to unirrigated lands, but achievements have been way below potential. In the process of this expansion, *fiscal constraints* have emerged. Since the mid-eighties, irrigation expenditure has been stagnant in real terms while the average (real) cost of investment in new irrigation has increased.

Surface water constraints have become serious in many states on account of both expansions of irrigated area as well as *gross inefficiency* in water use. While farmers at the head of the canal receive more water than they need (often causing waterlogging and salinity, leading to poor yields), tail-end farmers receive little or no water. Further, a large quantity of water does not reach its destination because of poor lining.

The cropping pattern has been distorted in several areas. For example, in some highly water-stressed regions of Maharashtra and Tamil Nadu, sugarcane, a highly water-intensive crop, is grown extensively. Part of the reason is that irrigation water comes at a *very low price, or even free*, to farmers. Of course, other factors such as minimum support price and trade policies are also responsible for this.

Cost recovery has been poor. As noted earlier, water charges continue to remain low as compared to the cost of supply. Even the low charges are not fully collected and arrears have been accumulating.

User orientation is weak. Surface irrigation in India is typically owned and managed by the government. The approach is top-down and centralized. A major reason why irrigation departments do not consult with farmers is that they have no autonomy and rely on state subsidies to meet their financial obligations.

### 9.2 Way forward

#### 9.2.1 Shift focus from area expansion

To overcome water scarcity and at the same time meet the challenges of agriculture under the current fiscal constraints, there is a need to shift focus from area expansion to increase in productivity of existing systems. This would mean shifting public expenditure from new construction in favour of maintenance of existing systems,
institutional capacity building, and rehabilitation and modernization of existing schemes. New constructions should be limited and based on thorough assessment of economic, technical and environmental criteria.

9.2.2 Improve cost recovery and financial viability

Water charges need to cover at least the O&M expenses. As compared to urban utilities, irrigation water charges may require much greater increases. This can be done at one go or through an explicit, time-bound programme lasting not more than three to four years. Further, the method of pricing needs to be changed to volumetric pricing. An administratively and technically feasible option is to charge volumetrically for bulk supplies to water user associations (WUAs). Finally, each state needs to review its own situation and take measures to reduce the gap between billing and collection. Making WUAs directly responsible for billing and collection can substantially increase collection rates.

9.2.3 Transfer management to water user associations

Evidence from countries such as Mexico and Chile shows that farmers can better manage and maintain irrigation systems than the government. This is so because they have not only a stake in the quality of service but also a better understanding of local needs and better ability to resolve water management issues than the government. In India too, a beginning has been made (Andhra Pradesh and Orissa) where WUAs act as organized client groups. Key features of the system include:

- A democratic, grassroots base with representation of tail-, head- and middle-reach farmers
- A demand-driven approach, with investment programmes planned with and led by WUAs with professional inputs from government staff. To ensure ‘ownership’ of the system, users contribute upfront a part of investment costs and bear O&M costs.
- Directly responsible for collection of water charges
- Command-based approach, based on hydrological units: minors, distributaries, branch canals, etc.
- A clear legal framework, usually requiring a new legislation, such as the Andhra Pradesh Farmers’ Management of Irrigation Systems Act (see Box 29.8)
- Each WUA in an irrigation system should have a legal water right. Within each WUA, each member should have water rights proportionate to their farm area and be able to buy, sell, rent or lease water.
Box 29.8: Salient features of the APFMIS Act

The Andhra Pradesh Farmers Management of Irrigation Systems (APFMIS) Act of 1997 has been an important piece of legislation. It is the first of its kind in India, which seeks to bring a new approach to irrigation management. Some of the most important features of the law are given below.

- Transfer of power for the management of state-owned assets
- Creation of new autonomous institutions as legal entities
- Areas defined on a hydraulic basis
- All land holders in possession of land in an irrigation system become WUA members with voting rights
- One member, one vote; elections by secret ballot
- Functional and administrative autonomy; freedom to raise resources
- Simplified procedures for taking up works
- Irrigation Department, as competent authority, is made fully accountable to the farmer organizations

Source: Peter, J. Raymond, ‘Irrigation Reforms in Andhra Pradesh’

9.2.4 Convert irrigation departments to water service agencies (WSAs)

Irrigation departments (IDs) should be converted into one or more (in larger states) WSAs, which would be utility-type companies with administrative autonomy, full accountability to users and a less-politicized environment. Typically, they would handle provision of irrigation (including through water markets) and drainage, flood control and bulk water supply to WUAs. The WSAs need to be organized in a decentralized manner along basin lines and restructured to create greater specialization of functions and staff skills. The WSA and the agriculture departments need to focus their activities on providing services demanded by WUAs.

Notes

1. Recognizing this, the NWP 2002 states that ‘The success of the National Water Policy will depend entirely on the development and maintenance of a national consensus and commitments to its underlying principles and objectives. To achieve the desired objectives, State Water Policy backed with an operational action plan shall be formulated in a time-bound manner, say in two years.’

2. Out of the current water utilization of 605 bcm, irrigation accounts for 83 per cent, domestic 5 per cent, industry and energy 3 per cent each and others 6 per cent.
3. The court has held that if a legislation under Entry 56 of List I of the Constitution is made, the need for consent would not arise and the centre would be in a position to undertake and complete the project. (Entry 56 says: ‘Regulation and development of inter-State rivers and river valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest.’)

4. Coastal areas and small islands face unique groundwater problems because of their vulnerability to salt water intrusion, which is generally irreversible.

5. In Chittoor district of Andhra Pradesh, as part of a pilot, sprinklers are subsidized. This, together with the provision that the provider would be responsible for repair and maintenance for some specified initial years, has made sprinklers popular. Farmers have reportedly gained substantial amounts through this process.

6. These are usually enforced in areas where withdrawal exceeds 85 per cent of annual recharge. Well spacing norms generally prohibit new wells within a radius of 200m in most parts. In case of serious depletion problems, the norms are more stringent. Depth norms specify the maximum depth of wells.

7. Some stocks of groundwater are found in largely nonrenewable aquifers underlying regions having little river flow or precipitation, and thus little recharge, in parts of Gujarat and Rajasthan. Here, even the most efficient water use leads to depletion. Groundwater development here has to have a very long-term perspective and should be linked to the policy issue of efficient time pattern of economic and population development.

8. In some cities (e.g. Delhi and Hyderabad), rainwater harvesting is mandatory, especially for large properties.

9. The larger the area the water has to flow before being collected for use, the more the evaporative loss.

10. In 1997, Punjab made water and power free for irrigation! Recently, some states (notably, Andhra Pradesh, Haryana, Orissa and Rajasthan) have begun to revise rates.

11. The meagre revenue that is generated goes to state budgets.

12. In developing countries, metering is not so common. Only half of the 50 utilities in Asian cities surveyed by the ADB in 1997 provided 100 per cent metering of production and consumption.

13. It is easy to see that in the case of a public stand post, which many people access, IBT is actually regressive.

14. Some small O&M contracts that do not involve any transfer of risks to the private sector can perhaps be handled by the government.

15. Service quality would include quality of water supplied, quantity and hours of water supplied, timely redress of consumer grievances and wastewater disposal as per agreed terms.
16. There are parallels to this elsewhere in the world. Saudi Arabia’s Supreme Economic Council decreed recently that the Electricity Services Regulatory Agency would assume regulatory responsibility for water until a separate regulatory body is established. Should the joint responsibility prove successful, the two regulators may stay as one in future. Such an arrangement is in line with the rest of the Gulf Cooperation Council (Bahrain, Kuwait, Quatar, Oman, UAE).

17. Currently, a nominal water cess is charged on the basis of industry type (and not kind of effluent). The cess is intended to act as user charge, revenue source for pollution control boards and pollution tax. While aiming at all three objectives, the cess appears to have achieved none (Gupta 2001).

18. Service contracts require limited information on an existing system and minimal monitoring capacity, while options such as BOT and concession require high political support, adequate information about the existing system and a strong regulatory framework (Chetan Vaidya, *Asian Journal*).

19. The National Commission on Agriculture recognizes only the rental market for LIS and not water markets.

20. Another distinction is that formal markets are often defined with respect to water rights, while informal markets operate for volumes of water. In other words, formal market transactions may or may not entail transfer of water, while informal market deals always do.

21. Disability Adjusted Life Years (DALYs) is a composite index of morbidity and mortality.

22. WHO, Population Service International, and Sulabh International Institute of Health and Hygiene are currently conducting a pilot SFS intervention to reduce diarrhoea in urban slums of West Delhi.

23. GAP II was launched in 1993. Although it was scheduled to be completed by December 2001, it has now been extended to 2005. It is much more wider in its scope (1912 MLD) and geographical coverage.

24. GAP II was launched in 1993 and was scheduled to be completed by December 2001, but has now been extended to 2005. It is much more wider in its scope (1912 MLD) and geographical coverage.


26. Currently, groundwater irrigation accounts for 39 per cent of the irrigated area, canal irrigation 47 per cent and other irrigation (mainly tanks) 14 per cent.

27. Andhra Pradesh raised its water charges by three times at one go.
Bus Rapid Transit System (BRTS) could well revolutionise urban transport systems the world over. In introducing BRTS, India may have lagged behind other countries, but is rapidly catching up. Encouraged by the lower cost and greater flexibility of BRTS, together with a service quality that approaches metro systems, eleven Indian cities are at various stages of implementing BRTS and more cities are opting for it. Initial attempts at introducing BRTS have, however, caused a furore. The problem seems to lie not in the system, but in the way it is being implemented. What are the lessons and what would it take to make this endeavor successful?

Globally, many cities are experiencing heavy traffic congestion and high traffic-related pollution. The data collected from the six metropolitan cities in India, for example, show that the number of registered motor vehicles has grown four times faster than the population in these cities during the period from 1981 to 2001, while road space has barely increased. Cars have replaced buses and cyclists have switched to scooters and motorcycles, mainly due to rising disposable incomes and inadequate public transportation systems. To curb this trend, it is necessary to make public transport systems more widespread and convenient in terms of travel comfort and speed. Of the available public transport modes that can address these challenges, BRTS is increasingly being preferred because of its huge cost advantage and flexibility.

**What is BRTS?**

BRTS essentially gives priority to buses through dedicated bus lanes, and provides dedicated lanes for pedestrians and non-motorised vehicles like cycles and rickshaws. It is sometimes called a High Capacity Bus System (HCBS), as in Delhi. The capacity of the system is increased because buses have unimpeded right-of-way, which reduces the turnaround time and because more buses can operate in the dedicated bus lanes.
Simply put, BRTS is like a metro with the flexibility of a bus system (see Box 30.1). Given below are the features (and the purposes they serve) of a classic BRTS:

- A dedicated bus lane separate from all other traffic modes (higher speed)
- Priority treatment of buses at intersections (higher speed)
- Off-bus fare collection (higher boarding speed)
- Buses with large/multiple doorways, low floors and level boarding (quicker boarding and alighting, and physically-challenged friendly)
- High frequency, greater adherence to schedule, all-day service (reliability; less waiting time)
- GPS (real-time tracking of buses) and PIS (passenger information system)
- Comfortable and safe bus stations; air-conditioned buses with comfortable seats (passenger comfort)

Box 30.1: Bogotá’s TransMilenio

BRTS is essentially a Latin American innovation but its popularity has become widespread, with more than 30 cities in both developing countries (such as China and Indonesia) and developed ones (such as Canada, US, Australia and Finland) implementing it. The TransMilenio system in Bogotá (Colombia), which became operational in 2001, is the most well-known. The driving force behind the system was Mayor Peñalosa, a strong leader and leading town-planner. When his initial proposal for an integrated public transit—that included a subway—was turned down by the national government on cost considerations, Peñalosa quickly recognized the advantages that a bus system could have and formulated a plan based on the bus systems in Curitiba and Sao Paolo, Brazil, for which he got the support from the national government. He also tactfully overcame the opposition from the traditional private owners and operators of buses. The results have been dramatic. In addition to cutting the travel time by 35 per cent, TM has reduced fatal car accidents by 93 per cent and some air pollutants by 40 per cent. While Bogotá has become worthy of emulation all over the world, Peñalosa has become a star.
**BRTS in India**

Although conditions appropriate for the introduction of BRTS have been around for some years in India, facilitating policy and financing frameworks came into being only recently. The National Urban Transport Policy (NUTP), which gives priority to public transport systems over personalised transport, was approved by the Cabinet only in April 2006. While emphasizing the need for public transport systems, the NUTP observes that “… a bus carrying 40 people is allocated only two and a half times the road space that is allocated to a car carrying only one or two persons.” Complementing this policy regime is a new framework for financial support through the JNNURM, the flagship programme of the Government of India to promote urban renewal.

Given the advantages that BRTS enjoys over other modes of transport, especially in terms of cost and flexibility (see Table 30.1), it is not surprising that eleven Indian cities are already at various stages of implementing BRTS projects in different forms (see Box 30.2, Business models). All these projects, with the sole exception of Delhi, are being funded under JNNURM. In two cities—Delhi and Pune—the first phase of BRTS is already in operation.

BRTS got off to a poor start in India. Pune, the first Indian city to experiment with it, started on a mere 5 km stretch with four low-floor buses in December 2006. It has been widely considered a fiasco, due to rushed implementation with inadequate planning and several operational issues arising. Criticism by the media, experts and, above all, the general public, has damaged the image of the Pune BRTS.

Delhi’s pilot BRTS, on the other hand, was implemented after almost half a decade of planning. A detailed traffic study was carried out and the design and construction of the system was entrusted to the Indian Institute of Technology (IIT) and Rail India Technical and Economic Services (RITES). Delhi Integrated Multimodal Transit System (DIMTS), a joint venture between Delhi Government and IDFC, was created to operate the system. The first phase (a 6 km stretch) started operating in April 2008. The system has some of the standard elements of a BRTS such as exclusive bus lanes operating in the centre. Bike lanes parallel the whole corridor and together with the system’s pedestrian access, it has created one of the first high quality walking and cycling environments in India.

**Table 30.1: Alternative mass transport systems**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>LRT</th>
<th>Metro</th>
<th>BRTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial speed km/hr</td>
<td>15–40</td>
<td>24–55</td>
<td>25–30</td>
</tr>
<tr>
<td>Infrastructure cost Rs crore/km</td>
<td>100</td>
<td>150–300</td>
<td>10–20</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Low</td>
<td>Very low</td>
<td>Very high</td>
</tr>
</tbody>
</table>

The BRTS in Delhi has, however, run into a controversy. Car drivers are largely condemning it as speed in the mixed traffic lane has slowed down, especially during peak hours. On the other hand, the majority of bus commuters feel that the BRTS marks an improvement in Delhi’s public transport system, according to two independent surveys. However, another survey shows that the BRTS speed in Delhi is relatively low compared to that in other cities (see Table 30.2). With the BRTS corridor open to all existing buses to enter and exit (open system), speed is affected. Of course, as the Delhi system evolves into a closed system, and intelligent signalling systems are installed, traffic speed will improve and this can be achieved at a relatively low cost. Nevertheless, poor public perception and barriers to speed have arisen due to some mistakes which could have been avoided (see Box 30.3).

**Box 30.2: Business models**

BRTS in different cities follow different business models, although there are some commonalities, significantly:

- To distance bus operations from red tape, a company is set up to run BRTS. The company is generally publicly owned and is responsible for corridor management.
- Bus operations are typically separated from corridor management. In most cases, bus operations are contracted out to private parties, who are responsible for investment in the rolling stock as well as bus operations. On the other hand, there are countries such as China and Turkey where companies set up to run BRTS also own and operate buses.
- The cost of the infrastructure (roads, stations, etc.) is borne by the government, while O&M costs are borne by the passengers.
- Competition among bus operators for passengers, which is often a source of accidents, is replaced by competition for right to operate.

Differences, however, remain in how bus services are contracted and how demand risks are shared between BRTS operators and bus operators. In a vast majority of cases, bus operators are awarded concession contracts by the BRTS operating company to the lowest bidders of reward per km travelled. For bus operators, this is the only source of income. Bus operators’ profits depend on their operational efficiency, although it must be noted that it is difficult to gain from cutting maintenance costs, since strict standards are set for different service quality parameters (cleanliness, safety, timeliness); infractions usually attract penalty. The BRTS operating company acts as concession manager and funds the payments to bus operators from passenger fares, which they collect. To ensure that BRTS operating companies are viable, tariffs are set and revised keeping in view payments to bus operators, which in turn depends on input cost (such as fuel cost). While in Bogotá tariffs are set with the sole objective of covering O&M costs, in Ahmedabad political considerations cannot be ruled out and subsidies to the
operating company are a distinct possibility. There is also a difference between Bogotá and Ahmedabad as to who bears the demand risk. While the demand risk is borne entirely by the BRTS operating company in Ahmedabad (in view of the low share—14–15 per cent—of public transit) through a guaranteed number of kilometres per year to the bus operator, in Bogotá it rests with the bus operators, who do not enjoy any such guarantee.

The City Bus Service of Indore follows a somewhat different revenue model, where Indore City Transport Services Limited (ICTSL) allocates bus routes to private bus operators who offer to pay the highest revenue to ICTSL through competitive bidding. In addition to this, ICTSL shares with bus operators revenues from (i) advertisements on the buses and (ii) issuance of daily and monthly passes to passengers. On-board fare collection goes to bus operators. Clearly, the demand risk is shared between ICTSL and bus operators.

The third category of business model is the one currently followed by Delhi, where bus operations are not yet integrated into BRTS. In Delhi, the focus so far has been on construction of corridors and corridor management, while no attempt has been made to choose which bus operators would ply on BRTS lanes (open system). DIMTS gets a fee from Delhi government, which covers its cost of corridor management, which includes passenger information system, camera-based monitoring, etc. It is still not clear as to how the BRTS business model will evolve in Delhi.

Policy Group Quarterly, September 2008

Table 30.2: Comparison of efficiency

<table>
<thead>
<tr>
<th>Line</th>
<th>Speed (in km/hr)</th>
<th>Ridership (passengers/hour/direction)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bogotá TransMilenio</td>
<td>29</td>
<td>42,000</td>
</tr>
<tr>
<td>São Paulo 9 de julho</td>
<td>12</td>
<td>34,910</td>
</tr>
<tr>
<td>Porto Alegre AssisBrasil</td>
<td>18</td>
<td>28,000</td>
</tr>
<tr>
<td>Belo Horizonte Cristiano Machado</td>
<td>15</td>
<td>21,100</td>
</tr>
<tr>
<td>Delhi</td>
<td>13</td>
<td>12,000</td>
</tr>
<tr>
<td>Curitiba Eixo Sul</td>
<td>21</td>
<td>10,640</td>
</tr>
<tr>
<td>Quito EcoVia</td>
<td>18</td>
<td>10,200</td>
</tr>
<tr>
<td>Beijing</td>
<td>15</td>
<td>7,500</td>
</tr>
</tbody>
</table>

Source: Bus Rapid Transit: How Delhi Compares, Walter Hook, ITDP

While Delhi and Pune have introduced BRTS through pilots, Indore has started with a city-wide approach to improve bus service with initiatives such as route planning, development of bus shelters and training to bus drivers. A specialized agency for public
transport, Indore City Transport Services Limited (ICTSL) was set up and a franchisee system has been adopted to involve private bus operators. Incentives have been created for bus operators to provide a threshold level of service quality. All these have led to gains in travel time, safety and convenience and, most importantly, a positive public perception. With the initial favourable conditions in place, ICTSL now has decided to introduce BRTS, which significantly improves the chances of its success.

Ahmedabad is following yet another approach. Care has been taken to ensure that the mistakes of Delhi are not repeated. For example, the project would be started on a relatively large stretch (38 km) selected on the basis of an origin-destination survey and the corridors will be open to only special BRTS buses. Bus-stops would be on the median and some distance away from intersections. Like in many successful BRTS, the bus fleet will be owned and operated by private operators, under the supervision of an operating company (Janmarg). Further, a well-designed incentive system will be put in place to improve service standards of bus operators.

LESSONS FROM EXPERIENCE

To ensure that BRTS becomes a success, Indian cities need to learn not only from the early movers in India, but also from the experiences of cities in other countries that have had a longer run. Some of these are listed below:

**Box 30.3: Strategic errors and design flaws in Delhi BRTS**

Starting off as an open system has been perhaps the biggest mistake in Delhi. This has slowed the system because of (i) buses moving in and out at any point of the corridor, (ii) long halts by buses to pick up passengers and (iii) bus breakdowns. Other mistakes include:

**Short stretch:** Operations have started on a short stretch of 6 km, yielding minimal advantages to most commuters, because only a small part of commuters’ trips (often much less than 6 km) is on the dedicated corridor.

**No route rationalisation and network development:** No comprehensive route rationalisation was carried out. Bus routes remain the same as before. Further, different corridors being studied are disjointed and do not constitute a good network.

**Bus stops at junctions:** Since bus-stops are at the intersection, the number of waiting lanes available for mixed traffic is significantly reduced, resulting in a slowdown of traffic. Also, with bus-stops to the left of approaching buses—rather than on the median—avoidable infrastructure has been created and transfers to new routes have become difficult for passengers.

**Shifting bus lanes from centre to left:** Delhi started off the right way by having bus lanes in the centre, as is the case the world over. Central lanes minimize interference
from the turning traffic as well as slow-moving traffic, which are rampant on the left lanes. Buses in the central lane, being a radically different concept, however, led to opposition from the public who are used to using buses on the left lane. The problem arose mainly because of the absence of a sustained awareness campaign that crossing roads to access or exit from BRTS bus-stops can be made safe by use of signals. Shifting the BRTS corridor to the left, as is being considered, may defeat the objective of BRTS.

It is politically difficult to implement BRTS, because it is popularly conceived as a system that redistributes congestion from users of bus transit to owners of privately owned vehicles.

Strong and visionary leaders at the city level are required to deal with opposition from aggrieved businesses and private vehicle owners. Bogotá was able to get past the opposition by linking the implementation of the BRTS with an urban renewal programme. Los Angeles, on the other hand, was unable to create a BRTS because it did not have the support of the elected local leaders.

Existing bus operators can be co-opted in the new system to minimise opposition by keeping bidding open to them (Indore). Delhi has shown that street hawkers, a significant set of stakeholders, can also be accommodated.

Intensive training of police, bus drivers, operators, traffic system planners and an awareness campaign for all types of users—pedestrians, cyclists, bus commuters, etc.—is necessary to explain how the system works.

Effective traffic management and enforcement of discipline is essential to address key issues such as traffic violations, property damage and jaywalking, as have emerged in Delhi. A separate BRTS Regulation Act may be necessary to confer enforcement powers on the operating agency to ensure traffic discipline. Besides traffic discipline, the Act would facilitate coordination among different agencies involved in the BRTS.

Efficient transfer facilities and supporting infrastructure such as walkways, bicycle lanes and feeder buses are necessary to increase ridership in BRTS, along with “park and ride” facilities of car parks at key interchange points, and foot overbridges and subways to facilitate pedestrian crossing at bus stations. This should be complemented by efficient transfer fare payment.

BRTS must be part of a larger urban strategy. Finally, the effectiveness of BRTS can be enhanced by appropriately pricing the costs of congestion and pollution caused by private transportation. TransMilenio, for example, is a part of a larger public mobility plan that includes policies aimed at increasing the costs of private transportation such as a gasoline tax and high parking fees.

In short, the success of BRTS depends on an integrated set of actions by different agencies and a radical shift in culture, skills and organisational responsibilities of system related agencies.
INTRODUCTION

Notwithstanding the empowerment of urban local bodies (ULBs) vide the Seventy-fourth Constitutional Amendment Act (CAA) in 1992, there has been a steady deterioration in the provision of urban infrastructure services. Investment in urban infrastructure has been neglected. According to the Twelfth Finance Commission report, most of the infrastructure initiatives have been stalled due to financial constraints. That is not surprising since the total revenue of the municipal sector in 2001–02 was merely Rs 15,149 crore or 0.66 per cent of GDP.1 Not only is this tiny by any normative standard, it is well below that of other emerging economies like Brazil and South Africa where it is about 5 per cent and 6 per cent respectively. In this paper, we look at the financing options and constraints that ULBs face.

Globally, the 1990s saw major changes in the provision and financing of infrastructure as technological changes permitted a reduction in costs, unbundling of services and the possibility of competition in sectors hitherto considered natural monopolies. It was then hoped that private finance would supplement public investment in infrastructure services.

In India too, some of these expectations were echoed in the Report of the Expert Group on Commercialisation of Infrastructure Projects (1996), chaired by Rakesh Mohan. Urban infrastructure had historically been financed by loans and grants from the central and state governments, as ULBs’ own resources have generally been inadequate to meet even the operations and maintenance (O&M) requirements of the services. With greater scope for commercialization of infrastructure services, including in the urban sector, there was a distinct role for the private sector in public–private partnerships (PPP) and the potential to tap market-based financing sources.
In the thirteen years since the report came out, considerable advances have been made in commercializing some infrastructure sectors and bringing in private finance, but progress in the urban sector has been disappointing, to say the least. In particular, PPP has not succeeded in bringing significant private commitments to core urban infrastructure in India or, for that matter, worldwide.\(^2\)

This paper looks at three main sources that municipalities can tap to finance urban infrastructure: debt, private financing through PPPs, and land-based financing. However, unless the municipality has its own house in order, it will not be able to access external financing sources. Section 1 provides a backdrop on the state of municipal finances. It points to three fundamental pillars of a sustainable municipal finance system in India: the property tax, user charges, and an intergovernment revenue-sharing system. If these are well-managed, and the municipality has steady annual operating surpluses, there is a good basis for accessing other sources of finance and complementing them with public finance. Section 1, however, shows that the situation is far from desirable. Fixing this is the first priority.

1. **Municipal Revenues**

   A prerequisite to accessing market-based finance is a sound financial position of the ULB. A creditor needs to be assured that the ULB can (and will) service its debt and an investor expects a reasonable return to his equity in the project. Thus, a stable solid revenue base is essential, comprising buoyant local taxes and adequate user charges on the services provided by the ULB. Also important, though outside the control of the ULB is a predictable, transparent system of inter-government transfers.

   Tax revenues, which are the major source of revenue for the municipal sector, comprise the largest share (over 45 per cent of the total revenues for municipal corporations covered in the RBI sample and 39 per cent for all ULBs in the country as per the Twelfth Finance Commission).\(^3\) Non-tax revenues i.e. charges and fees comprise about 28 per cent and 19 per cent respectively. It is understandable that the larger municipal corporations would rely more on tax revenues and charges and fees, whereas the large number of smaller ULBs would rely more on grants (see Table 31.1).

<table>
<thead>
<tr>
<th>Revenue type</th>
<th>Source</th>
<th>% share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tax</td>
<td>Property tax, octroi, advertisement tax, vacant land tax, tax on animals, taxes on carriages and carts. Shared taxes: entertainment tax, profession tax, motor vehicles tax</td>
<td>45 (39)</td>
</tr>
</tbody>
</table>
Table 31.1: Revenue sources of municipalities (contd...)

<table>
<thead>
<tr>
<th>Revenue type</th>
<th>Source</th>
<th>% share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-tax</td>
<td>User charges, municipal fees, lease charges and sale &amp; hire charges</td>
<td>28 (19)</td>
</tr>
<tr>
<td>Grants</td>
<td>• Planned transfers from upper tiers of government</td>
<td>12 (35)</td>
</tr>
<tr>
<td></td>
<td>• Non-plan grants like compensation against loss of income or specific transfers</td>
<td></td>
</tr>
<tr>
<td>Loans</td>
<td>Borrowings by local authorities from various sources such as government (centre or state), LIC, HUDCO, municipal bonds, etc. for capex</td>
<td>3</td>
</tr>
<tr>
<td>Other receipts</td>
<td>Fines, fees, sundry receipts, rental income on tools, etc.</td>
<td>12 (6)</td>
</tr>
</tbody>
</table>

Source: Budgets of Municipal Corporations, ‘Municipal Finance in India—An Assessment,’ RBI 2007; Twelfth Finance Commission

Note: The share refers to the average share of each component between 1999–2000 and 2003–04 in the budgets of 35 municipal corporations. The figures in parentheses refer to the shares of all ULBs in the country based on data from the Twelfth Finance Commission.

The property tax

By far the largest tax source for the municipal sector is the property tax (see Table 31.2). It is the main source of revenue for municipal corporations in almost all states, and especially since octroi has been abolished in all states except Maharashtra (octroi was abolished in Gujarat in 2007).¹

Table 31.2: Major sources of tax for some key municipal corporations

<table>
<thead>
<tr>
<th>Municipal corporation</th>
<th>State</th>
<th>Major taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delhi</td>
<td>Delhi</td>
<td>property, advertisement</td>
</tr>
<tr>
<td>Mumbai</td>
<td>Maharashtra</td>
<td>octroi, property tax</td>
</tr>
<tr>
<td>Kolkata</td>
<td>West Bengal</td>
<td>property, advertisement</td>
</tr>
<tr>
<td>Chennai</td>
<td>Tamil Nadu</td>
<td>property, profession</td>
</tr>
<tr>
<td>Jaipur</td>
<td>Rajasthan</td>
<td>octroi, property</td>
</tr>
<tr>
<td>Bangalore</td>
<td>Karnataka</td>
<td>property, advertisement</td>
</tr>
<tr>
<td>Surat</td>
<td>Gujarat</td>
<td>property, octroi</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>Andhra Pradesh</td>
<td>property, profession</td>
</tr>
</tbody>
</table>

Source: ‘Municipal Finance in India—An Assessment’ (RBI 2007)
Although the property tax is a key revenue source for ULBs, its revenue generation has been much below potential in India. Total local taxes of ULBs were less than 0.3 per cent of GDP as of 2001–02 (Twelfth Finance Commission). Property tax collection by ULBs is currently estimated at Rs 7000–8000 crore, which is less than 0.2 per cent of GDP. In other countries where it forms a major source of local revenue, the tax collection ranges between 1 per cent to 2.5 per cent of GDP (see Box 31.1 for international comparison). There is therefore significant scope to increase the yield of the property tax in India.

**Box 31.1: International comparison of property tax**

Internationally, especially in Anglo-Saxon countries, the property tax dominates as a source of local tax (see Table 31.1). The average share of property taxes in the total local tax revenues is over 65% for the seven countries in the table below. Its share is over 90% in Canada, United Kingdom and Australia. In the US, property tax accounts for 70–75 per cent of local tax revenues and is equivalent to about 2.5 per cent of GDP. The capital value of the property determines the tax base and in most cases the rate exceeds 1%.

<table>
<thead>
<tr>
<th>Country</th>
<th>Tax source as a % of total local tax revenues</th>
<th>Local taxes as a per cent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Income</td>
<td>Sales</td>
</tr>
<tr>
<td>Australia</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>USA</td>
<td>6.5</td>
<td>21.8</td>
</tr>
<tr>
<td>Canada</td>
<td>0</td>
<td>1.9</td>
</tr>
<tr>
<td>Germany</td>
<td>78</td>
<td>6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Japan</td>
<td>47.4</td>
<td>20.7</td>
</tr>
<tr>
<td>France</td>
<td>0</td>
<td>11.5</td>
</tr>
</tbody>
</table>


Most of the ULBs in India base their collection of property tax on the property rental value. There are several problems with this system. Self-occupied properties, particularly residential properties that have never been rented out are very difficult to value and arriving at a hypothetical ‘rent’ is not easy. It gives scope for subjective assessments and lack of transparency in the assessment process. Moreover, due to state rent control laws, revenue growth from property taxes has tended to stagnate. Instead, a shift to collection based on market rental values or capital values could significantly increase the revenues for the ULBs.
Adopting a capital value system in India has its own challenges. This system requires an accurate and comprehensive database with each ULB to enable efficient property tax collection. Most of the ULBs do not have reliable records and a significant number of properties are not even included in the tax base. Arguably, the biggest difficulty in the implementation of the capital value system lies in valuation. The annual value is arrived at on the basis of estimated market value of land and cost of construction at the time of construction or acquisition. But in the absence of a well-functioning property market, the purchase value may not reflect its true use. It may also be deliberately underreported to evade the high stamp duties and registration fees. The ULBs lack a cadre of trained assessors who could evaluate the properties and update the records on a regular basis. Moreover, since the capital value is determined with reference to the date of acquisition or construction, there is no buoyancy in the tax. Finally, there may be strong resistance to move to a capital value system as some argue that taxpayers in Indian cities are considered ‘property-rich’ but ‘cash-poor’.

Implementing change and enforcing tax compliance becomes more difficult if political interests are not aligned. But it is hoped that the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) could be an important driver in the reform of property tax systems as it is one of the mandatory reforms under JNNURM. Indeed, the JNNURM recognizes the need for comprehensive reform of the property tax system, covering the rate and base structure, valuation and assessment systems, tax administration and citizen interface mechanisms. The guidelines emphasise

• putting in place a comprehensive property data base, including GIS where needed, to enable complete property mapping and to bring all properties in the tax net.
• introducing a self-assessment system for computation of property tax that is formula-based.
• improving collections to achieve at least 85 per cent of demand.

Some cities like Patna, Ahmedabad, Bangalore, Pune, Delhi, Indore, Mirzapur and Hyderabad have experimented with an area-based system of assessment for property taxation. In this system, the tax base for a particular property is arrived at by multiplying unit area value assigned to the locality (adjusted for the property’s occupancy, age, structure type and type of use) by covered area of the property. This system, which approximates capital values, has substantially improved revenues. In Bangalore, the shift from rental value based assessment to an area-based system increased revenues by around 62 per cent. In Hyderabad, it is said to have almost tripled revenues. More cities are beginning to implement this system. Mumbai, for instance, recently modified legislation to do so. Since it is relatively simple to administer, at the minimum it should be extended to all the 100-plus municipal corporations.
User charges

Besides their weak tax base, ULBs do not recover the costs of services they provide. In most cases, the existing tariffs or user charges are not sufficient to meet production and O&M cost incurred in service provision. In fact, in some cases, cost recovery forms a small fraction of the total O&M cost. Annexure Table 31.7 provides an overview of the cost recovery of water supply and sewerage (WSS) and solid waste management (SWM) services for select municipal corporations (MCs) in 2004–05 that are now covered by the JNNURM. Only 6 out of the 24 MCs considered recovered more than 50 per cent of their costs as far as WSS services are concerned. The performance was more dismal in the case of solid waste management (SWM) services where 11 out of 20 MCs did not levy user charges for these services despite incurring significant costs. Further, only 2 MCs recovered more than 50 per cent of the operating cost of service provision.

Cost coverage is a function of both reduction of expenditure inefficiencies and augmentation of revenues by levying appropriate levels of user charges. The latter has received considerable focus under the JNNURM wherein the ULBs in the participating 63 cities are mandated to levy reasonable user charges on different municipal services such as WSS, SWM and public transport so as to achieve full recovery of O&M costs from these charges within seven years from the date of entering into a Memorandum of Association with the GOL.5 Data obtained for 24 ULBs covered under JNNURM indicates that most ULBs at present are levying two types of user charges. In the case of WSS services, both fixed flat tariffs (which are not restricted to unmetered areas) and varying volumetric charges linked to the level of consumption are in practice. In the case of SWM, a monthly flat tariff framework is generally practised.

The ULBs that are included in the 63 cities under JNNURM have set a target date of achieving 100 per cent cost recovery for WSS as well as SWM services by 2010–11 or 2011–12. However, tariffs have not been revised in a timely manner (see Annexure Table 31.7). With the exception of 6 MCs, tariffs have not been revised since 2005 for WSS services. The scenario is bleak for SWM services. Given such disregard to tariff revision, achieving a target of 100 per cent cost recovery seems improbable for most ULBs. Information available under JNNURM6 indicates that only six cities viz. Visakhapatnam, Nashik, Pune, Greater Mumbai, Chennai, Madurai have achieved 100 per cent cost recovery for WSS services and only three cities viz. Visakhapatnam, Nashik, Greater Mumbai have achieved 100 per cent cost recovery in SWM services. It would be pertinent to add here that ULBs usually have to get the approval of the state government for levying user charges and therefore cannot act according to economic criteria alone but are also forced to follow political considerations.
There is no denying that periodic revision of user charges is necessary to recover the expenses incurred in service provision. But increasing user charges without perceptible improvement in the quality of supply or service (QoSS) may be resisted by consumers. An option that may be explored in such cases, particularly where private sector participation (PSP) is involved, is allowing tariff revision after the operator demonstrates initial improvements in QoSS and brings about some reduction in inefficiencies. Attempts towards this end have been made in Karnataka under the 24 x 7 water supply pilot projects being implemented through PSP in select wards of ULBs in Belgaum, Gulbarga and Hubli–Dharwad. Of course, the implementation of such an option may be difficult in places where tariffs are either non-existent or are highly inadequate.

**Inter-government transfers**

For strengthening the finances of ULBs, the Seventy-fourth CAA introduced two features: (a) a provision for the constitution of State Finance Commissions (SFC) every five years, and (b) a requirement that the Central Finance Commission suggest measures to augment the consolidated fund of states to supplement the resources of municipalities on the basis of the respective SFC recommendations. Yet, it has been observed that, ‘the revenue instruments assigned to ULBs by state governments at present are grossly inadequate and not commensurate with the functions expected to be performed by them in accordance with the Seventy-fourth CAA’ (RBI 2007). While there has been progress in some states with tax pool-sharing arrangements, there is not yet a perceptible improvement in the quantum and predictability of inter-government fiscal flows to ULBs.7

Essentially, ULBs have limited autonomy. With respect to taxation powers, these are defined in the municipalities’ Acts and the authority to change tax bases and rates rests largely with state governments. For instance, the municipal Acts allow the municipality to levy taxes other than those mentioned explicitly therein with the approval of the state government. While ULBs may have greater powers to levy charges and fees, in practice this is not so. The ability to levy user charges is either specified in the acts or more often in the bye-laws framed by the municipal corporations under the powers derived from the acts. Often, however, political influence interferes with their functioning.

**2. Debt financing**

Typically, the various options available with municipalities for financing urban infrastructure facilities are borrowings from banks and financial intermediaries, raising funds from the capital markets or involving private sector participation in various forms such as contracts, leases and concessions. In this section, we discuss
the options for debt financing. The section below, ‘What does experience tell us?’, presents international experience and what is currently being done in India. The following section, ‘What can be done?’, discusses options going forward. In the following Section 3 we turn to PPP options.

What does experience tell us?
After the demise of the term-lending institutions in India, lending for urban infrastructure investment has been limited. ICICI, for example, once it merged into a commercial bank, moved to retail lending, partly because of the higher returns that offers and partly because of the perceived riskiness in municipal lending. In recent years, commercial banks, particularly public sector banks, have substantially raised their lending to infrastructure projects. Yet they have not ventured to extend credit to basic urban infrastructure in any significant way. Similarly, non-bank finance companies (NBFCs) barely lend for core urban infrastructure such as water supply and sanitation, drainage, and solid waste management while they more readily finance commercial infrastructure. And the insurance sector, in particular LIC’s investments in urban infrastructure have been declining in recent years as the mandated investment requirements were revised. What then can be done to step up financing of urban infrastructure in a sustainable way?

Most countries, including the now developed ones, started lending to municipalities through specialized municipal banks or municipal development funds (MDFs).

Municipal development banks
Bank lending was—and still is—the primary source of local credit financing in western Europe. Specialised municipal banks were set up to provide not just capital but a range of services to complement their lending, such as assistance in preparation of municipal budgets, designing and appraising investment projects, and even managing the municipalities’ financial accounts. These support services and subsidized credit provision were important in the early years of municipalities’ learning about credit markets and were possible because of central government policy to subsidise the bank by giving it preferential access to low-cost, long-term savings or to accord it partial protection from competition.

With financial sector deregulation in the late 1980s, most municipal banks lost their preferential access to below-market sources of long-term savings which forced them to compete with other financial institutions for savings. In some countries, such as Belgium, France and Spain, municipal banks were privatized. Credit Local de France (CLF), the largest municipal bank in the world, merged with Credit Communal Belgique in 1996 to form what is now a global company, Dexia, which specializes in local government financing. In other countries, such as Germany and the Netherlands, municipal banks remained in the public sector but have been able to transition to accessing capital markets for their source of funding.
One consequence of the change to commercial bank lending is that the tenor of bank loans to municipalities tends to be much shorter (as banks’ liabilities are generally shorter), thereby requiring frequent roll-over during the life of an infrastructure investment project. Credit risk would also be priced by commercial banks, whereas municipal banks charged the same interest rate to all clients. Banks and financial institutions may also require sovereign guarantees.

In some countries, commercial banks engage in real estate-based municipal lending. China has relied on this significantly as a means of financing its ULBs. Simple municipal loans from commercial banks are, in effect, real estate loans secured by real property collateral. An SPV could borrow against the land asset to finance infrastructure construction such as roads, which would raise adjacent land values, and use the proceeds from long-term land leasing to repay the principal value of the loan. However, there is a risk that the volatility in land markets could be transmitted to the municipal credit market (see Section 4).

**Special funds**

Many countries have established municipal development funds (MDFs), with initial capitalization typically provided by the central government and often supported by multilateral or bilateral agencies. Over 50 developing countries have established such intermediaries (Peterson 2000). But it is not just developing countries that have set up such specialised Funds. The UK Public Works Loan Board is one of the oldest models (see Box 31.2).

MDFs may just operate as a ‘loan window’ within a government agency or have legally independent status, thus spanning across the spectrum of institutional structures from simply a refinance facility to a full-fledged municipal bank. As in the case of municipal development banks, the functions of MDFs go beyond the supply of credit to providing technical assistance (TA) and other services. While this is useful for ULBs that do not have adequate technical, financial or project management expertise, it may also perpetuate their dependence on the MDF and deter their ‘graduation’ to functioning in a credit market (Peterson 2000). The case for an MDF basically follows the ‘infant industry’ argument—that a ULB that is just beginning to enter the credit market needs initial support—but then it should not remain an infant. And that is where most of the MDFs have not succeeded. The incentives are stacked in perpetuating a system where MDFs continue to disburse funds to execute projects but do little for the development of a credit market in which ULBs participate.

The performance of MDFs has been quite mixed: some have very low non-performing loans whereas others have high rates of non-performing loans and some have even collapsed. More than 90 per cent of local loans eventually defaulted in the
Calcutta MDF, as the state government did not press for collections. The program had been initiated by a predecessor government of a different party (Peterson 2000). This is an example of the kind of political risk that an MDF brings. Apart from political risk, though, it should not be surprising if there are fairly high problem loans in the start-up phase of municipal lending. Indeed, as Peterson argues, one of the key reasons for having a state-sponsored development bank is to identify the credit risks that exist and to help bring them down through changes in local financial management, inter-governmental financing arrangements, or appraisal methods.

**Box 31.2: Public Works Loan Board, United Kingdom**

Established in 1817, the Public Works Loan Board (PWLB) is an independent and unpaid statutory body. It is headed by a maximum of 12 commissioners at a time who are appointed for a period of four years. It primarily lends to local authorities for capital purposes. It has a simple procedure and offers low interest rates. Loans are secured by statute on the authority’s entire revenue stream. Prior to sanctioning a loan, the commissioners must satisfy themselves that there is sufficient security. It is estimated that about 85 per cent of the loans borrowed by local authorities in the UK are from the PWLB. The money is sourced from the National Loans Fund. As on 31 March 2009, total outstanding loans stood at over £50 billion. With such a large share of local borrowing through the PWLB, it is also able to serve as an instrument of macroeconomic control of sub-national borrowing.

*Source:* Serageldin et al. UN–HABITAT (2008); Public Works Loan Board; Peterson (2000)

Most of the MDFs with high repayment rates had special types of loan guarantees. Loans backed only by a ‘general obligation’ pledge to repay debt from local revenues have proved risky and additional guarantees have been necessary. Amongst the MDFs with the best payment record are those which have lent to municipalities through private commercial banks (see Box 31.3). But clearly, commercial bank lending is not feasible until the municipal sector demonstrates that credit risks are controllable.

**Box 31.3: Successful municipal development funds (MDFs):
FINDETER in Colombia and MUFIS in Czech Republic**

The municipal credit markets in Colombia and the Czech Republic have undergone a major transition over the years. Notably, competitive local credit systems have evolved from municipal credit monopolies. The MDFs, the majority owned by the government, sourced their funds from government grants, donor funds, public or regulated institutional savings and, to some extent, the capital market. However, they did not directly finance municipalities, but provided commercial banks with
long-term loans for on-lending to the municipal sector. All the risk lies with the commercial banks that perform the credit analysis before lending the funds. The credit standards of the banks led to extremely low default rates of the municipalities (less than 2 per cent NPLs).

Some of the key reasons for their success are:

- Decentralization reforms gave the municipalities strong revenue generation powers. The revenue stream helps them in timely repayment of their borrowings.
- The voluntary intercept guarantee played a credit enhancement role and offered security to the commercial banks. The ULB sets up a special account into which inter-governmental revenue-sharing payments flow and the lender has first claim on these resources as long as municipal loan payments are due.

Over time, the good credit experience encouraged bank lending to the municipal sector from banks’ own resources. Competition among banks to lend to the sector led to a reduction in bank interest margins and lengthened average tenors for infrastructure. The larger municipalities prefer direct commercial bank borrowings mainly because the bank approval process is much quicker than the MDF’s approval. Thus, it has led to the development of a self-sustaining credit market.

Competition has produced a segmentation of the municipal credit market:

- Large municipalities raise finance mostly by issuing municipal bonds
- Mid-sized municipalities borrow from commercial banks
- Small municipalities borrow from parastatal institutions such as MDFs.


**Municipal bonds**

In many countries, municipalities are tapping their domestic and international capital markets for funds via issuance of interest bearing securities such as bonds which usually have a longer tenor. The US has the most sophisticated local municipal bond market (see Box 31.4). Its municipal bond market is the third largest debt market (US$2.7 trillion or 18 per cent of GDP) after its Treasury securities market and corporate bond market.

Generally, bonds emerge as a significant financing source at a later stage of development than municipal banks. They require a greater degree of maturation of the ULB as well as of the financial system. The hand-holding provided by a municipal development bank or an MDF is absent: municipalities have to separately obtain financial advisory services, technical assistance on project design, and assistance in financial management and payments system. Moreover, bond markets rely on extensive public disclosure requirements that issuers need to comply with.
Box 31.4: Municipal bonds in the US

Unlike in most countries, local entities in the United States such as counties and cities have constitutionally guaranteed rights to levy tax. This almost assured stream of revenue makes investment into their bonds more secure and feasible. There are two types of municipal bonds issued:

- General obligation bonds—backed by the full-faith-and-credit of the issuing government. Their repayment is done from the taxes levied by the government.
- Revenue bonds—generally for specific projects and repayable (both principal and interest) either from the revenues generated from the specific projects or from higher level government grants. These are viewed as being less secure as compared to general obligation bonds and hence carry a higher interest rate.

Municipal bonds are attractive to investors because of

- exemption from income tax (in over 90 per cent issues)
- large and deep municipal bond market gives investors an easy exit
- confidence in repayment, backed by a long history of legal and procedural protection (There is a separate board for municipal rules in the US.)
- extensive public disclosure requirements
- stringent financial reporting standards
- private bond insurance (About half of municipal bonds issued were insured prior to the start of the financial crisis in 2007. Municipalities pay premium for insurance coverage, which rises with credit risk.)

Domestic households and mutual funds are the largest investors into municipal bonds followed by insurance companies, banks and others.

The practice of municipal bond financing for urban infrastructure started in India for the first time in 1997 with the Bangalore Municipal Corporation issuing municipal bonds of Rs 125 crore with a state government guarantee. The first issue without a state government guarantee was floated by the Ahmedabad Municipal Corporation (AMC) for Rs 100 crore, with a maximum tenor of 8 years (redemption at the end of the sixth, seventh and eighth year). As a protection to the investors of the AMC bonds, state government grants and property tax revenues were escrowed for the interest payments and repayment of the principal.

Municipal bonds issued in India may be classified into three types:

- Taxable municipal bonds
- Tax-free municipal bonds
- Pooled finance municipal bonds
Taxable bonds

Taxable municipal bonds are those on which the interest earned attracts payment of income tax. Prior to 2000–01 (when tax-free municipal bonds were introduced in India), they were the only type of municipal bonds that existed. Since then, taxable bond issues have been negligible.

<table>
<thead>
<tr>
<th>City/state</th>
<th>Amt (Rs crore)</th>
<th>Year</th>
<th>Int. rate</th>
<th>Escrow</th>
<th>Purpose</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangalore</td>
<td>125</td>
<td>1997–98</td>
<td>13%</td>
<td>State govt grants &amp; property tax</td>
<td>City roads/ street drains</td>
<td>A-</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>100</td>
<td>1997–98</td>
<td>14%</td>
<td>Octroi from 10 collection points</td>
<td>WS &amp; S project</td>
<td>AA-</td>
</tr>
<tr>
<td>Ludhiana</td>
<td>10</td>
<td>1999</td>
<td>13.5–14%</td>
<td>W&amp;S taxes and charges</td>
<td>WS &amp; S project</td>
<td>LAA-</td>
</tr>
<tr>
<td>Nashik</td>
<td>100</td>
<td>1999</td>
<td>14.75%</td>
<td>Octroi from 4 collection points</td>
<td>WS &amp; S project</td>
<td>AA-</td>
</tr>
<tr>
<td>Indore</td>
<td>10</td>
<td>2000</td>
<td>13%</td>
<td>Grants/ property tax</td>
<td>Improvement of city roads</td>
<td>A</td>
</tr>
<tr>
<td>Nagpur</td>
<td>50</td>
<td>2001</td>
<td>13%</td>
<td>Property tax &amp; water charges</td>
<td>WS project</td>
<td>AA-</td>
</tr>
<tr>
<td>Madurai</td>
<td>30</td>
<td>2001</td>
<td>12.25%</td>
<td>Toll tax collection</td>
<td>City road project</td>
<td>LA+</td>
</tr>
<tr>
<td>Visakha-</td>
<td>20</td>
<td>2004</td>
<td>7.75%</td>
<td>Property tax</td>
<td>WS project</td>
<td>AA-</td>
</tr>
<tr>
<td>patnam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>445</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Of the above issuances, only those by Bangalore and Indore ULBs were guaranteed by the state governments.

Interestingly, the Madurai Municipal Corporation (MMC) issued a revenue bond for financing the construction of the Madurai ring road, which was the first of its kind of bond issue (see Table 31.3). The revenues from toll collections were escrowed for servicing the debt and GoTN gave a repayment guarantee which provided additional security. The bond was privately placed, with assistance from TNUDF to refinance a loan that MMC had, in fact, received from TNUDF at a higher interest rate.
**Tax-free bonds**

To give a boost to the issuance of municipal bonds, the FY 2000 Union Budget proposed the introduction of tax-free municipal bonds, wherein the interest income earned from these instruments is exempt from income tax. This has a dual benefit as the investor is able to get tax-free returns and the issuer is able to raise capital at lower cost. The government brought out guidelines for the issuance of tax-free bonds in 2001, which were revised in 2006 (see Box 31.5).

About Rs 650 crore of tax-free municipal bonds have been issued (see Table 31.4). However, once the government placed a cap of 8 per cent per annum on the interest rate of such tax-free municipal bonds, and interest rates trended up, these bonds became less attractive.

**Box 31.5: Key features of GOI guidelines for tax-free bonds**

*individual and pooled*

- Funds raised from tax-free municipal bonds are to be used only for capital investments in urban infrastructure for
  - Potable water supply
  - Sewerage or sanitation
  - Drainage
  - Solid waste management
  - Roads, bridges and flyovers
  - Urban transport (if this is a municipal function under respective state legislation)
- The project shall be financially viable i.e. be able to generate a stream of revenue sufficient to finance the O&M cost. User charges should be levied to cover O&M costs within five years.
- The issuer shall create an escrow account for debt servicing of bond proceeds and for meeting O&M costs of the proposed project with earmarked revenue, which will be monitored by an independent trustee (like DFI or nationalized bank).
- All the bond issuers must obtain an investment grade from an RBI-approved credit rating agency. The minimum maturity would be 5 years and the issuers may have the option for buy-back arrangements of the face value of the bonds from any investor after a lock-in period of 3 years.
- The amount of issue will be approved on a case-by-case basis by MoUD, GOI. The maximum amount will be the lower of 50 per cent of project cost or Rs 300 crore.
- Interest income earned from tax-free bonds is exempt from tax provided that the coupon rate is less than 8 per cent.

*Source: MoUD*
Table 31.4: Tax-free municipal bond issues

<table>
<thead>
<tr>
<th>City</th>
<th>Amt (Rs crore)</th>
<th>Year</th>
<th>Int. rate</th>
<th>Escrow Purpose</th>
<th>Purpose</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmedabad</td>
<td>100</td>
<td>2001–02</td>
<td>9%</td>
<td>Property taxes of two zones</td>
<td>Road constrn &amp; widening</td>
<td>AA</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>82.5</td>
<td>2002–03</td>
<td>8.50%</td>
<td>Taxes on advertising, profession &amp; non-residential prop</td>
<td>WS &amp; S projects</td>
<td>AA+</td>
</tr>
<tr>
<td>Nashik</td>
<td>50</td>
<td>2002–03</td>
<td>7.5</td>
<td>Property tax &amp; octroi</td>
<td>Water &amp; sewerage</td>
<td>AA</td>
</tr>
<tr>
<td>Visakha-</td>
<td>50</td>
<td>2003–04</td>
<td>5.2%</td>
<td>Property taxes &amp; revenue from WS and drainage</td>
<td>WS projects</td>
<td>AA</td>
</tr>
<tr>
<td>patnam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyderabad</td>
<td>50</td>
<td>2003–04</td>
<td></td>
<td>Drinking water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>58</td>
<td>2003–04</td>
<td>6.4%</td>
<td>Revenues from octroi and property tax</td>
<td>WS, storm water drainage, roads, bridges and flyovers</td>
<td>A+</td>
</tr>
<tr>
<td>Chennai</td>
<td>42</td>
<td>2003–04</td>
<td>5.20%</td>
<td>WS &amp; sewerage charges</td>
<td>Water supply</td>
<td>AA</td>
</tr>
<tr>
<td>Chennai</td>
<td>50</td>
<td>2005</td>
<td></td>
<td>Water supply</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chennai</td>
<td>45.8</td>
<td>2005</td>
<td>5.38%</td>
<td>Property tax receivables</td>
<td>Roads infrastructure</td>
<td>AA</td>
</tr>
<tr>
<td>Ahmedabad</td>
<td>100</td>
<td>2005</td>
<td>6%</td>
<td>Mortgage of land plots, trust &amp; retention account with bank</td>
<td>Roads &amp; water supply</td>
<td>A+</td>
</tr>
<tr>
<td>Nagpur</td>
<td>21.2</td>
<td>2006–07</td>
<td>7.75–7.9%</td>
<td>WS project</td>
<td></td>
<td>AA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>649.5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The majority of the funds raised via municipal bonds have been utilized to finance urban water supply and sewerage projects followed by urban road projects. Altogether, some Rs 1100 crore has been raised through individual ULB bonds in over a decade. This is, actually, an insignificant amount considering the size of the government bond market or even the requirements of ULBs. Almost all of these were privately placed with banks and institutional investors. The tenor was generally 7 years or less, still far from the desired long-term finance requirements of most
urban infrastructure. It is noteworthy that almost all issues were without a government guarantee. However, they relied largely on escrowing of revenues which was significant in the case of many ULBs. Almost 50 per cent of their total revenue was being used as collateral for a single issue (Ghoodke). Clearly, this would impact the ULBs’ flexibility to finance other projects.

To attract investments into municipal bonds from the capital markets, the ULBs must have them rated by a recognized rating agency. About 58 ULBs/pooled bodies so far have either been individually rated (corporate credit rating) or had their bonds rated by various rating agencies such as FITCH, CRISIL, ICRA and CARE. Of these, 37 MCs are investment grade, but only 12 of them have raised funds via bond issues (see Annexure Table 31.8 for MC ratings). The larger and more efficient municipalities especially have managed to get investment grade rating.

**Assistance to smaller municipalities through pooled financing mechanisms**

Most of the municipal corporations, especially the small and medium-sized ones, lack the requisite creditworthiness and expertise to access the capital market on their own. Moreover, the transactions costs may be prohibitively high for small size issues. Pooled financing enables a number of ULBs to borrow under one umbrella and avail the benefits of economies of scale and credit enhancement, thereby giving them access to the capital market and at lower cost. Pooled financing has been successfully used in several countries and can constitute a significant means of financing of smaller municipalities (see Box 31.6).

**Box 31.6: Pooled financing in Sweden**

Municipalities in Europe possess the right to engage in collective, inter-municipal initiatives. On this basis, Swedish municipalities in 1986 established the Kommuninvest Corporation, an association of ten municipalities and the Orebro County Council, which enables them to raise funds collectively from the capital markets just like a pooled financing mechanism.

Some of the other key features are:

- Its good financial health is strengthened by the municipalities’ right to levy taxes, a constitutionally guaranteed right because of which it enjoys a AAA rating.
- All Swedish municipalities can join the association as members.
- Lending terms are the same for all municipalities, irrespective of loan size.
- Kommuninvest raises funds through bond issues on the European and Japanese capital markets.
- About 35 per cent of total municipal borrowings are funded via Kommuninvest.
- Kommuninvest’s co-operative nature also helps in keeping overheads low.

*Source: Kommuninvest; Serageldin et al. UN–HABITAT (2008)*
In India, there have been two pooled municipal bond issues so far, both of which were structured and supported by the USAID (see Table 31.5).

Table 31.5: Pooled bond issues

<table>
<thead>
<tr>
<th>State</th>
<th>Amt (Rs cr.)</th>
<th>Year</th>
<th>Int. rate</th>
<th>Escrow</th>
<th>Purpose</th>
<th>Tenure</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tamil Nadu</td>
<td>32</td>
<td>2002</td>
<td>9.2%</td>
<td>Municipal revenues</td>
<td>WS &amp; S projects</td>
<td>15 yrs</td>
<td>LAA</td>
</tr>
<tr>
<td>Karnataka</td>
<td>100</td>
<td>2005</td>
<td>5.95%</td>
<td>Project receivables</td>
<td>WS &amp; S projects</td>
<td>15 yrs</td>
<td>LAA</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>132</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Both of the above issues were partially guaranteed (to the extent of 50 per cent of the principal in each case) by USAID.

The first one, promoted by the Tamil Nadu Urban Development Fund (TNUDF), has been cited internationally as a successful innovative financing mechanism. The TNUDF and state government set up the Water and Sanitation Pooled Fund (WSPF), a trust, to issue the bonds of 14 municipalities. While the bonds were unsecured, a multi-layered credit enhancement mechanism was set up:

- First, escrow accounts funded by municipal revenues: the ULBs were to transfer payments into escrow accounts. If the payments were insufficient, the WSPF could withdraw funds from ULB bank accounts where tax collections are remitted and/or directly intercept state transfer payments.
- The second charge was the creation of a state-funded Bond Service Fund (BSF), with a reserve fund of Rs 6.9 crore (equal to about one and a half times annual debt service). This fund would have liquid securities held by WSPF.
- The third level of security was a USAID guarantee of 50 per cent of the principal of bonds to replenish the BSF if needed.

The second, the Karnataka Water and Sanitation Pooled Fund (KWSPF) Trust, issued a pooled bond for 8 ULBs around Bangalore, with a similar three-tier credit enhancement structure with Rs 25.5 crore in the BSF.

Subsequently, the Govt of India set up a Pooled Finance Development Fund (PFDF) Scheme in order to assist ULBs tap capital market funds for urban infrastructure in all states (see Box 31.7). The objective of this scheme is to support state initiatives to establish pooled financing structures, provide technical support and credit enhancements and leverage urban reforms. The cost of funds for ULBs is lowered by providing credit enhancement grants to State Pooled Finance Entities (SPFE) for accessing capital markets through (pooled financing) bonds on behalf of the ULBs.
The interest earned on these bonds is exempt from tax, provided they are in accordance with the government guidelines (see Box 31.7). State Pooled Finance Entities have been set up in Andhra Pradesh, Karnataka, Nagaland, Orissa, Rajasthan, Tamil Nadu, Kerala and Assam for implementation of the scheme. However, these have not yet been operationalised. The SPFE of Tamil Nadu, viz. WSPF, received central assistance of Rs 5.66 crore towards the CREF and project development cost. Although municipalities in India have not used this source to its potential, it could play an important role in future urban infrastructure financing.

**Box 31.7: Key features of GOI Pooled Finance Development Scheme**

The Pooled Finance Development Fund Scheme (PFDS) was approved by the government in September 2006. As per the scheme, each state/union territory is required to create an entity for its execution—a State Pooled Finance Entity (SPFE). The primary objective is to provide credit enhancement to the ULBs and assist them in raising funds from the capital markets. In addition, the SPFEs are required to perform other vital functions:

- **Creation of a trust or a special purpose vehicle (SPV)**
  This trust/SPV is required to issue the debt securities on behalf of the ULBs.

- **Identification of project**
  The SPFE identifies the project based on its priority and viability.

- **Play a vital role in project development**
  The SPFE is supposed to assist in the implementation of the project and monitor its progress on a constant basis. It must ensure that the funds are being utilized for the specified project or set of projects identified and the possession of land is with the issuer. It must also keep a check on meeting the timelines.

- **Creation of an escrow account**
  The issuer must create an escrow account that would be monitored by an appointed independent trustee like a nationalized bank or a domestic financial institution.

- **Project appraisal**
  The project must be appraised by a credit rating agency.

- **Set up and manage Credit Rating Enhancement Fund (CREF)**
  A CREF is to be set up by the central government. This fund provides additional security to the investors apart from the escrow mechanism and state financial assistance to the ULBs. Of the funds available with the central government for the PFDS, 5 per cent are to be utilized for project development purposes and 95 per cent to be contributed to the CREF.

*Source: MoUD*
Why have municipal bonds not taken off in a significant way?

- **High risk**: In India, investors tend to shy away from deploying their funds into municipal paper. This may be attributed to several factors such as high project execution risks, poor cost recovery, inefficiency in municipal services, and corruption of the ULBs.
- **Interest rate cap**: The interest rate cap of 8 per cent on tax-free bonds makes such bonds unattractive when interest rates rise.
- **Low retail demand**: Retail investors do not find them an attractive investment option since alternatives like PPF offer similar returns with much greater security.
- **Limited institutional demand**: On the institutional side, banks hesitate to invest as these bonds do not possess SLR status.
- **Absence of a secondary market**: Investors find it extremely difficult to liquidate these bonds due to the absence of a developed bond market.
- **Expensive**: The average size of municipal bond issues so far has been about Rs 60 crore per issue, which is not very large. Municipalities coming out with relatively small size issues find it costly to raise funds via this route.
- **Few creditworthy issuers and viable projects**: Most of the ULBs that actually need funding cannot issue bonds since their ratings are poor. In addition, the number of financially viable projects is not very large.
- **Cash flow timing cannot be controlled by municipality**: In the past, projects have not been ready to use the funds mobilized, leading in some cases to negative carry.
- **Accounting and auditing practices of ULBs need improvement**: Greater transparency and clarity in the accounts would reassure investors about the accounting systems as well as help make decisions on investments.

What can be done?

The main barrier in ULBs raising finance is their weak financial base and their inability to recover costs of service provision. So, unless major strides are made in getting the ULBs on a sound financial footing, there is little hope of getting market-based finance. Even though in practice ULBs may not currently have the kind of autonomy that is envisaged in the seventy-fourth CAA, they certainly have scope to more fully exploit their tax potential by improving collections through better records and enforcement. At the same time, state governments need to assure the ULBs of a significant and predictable revenue-sharing arrangement. On the strength of such steady flows, the ULBs could obtain other sources of financing.
There is wide diversity in the ULBs—a few have brought in professional management and are run efficiently but the vast majority are weak—financially, technically and managerially. A differentiated system for dealing with the ULBs at different stages of maturity is therefore necessary. For the larger, more progressive ULBs, bonds could form a significant source of their capital investment financing as they would be a less expensive way of raising resources than commercial bank lending. Even municipal corporations with investment grade rating will need credit enhancement though, at least till such time that they can demonstrate a solid track record. However, municipal bonds cannot be a major source of finance at this stage of financial development of the sector as well as of ULBs.

Some suggestions to foster the muni-bond market:

- Remove/raise the cap on the interest rate on tax-free bonds. It could be linked to a benchmark that is revised from time to time. The SBI PLR has been suggested as a possible benchmark.
- The government could explore the possibility of using IIFCL in subscribing to such bond issues or in case some investor wishes to liquidate their holdings prematurely.
- The regulatory mechanism for securities exchange is well set up in India with the presence of the Securities and Exchange Board of India that regulates the markets. On similar lines, an institution could be set up to regulate all municipal bond issues. In the United States, the Municipal Securities Regulatory Board regulates municipal bond issues. Such an institution would create greater transparency and standardization in the municipal bond market.
- Mandatory detailed disclosure requirements, irrespective of the tenure or mode of issue (public offer or private placement). This will also help to induce accounting and auditing reforms.

For the large and possibly even mid-sized ULBs, commercial bank borrowing should be pursued. There is currently a lacuna in bank lending. Commercial banks need to be incentivized to lend to creditworthy ULBs, since the banks may be too risk-averse. Unless they start lending, though, a track record of the ULBs cannot be built up. Financial safeguards can be built in for the security of commercial banks, such as voluntary intercept guarantees to sequester inter-governmental inflows (grants or revenue-sharing) or local revenues such as property tax or project-specific revenue streams. Commercial banks could get access to refinancing, as was done in the case of the successful MDFs in Colombia and the Czech Republic. In this case, the commercial bank takes the full credit risk but has access to long-term finance. Banks could also have more liquid collateral (than real estate) by requiring municipal borrowers to maintain their ordinary business accounts with them and grant them the right to automatically debit loan payments due.
Finally, for the ULBs that are too weak, there needs to be substantial hand-holding and capacity-building. This will have to be done through government resources, both central and state. State nodal agencies may be needed to help develop expertise of ULBs, for which there are already guidelines—for the Pooled Finance Development Fund Scheme (Box 31.7).

A National Urban Infrastructure Fund (NUIF) is proposed to be set up as a Trust with World Bank assistance to provide a source of funding for bankable projects/schemes of ULBs. NUIF will serve as an SPV which will create ‘necessary comfort level amongst financial institutions and commercial banks with respect to repayments by avoiding direct exposure of ULBs to them.’ Its goal would also be to build capacities in ULBs to develop bankable projects.

If appropriately designed, this is a model that can be considered to jump-start lending to ULBs. The benefit of this approach is that it helps ULBs build capacity in project development and execution as well as financial management, and learn about credit markets in the initial stages of their borrowing experience. There are several risks to setting up such an institution (as discussed in the section on Special Funds), but there are few options if the enormous needs of the urban sector are to be met.

3. PPPs TO FINANCE URBAN INFRASTRUCTURE

Limited role of private finance in core urban sector

PPP approaches are arrayed across a spectrum of relative risk and responsibility shared between the public and private sectors. At one extreme, the private sector assumes all responsibility for financing, constructing, operating and maintaining assets, together with all associated risks. At the other end, the public sector assumes all of these responsibilities. The vast majority of PPP approaches fall in the middle of the spectrum, with the risks (construction, regulatory, revenue and financing) and responsibilities (with regard to operations, maintenance, rehabilitation and expansion) shared between the public sector and its private partners.

The purpose of PPPs could be to finance public services or to enhance operational efficiency in the provisioning of public services, or a combination of the two. International experience in developed and developing countries indicates that the role of the private sector as the source of finance for core urban infrastructure (water supply and sanitation (WSS), solid waste management (SWM), drainage, and urban transportation) requiring large capital investment has remained limited. The reason for the lack of interest by the private sector in such projects with long payoff periods (such as WSS capacity expansion, urban transport like metro rail projects) is because of the tendency to transfer revenue risk to the private sector often without an appropriate tariff structure which allows full cost recovery. Many PPP projects in
the urban sector have undergone renegotiation during their implementation. There were several cases in Latin America where water contracts were negotiated on tight contractual terms, but ended up being renegotiated, many of them at the request of the operator who faced substantial revenue risk due to the practice of price cap regulations. Moreover, when international companies are involved they need to bear the currency risk as well. Experience from PPP projects during the late 1990s indicates that after the Asian financial crisis, involvement of international water companies in BOT projects reduced substantially because the currency risk became insurmountable for these companies.

There are, however, cases in which the public sector has formed a joint venture with the private sector and successfully mobilized finance for large urban infrastructure projects. Examples are in the upgradation of existing water supply and sanitation systems (e.g. upgradation and operation of water systems in Bucharest, Scotland and Berlin) solid waste management and construction of landfill site in Hungary, airports (e.g. international airport Hamburg), sports complex (e.g. The National Stadium for Beijing Olympics, 2008). The extent of equity contribution by the public sector ranged from 16 per cent in the case of the water system in Bucharest to 51 per cent in the case of the water system in Scotland. A common factor across the JV models is that the controlling board of the JV includes public and private parties. However, the structure for profit sharing varies across these projects. In the case of the Bucharest water system and also the SWM project in Hungary, the public sector received a share of profits in proportion to its equity contribution whereas in the case of the Scottish or Berlin water projects, profits accrued only to the private sector.

In India, several PPPs have been structured in the urban sector but in terms of the capital cost these are small projects of not more than Rs 20–25 crore. Examples are solid waste management (in Delhi, Bangalore, Chennai, Jodhpur, Rajkot), urban transport (e.g. bus terminus in Dehradun, Amritsar; Indore bus transport system; Andheri–Versova–Ghatkopar metro corridor in Mumbai), urban renewal and regeneration (office-building re-development for Municipal Corporation of Delhi, relocation and re-development of prisons in Surat, Baroda, Jaipur), urban roads and bridges (Thiruvananthapuram city roads).

A number of BOT-type PPP projects were initiated in the WSS sector (bulk water treatment and distribution in Pune, Hyderabad, Goa, Bangalore, Delhi, Sangli) but many of them were abandoned. A review of 29 projects in 2004 in the WSS sector indicates that 13 were abandoned. Several factors contributed to their abandonment such as lack of clarity in scope and framework for PPP, absence of rigorous contract, weak policy and regulatory support, inadequate capacity of stakeholders, and lack of strong leadership to drive the project. Another factor that
has constrained the private sector interests in the WSS projects is the lack of availability of baseline data. Hence often when the private sector conceives a WSS project it bases it on the assumption that no project assets exist and everything new would have to be constructed. When it comes to core urban infrastructure, the revenue risk for the private sector is substantial because the tariff levels are extremely low and the coverage is limited. For instance, in case of water supply all supplied water is not metered and the present level of tariffs are not even able to cover O&M expenses. Consumer satisfaction with the quality and quantity of water supplied is very poor, which leads to resistance to tariff increases. Based on 2005–06 data, none of the 20 JNNURM cities in a study benchmarking water utilities had 24 x 7 water supply. The average water availability was 4.3 hours with a range from 0.3 hours per day in Rajkot to 12 hours per day in Chandigarh.11 The situation is no better in most cities today.

As a result, the private sector has chosen to lower its risk engagement with municipalities by being involved through lease or management contracts where their investment commitment is low. Examples of such projects can be seen in the distribution of water supply in cities like Hubli–Dharwad, Belgaum, Gulburga, Latur, Nagpur or collection and transportation of solid waste in cities like Delhi and Chennai. These projects either have the potential for significant operational efficiency gains, which reduces their revenue risk (as in Latur), or involve payment for services by the local bodies (as Hubli–Dharwad, Belgaum and Gulburga), which eliminates revenue risk altogether.

Hence, the funding mechanism for capital investment in urban infrastructure has largely depended on government sources, be it budgetary allocation, debt against government guarantees, mandatory financing by institutions such as HUDCO and LIC, or local government funding. Some attempts are being made to convert urban service projects into bankable projects to get commercial bank loans. However, even in such projects the lending is secured against government guarantees. And unfortunately, in such lending there is practically no due diligence on the project financials because of the government guarantee.

**How can BOT-type projects be structured to attract private financing?**

The extent of commercialization varies across different urban infrastructure sectors and this poses a challenge for structuring PPPs. Depending upon the extent to which there is a potential for generation of revenues through user charges, the extent to which user charges could cover the return on investment and whether there is public sector equity or subsidy in the project, five financing structures for urban PPP projects emerge. The conceptual framework for private sector financing of urban infrastructure through PPPs is presented in Figure 31.1. At one end of the spectrum, full cost recovery is possible through user fee without the need for any government
guarantees or subsidies to incentivise private sector investment. However, often user fees cannot be raised to full cost recovery levels; so if there is potential for supplementing revenues through other sources such as advertising or lease rentals from commercial space, projects could become viable for the private sector. In such cases, project cash flows from user fee in combination with alternative revenue sources provide a sufficient return on investment. Examples of such projects are parking or bus terminus development. On the other hand, in most core urban sector projects such as water supply, sanitation, education and healthcare (particularly for poor), full cost recovery even in combination with project-related alternative sources of revenue is not possible or the revenue risks are too high for private sector interest. Such projects require government financial support. The government support could be on the capital side in the form of capital grants, equity (in a public–private JV),12 or on the revenue side in the form of revenue guarantees and annuities or a combination of capital and revenue support. Annuity is a structure in which a public entity provides an agreed revenue stream over a fixed period in return for an initial investment. Government support could also be in the form of a minimum revenue guarantee structure, if user charges fall short of the minimum with the incentive that any collection above the minimum accrues to the private partner (based on meeting performance benchmarks).

Figure 31.1: Alternative financing options
The risks (construction cost, operation and revenue) for the private sector and the revenues to the government which are associated with each of these structures are presented in Figure 31.1. In all cases, the project structuring and land-related risks rest with the public sector.

There is no clear-cut division on which urban sub-sectors (urban transport, water supply and sanitation, education, healthcare) could be categorized under which structure of Figure 31.1, but based on the financing needs and revenue generating potential of different urban infrastructure projects, it is possible to place the various projects in different conceptual structures shown in Figure 31.1.

**Urban public transportation projects**

The major types of urban public transportation projects include traffic improvement projects (for example, parking structures, bus stops, road information systems and junction improvements); road safety projects (for example, signage and street lighting); mass transportation systems (for example, MRTS, BRTS, city bus service and intermodal transfer facilities); pedestrian facilities (for example, footpaths and pedestrian crossing facilities); and terminals (for example, rail and bus terminals).

Projects with modest capital requirements and the ability to charge user fees and generate revenues from commercial rents or advertisements have successfully attracted private funding. These projects include bus terminals, traffic improvement projects, pedestrian facilities and road safety projects. The more capital-intensive mass transportation projects like the MRTS and BRTS need significant capital and operating subsidies and a supporting regulatory environment in order to attract private sector funds.

Bus terminal projects fall under the first structure for PPP projects identified in Figure 31.1, viz. projects where user fees and other commercial revenues are adequate to recover project costs. Bus terminals in Dehradun and Amritsar were developed under such a model. The private sector was responsible for constructing the terminals, and the return on their investment was through the adda fee (the fee bus operators pay to use the terminal), supplemented by advertising revenue and rental revenue from commercial property developed alongside the bus terminal (see Box 31.8). Since bus terminals are often located in the heart of the city where land values and commercial lease rentals are high, there are substantial opportunities for using the commercial potential of alternative land use to pay for the project costs. Typical project cost (excluding land) of such projects is around Rs 20 crore (cost of Amritsar Bus Terminal development was Rs 21.13 crore and the cost of the Dehradun bus terminal—comprising the bus terminal and a commercial mall—was Rs 28.4 crore).
The Punjab Infrastructure Development Board (PIDB), a nodal state government agency for infrastructure development and PPP, invited bids for the renovation and expansion of the existing Amritsar Inter-city Bus Terminal on a PPP basis. Through a competitive bidding process, an SPV of Rohan and Rajdeep groups, M/s Rohan and Rajdeep Infrastructure Pvt. Ltd (RRIPL), was awarded the project on a BOT basis. The bid parameter for the project was the lowest-quoted concession period. RRIPL bid was the lowest at 11 years and 5 months (including the construction period). RRIPL was to design, finance, construct and operate the inter-city bus terminal, including passenger amenities, shops and public conveniences. RRIPL would get revenues from parking charges from the halting buses (adda fee), supplemented by lease rentals of shops, kiosks and offices, and advertisement hoarding rental charges. The entire revenue risk was to be borne by the private sector operator. The land was provided by the Department of Transport for the entire concession period at a lease payment of Rs 50,000 per month. The initial estimated cost of the project was Rs 19.13 crore of which, Rs 7.13 crore was contributed by the sponsors of the SPV as equity capital and debt of Rs 12 crore was raised through IDFC. There were cost overruns of Rs 2.01 crore, which were funded by the promoters. During appraisal of the loan application from the SPV, IDFC appointed an independent traffic consultant to verify the bus traffic demand to validate the adda fee component of the revenue stream. The survey results indicated that 95 per cent of the bus owners felt that the terminal required improvement and about 88 per cent of the bus drivers overall were willing to pay the proposed fees if the terminal facilities were improved.

The project is operational since November 2005. A review of the performance of the project indicates that the actual revenues have significantly surpassed the projected revenues for both FY 07 and FY 08 in all revenue-generating segments such as toll collection, lease rents and hoarding rentals. The first 3 quarters of FY 09 indicate that toll collection forms about 68 per cent of the revenue, lease rents form 23 per cent and the rest 9 per cent comes in from hoarding rentals.

Following Amritsar, Jalandhar and Ludhiana were two other projects that have been completed through PPP in Punjab.

Source: IDFC

The potential for replicability of such projects is huge. According to the 2001 census, there are 427 Class I towns (towns with population greater than 100,000) in India. A typical project size of Rs 15 crore with private participation for the construction/modernization of bus terminals in India would translate into an investment of approximately Rs 6,400 crore by the private sector. However, it must be noted that terminals that are to be developed in areas where commercial rents are low (for example areas at the periphery of an urban area) are less likely to attract private sector interest as the revenue from commercial rents and advertising may not be
enough to make these terminals financially viable to the private sector. Further, the technical capacity of the ULBs to identify projects and then put together detailed project plan need to be strengthened.

Other transportation projects that have modest capital requirements and could fall under the first structure of PPP in Figure 31.1 include parking structures, bus stops, traffic improvement projects such as signage and street lighting, and pedestrian facilities. The parking charges (supplemented by the revenues from commercial properties, if required) pay for the cost of parking structures. Although there may not be direct user charges for most of the other types of projects, most of their costs can be recovered through advertising revenues. For example, pedestrian facilities like the foot overbridge in Hyderabad are being built by the private sector. Revenues from advertisements on the wall of the bridge are funding the project. Similarly, advertising on spaces alongside signages and street lighting could fetch revenues to fund these projects.

The situation is somewhat different with the mass transportation systems, although even in such cases there is a place for private finance. Among the three most common urban mass transportation projects—MRTS, BRTS and city bus service—MRTS and BRTS are very capital-intensive, and the tariffs may not be sufficient to cover the capital costs. The public sector may need to provide viability gap funding (VGF) for capital infrastructure. However the quantum of the VGF could be reduced if revenues from land and/or real estate are harnessed. These projects fall under the second structure for PPP (Figure 31.1) based on a combination of initial capital grant and revenue stream comprising user charges. Commercial rents and advertisement revenues are also a significant funding source for these projects.

The airport express link project of Delhi METRO provides a good PPP model for the capital-intensive mass transportation projects. Delhi Metro Rail Corporation (DMRC) is developing an airport express line connecting Connaught Place with the domestic and international airports, and would build the fixed infrastructure. The private sector would provide the rolling stock and operate the system for 30 years. The cost of the fixed infrastructure and the rolling stock is almost in equal proportions.

The third urban mass transportation system—the city bus service—though not as capital-intensive as MRTS and BRTS, may need capital subsidies in order to attract private funding. The Indore City Bus Service which became operational in 2006 is an example in which the public sector provided the capital infrastructure and the private sector provided the buses, which it operates (see Box 31.9). The user charges (fare-box revenue) and advertisement revenues cover the project’s capital and O&M costs. However, only the commercially lucrative routes have been bid out in Indore. This poses a challenge, because for any city bus transportation to function as a
complete system, all the routes (even the commercially unviable) need to be operational. Private sector interest in these routes can be generated in two ways. First, private investment in financially non-lucrative routes can be incentivized by bundling these routes with financially lucrative routes. Little or no restrictions placed on the upside revenue potential coupled with minimum revenue guarantees would provide additional incentives. Alternatively, the public sector can provide a direct subsidy to the private sector operators plying on these routes.

**Box 31.9: Indore City Bus Service**

The city of Indore did not have a public transportation system and much of the intra-city transport was with private minibuses, tempos, mini-vans, and auto-rickshaws. There was a need for an efficient, safe and affordable public transportation system. A special purpose vehicle, Indore City Transport Services Ltd (ICTSL), was set up by the Indore Municipal Corporation, Indore Development Authority and the district administration to operate and manage the public transport system. ICTSL implemented the Indore city bus service as PPP.

ICTSL, as concessioning authority, identified the routes for operations of the buses and then initiated a competitive bidding process following which it appointed four concessionaires for a period of five years for different zones within the city. The project has been structured such that the investment in the urban bus transport system is shared between ICTSL and private operators. While ICTSL undertook the investment in common infrastructure like bus stops, bus terminals, automatic fare collection system and office space, the concessionaires were responsible for the investment in the rolling stock. The investment made by concessionaires has been financed entirely through debt obtained from banks. As far as the O&M costs are concerned, the responsibility of these costs rests with the concessionaire.

The revenue stream of the concessionaire under this service comprises fares (daily fares, and daily and monthly passes based on fares prescribed by the ICTSL) and advertisement revenues (from advertisements at bus stops and public information system display screens on buses). The concessionaire retains 60 per cent of the advertisement revenue, 80 per cent of pass revenue and the entire daily fare collection, passing on the rest to ICTSL. Advertisement revenues account for nearly 25 per cent of the income earned by each bus running under this service. In addition to a share in advertising revenue and revenue generated through passes, the concessionaires also pay a monthly premium to ICTSL for operating the service. The concessionaires are required to comply with the performance and maintenance standards issued by the ICTSL. The key risks in this concession, viz. traffic risk, revenue risk and financing risk have been assigned to the concessionaires. The construction cost risk is however, shared by the public and private sectors.

Among all the urban public transportation projects, the mass transportation projects require the bulk of private funding. However, no regulatory framework exists for encouraging PPP in the mass transportation system. Therefore, we suggest that the following should be considered while developing a PPP policy framework for mass transportation systems:

a. Pricing: Conceptually two pricing strategies can be worked out. Each has its up and down side. In the first strategy, the tariffs are set so that they are competitive with the operating cost of non-mass transportation modes (which for many cities is the two-wheeler). While this pricing strategy would ensure ridership for the mass transportation system, the tariffs need to be set very low which means that the transit system is generally of low quality and financially unviable even at the operating level. The second strategy is more long-term. Here a very high quality transit system is developed (for example as in Singapore) which is also priced higher. Once the system is well-developed and up and running, the costs of using alternate private transport modes are raised through regulation (such as increasing taxes on cars and congestion pricing) to make the transit system the preferred mode. The downside to this strategy is that high capital and operating subsidies would be required in the short- to medium-term till the time transit is the preferred transportation mode for the population. The upside to this strategy is the opportunity to develop and maintain a very high quality transit system. The political acceptability of high tariffs is also an important issue as the tariffs may be unaffordable to the poor. Targeted subsidies can be provided to the poor to address this concern. For example, the system could have two tiers of coaches (like the Indian Railways), with the economy class coach fare subsidized by the other class of coach. Further, students, elderly, and other special groups could avail themselves of subsidized fares.

b. Bundling of real estate with transit projects: Several transit projects bundle real estate with the infrastructure project by giving land or development rights to the private sector partners to mitigate the private sector’s investment risk. However this strategy could be fraught with risk, especially for large urban mass transportation projects like MRTS. The real estate sector is cyclical and has a short- to medium-term focus. Additionally, the public sector runs the risk of being accused of giving away land and/or the development rights at throw-away prices should they grant the land/development rights to the private sector at the initial stages of project development. An alternative strategy would be for the public sector to manage the real estate component of the infrastructure project separately either through development of the real estate through a JV with private partners that specialize in developing real estate; or
by selling the land/development rights in an incremental manner so that it captures the full gain in the value of the land/real estate.

c. Instead of one-off bids, the entire mass transportation plan needs to be laid out to show interested private investors the entire project pipeline.

d. Need for a regulator: A regulator is needed to ensure safety of operation, set tariffs, ensure high level of service, level playing field for the private investors and develop arbitration policies. The regulator would need to take a comprehensive view of the transportation system and ensure that the various transportation modes (rail, bus, personal vehicles, etc.) complement each other to provide increased user accessibility.

e. The technical features (gauge length, rolling stock specifications, etc.) should be standardized. For example, in the case of Delhi METRO, DMRC decided to develop a broad gauge system, with the rationale that integration of the Delhi METRO with the national railway network would be easier if so desired at a later time. However, worldwide, METRO systems are on standard gauge (standard gauge offers many technical advantages over broad gauge). Thus the fixed and rolling infrastructure for the DMRC was priced at a very high level.

DMRC has decided to adopt standard gauge for Phase 2 of the METRO. This change, while providing more competitive options for purchasing fixed and rolling stock, raises the problem of integrating the Phase 1 with the Phase 2.

In summary, there is evidence to suggest that the private sector is able to fund small-to medium-size transportation projects where the user charges, supplemented by the commercial and advertising revenues, are adequate to fund the project. The capital-intensive mass transportation projects like MRTS or BRTS could require significant capital subsidies from the public sector in the form of VGF, or a combination of VGF and dedicated revenue streams from commercial rents and advertising. Finally, the city bus service could require public sector capital subsidies, especially for the commercially non-viable routes.

Urban roads

Difficulty in identifying the users of urban roads makes imposition of user charges difficult. Therefore, the toll-based PPP model which is very popular for inter-state roads and highways is difficult to apply to urban roads (except in some specific cases like urban bridges, such as Bandra–Worli Sealink, where the user identification is easy). Where tolling is not possible or is insufficient to cover the investment, annuity structures or shadow user charges (whereby the public sector pays ‘tolls’ to the private partner based on the asset availability to users and on service levels such as the condition of the roads) could be used. These payments to the private sector
are conditioned on performance. Such projects would fall in the fifth conceptual structure presented in Figure 31.1. For most city roads PPP would take a form where the private sector bears the construction cost and operational risk but the revenue risk lies with the public sector (for example, Thiruvananthapuram city roads).

A few other options for financing urban roads can be considered in the future to lower the annuity payments and shadow user charges. In the first option, part of the cess on petrol and diesel could be earmarked for urban roads. At present, urban roads do not get any part of the Rs 2 per litre cess (internationally known as Gas Tax) that is levied on petrol and diesel by the central government. We recommend that the urban roads should get a part of this cess, and if needed, the total cess should be increased to ensure that the urban roads get sufficient revenues to lower the annuity requirements. Further, the city governments should be allowed to levy additional cess on petrol and diesel. Taking a cue from progressive countries like Canada, a part of the central and/or the local cess can go towards funding public transportation. Earmarking a part of the cess for urban transportation projects meets several objectives. First, it provides the financially distressed ULBs valuable funds. Second, the cess ensures that those who drive cars more pay a larger share of the cost of funding urban roads. Third, cess is socially progressive as part of the cess revenue would go towards funding public transportation, essentially meaning that the users of private transportation modes would subsidize the more sustainable public transportation.

The second option is based on the premise that, the property owners that benefit from roads should pay their fair share of the road project cost. The roads provide accessibility to the abutting properties, which leads to an increase in property value. This increase in property value could be used to fund urban road projects by dedicating a part of the property taxes payable by the owners of adjoining properties for such projects. However, care should be taken to compensate the property owner for the disamenity-effects (for example, increased congestion and pollution, and loss of panoramic views) that some road projects could have, by giving them a discount on the amount of money payable by them to the government for the road improvements.

**Water and sanitation, solid waste**

A water supply and sanitation project is highly capital-intensive. For example, a water supply project involves pumping water at source, setting up water treatment plants, laying bulk water transmission lines, laying water distribution network and supplying water to individual customers and industries. Similarly the disposal of waste water also requires laying sewerage pipes and facilities to treat the waste water before it is disposed. Tariffs are insufficient to cover the cost of investment. The potential for other revenue generation (such as advertisement revenue) for WSS projects has not
yet been established. If, however, the whole value chain is unbundled, projects, in the nature of say improving operational efficiency for delivery of WSS services, could be carved out which require relatively low capital investment from the private sector but have the potential to be paid for through tariffs from users or annuity payment by the public sector. A number of such projects have come up recently in the WSS sector in India. Depending on the project and the extent of the possibility of unbundling various activities involved in water and sanitation, a variety of PPP models could be structured based on a combination of capital grant/subsidies, user charges and government guarantees to enable the ULBs to raise capital from the market.

**Water projects**

Water projects in which the consumer base is largely industrial or institutional can be readily commercialized. In the case of the Salt Lake water supply project, which is a water distribution and sewerage system project being developed on a BOT basis for a newly developed industrial township, tariffs that will be charged to industrial and institutional users are higher than for households. The project, which is expected to be completed in March 2010, still required a grant through JNNURM funding to make it viable. Such BOT water supply projects which require initial capital grant would fall under structure 2 of Figure 31.1.

Another BOT water supply project, the Tirupur water supply project, which is for the supply of water to industrial consumers, uses a public–private JV model to finance the capital. The capital cost for the project has been financed by a public–private JV and the consumers pay user charges for consumption of water. For this project, a special purpose vehicle (SPV) was set up as a public limited company, with equity from the Government of Tamil Nadu, Tamil Nadu Corporation for Industrial Infrastructure Development (TACID), Tirupur Exporters Association (TEA) and Infrastructure Leasing and Financial Services (IL&FS). The SPV was awarded a 30-year concession to implement the project. Such BOT projects involving equity from public and private sectors and user charges would fall under structure 3 of Figure 31.1.

Another set of projects that have emerged in the water supply sector are those which leverage private sector strengths to improve operational efficiency. In some ULBs, the O&M of water distribution has been separated and structured as a PPP project. These projects require the private sector to distribute continuous water, increase the coverage of water distribution and improve tariff collection efficiency. The private sector operates the water distribution network (involving giving new connections, maintaining the distribution network, metering, collecting tariffs and providing customer care) and gets revenue either through collection of tariffs or through annuity payments by the ULBs. The investment in augmenting water supply facilities is done by the public sector.
Box 31.10: Karnataka Urban Water Supply Improvement Project

The Government of Karnataka, with assistance from the World Bank, launched the Karnataka Urban Water Supply Improvement Project (KUWASIP) in 2005 to demonstrate, in 5 select zones in 3 cities (Belgaum, Gulbarga and the twin cities of Hubli-Dharwad), an efficient and commercially viable 24 x 7 urban water supply system through public private partnership (PPP). The cost of the project was Rs 237 crore which included investments to improve bulk water supply, establish 24 x 7 water supply in these zones and contract a private operator to construct-operate-manage the UWS system for two years, after a preparatory phase of 18 months.

Selected cities suffered erratic and limited water supply (for example, 7 hours/week in Dharwad), of dubious quality, partial coverage, high losses and poor O&M. The demo zones were selected such that they represent the socio-economic mix of the city, with at least ten per cent of the city connections, and the water distribution system to these zones is hydraulically isolable from the rest of the city. Thus, 10 wards in Belgaum, 11 wards in Gulbarga and 8 wards in Hubli-Dharwad were identified as demo zones covering 2.2 lakh people and 30 per cent of households from the lower income stratum.

Central to the project is a performance linked fee based management contract with an OC, a private entity, for distribution system rehabilitation and service provision in the demo zones. Following international competitive bidding which required bidders to specify the management fee, the contract was awarded to a joint venture of Compagnie Generale Des Eaux (CGE) and Veolia and the demo zones were handed over in 2005. According to the management contract, 60 per cent of total remuneration is a quarterly fixed payment and the remaining 40 per cent linked to achieving performance targets in the preparatory and O&M periods. The OC can also earn a bonus upto Rs 5.60 crore for bettering performance targets or pay a maximum penalty of 10 per cent of remuneration for failure.

The priority investment to improve bulk water supply was made by the Karnataka Urban Water Supply and Drainage Board (KUWSDB) and the OC was responsible for the upgradation of the distribution network including installation of meters, tariff collection system, etc. The tariff structure was rationalized by introducing volumetric tariffs. However, to protect the interest of low income households, low tariffs were introduced for basic consumption of water. The project faced initial apprehensions and resistance but these were overcome by involving NGOs and better educating the public about the benefits of the project.

One of the key successes is the reduction in losses from 50 per cent to 7 per cent due to improvements in the transmission and distribution network and better metering. It is commendable that despite continuous supply, the required volume of water supply has decreased. The OC has also saved around 24 per cent on civil cost of rehabilitating distribution network. The 24 x 7 supply to all connected consumers in the demo zones
is now a reality from 3 April 2008. The residents in non-demo zones have requested the ULBs to scale up the project to the entire city.

On 13 August 2009 the project was conferred the first prize in the PPP category of the National Urban Water Awards 2009 of the Ministry of Urban Development.

The success of 24 x 7 water supply through PSP in Karnataka is viewed by other states as an approach that could be adopted, as evidenced by the recent award of contracts in Latur, Mysore, Nagpur and Naya Raipur.

Source: IDFC Policy Group Quarterly No. 5

An example of O&M of water distribution is the Karnataka Urban Water Supply Improvement Project (KUWASIP—see Box 31.10). The World Bank and the government financed the capital required to improve the water facilities on a pilot basis in four cities (Hubli, Dharwad, Belgaum and Gulbarga). The private sector was involved in operating and maintaining water distribution in selected zones of three ULBs in Karnataka. The revenue structure for the private sector is performance-linked annuity payments (structure 5, Figure 31.1). In this project, no revenue risk was borne by the private sector. KUWASIP has demonstrated that continuous water could be supplied to households. On a macro level, if KUWASIP is repeated in urban India, it has the potential to generate additional revenue of around Rs 2800 crore for the ULB (assuming that 90 per cent reduction in non-revenue water could be achieved, as has been in the case of KUWASIP).

Other cities like Latur and Nagpur have also structured O&M of water distribution to households on a PPP basis. In the case of the Latur water supply project, for which the management contract was awarded to the private sector in November 2008, the private sector would even make lease payments to the public sector. The revenue risk is borne by the private sector as the revenue from the project is through collection of water tariffs. In such cases, the lease/management contract for O&M of water distribution would fall in the first structure presented in Figure 31.1.

Upstream projects, even in a PPP construct, would require government subsidies/grant. The potential to combine different types of users (industrial, institutional, households) and charge them differently, could reduce dependence on government grant/subsidies.

Sewerage projects

One of the problems with the sewerage disposal in India is that only 27 per cent of waste water is treated before it is disposed in rivers and other water bodies. There is a severe lack of capacity with regard to waste water treatment plants in the country.
However, augmenting capacity of the sewerage system is highly capital-intensive. The potential to charge users for sewerage disposal is limited to industrial or institutional users. A PPP model for the sewerage system would therefore generally require subsidies/grant. The potential for being able to levy user charges in the case of sewerage projects would reduce the dependence on grant/subsidies partly. The Salt Lake water supply and sewerage project, discussed earlier, involves collection and treatment of sewerage from institutional customers. Users are charged a combined fee for water consumption and sewerage disposal.

In other projects where levying of user charges is difficult (household sewerage collection and treatment), the revenue model for the private sector could be based on annuities as in the case of Alandur sewerage project (see Box 31.11). The Alandur sewerage project raised initial capital from the community as well, thereby reducing the dependence on government grant/subsidy.

Thus, in the case of sewerage projects, user charges or annuities on their own would not be sufficient to cover private sector investments and these projects would require capital grant of subsidies.

**Box 31.11: Alandur sewerage project**

The town of Alandur lacked a safe and hygienic system of sewerage disposal. Households either disposed the sewerage in septic tanks or holding tanks, and the municipality collected the sewerage periodically using tankers and disposed it in the low-lying areas outside the municipal limits. As a solution to this, the municipality along with the Tamil Nadu Urban Infrastructure Financial Services Ltd (TNUIFSL) decided to implement the sewerage project with the involvement of the private sector.

The project involved construction of a network of sewer pipelines and manholes, an underground drainage scheme of 120 km and a pumping house with pumping machinery on BOQ (Bill of Quantities) basis, and construction of a sewage treatment plant with a capacity of 24 million litres per day (MLD) on a BOT basis. IVRCL Infrastructures and Projects Ltd (EPC contractor) and Va Tech Wabag (O&M contractor) were selected following competitive bidding. The municipality provided the land (about 0.5 hectare) for the construction of the sewerage treatment plant and the pumping station. The private O&M contractor was appointed for 5 years for which a fixed fee would be payable.

The project cost was Rs 34 crore, which was financed through loans from TUFIDO and TNUIFSL (Rs 20 crore), grants from TUFIDO and the Government of Tamil Nadu (Rs 4 crore), deposits from the public (Rs 8 crore) and interest on deposits (Rs 2 crore). To safeguard interests of the lenders and the contractor, the terms and conditions of the loan agreement also provided for creation of an escrow account by the municipality.
In addition, to provide for any shortfall in the annuity payments, the Government of Tamil Nadu agreed to provide gap funding. The project was a unique case as it also involved public participation in financing an urban infrastructure project. Funds were mobilized by collection of one-time deposits in the form of connection charges. For this project to be replicable in other parts of the country, it would need strong political will along with active participation and commitment from the local community.


**Solid waste management**

The value chain of solid waste management comprises four activities: collection, transportation, treatment and disposal. Though it is required under the Municipal Solid Waste Act to undertake the whole chain of activities in an integrated way, the disposal part has been completely mismanaged. There are no sanitary landfill sites in the country and most often the waste is disposed without treating.

A number of PPP projects have come up in solid waste management but these do not cover the whole value chain. Many of them are for the collection and transportation of solid waste (Delhi, Chennai, Bangalore). The capital investment by the private sector in these projects is in vehicles and equipment required for the collection and transportation of waste. The private sector undertakes the collection and transportation of waste to landfill site and is paid tipping fees by the ULBs. There is usually a minimal revenue guarantee given by the ULBs to the private entity. These projects would fall under structure 4 of Figure 31.1. A risk with solid waste collection and transportation projects for the private sector is that the revenue model for these projects is based on tipping fees payments by the municipalities and the extent of replication across the country would depend on the municipality’s financial strength.

On the treatment side, a number of stand alone PPP projects have emerged (Mysore, Shimoga, Belgaum, Bangalore, Kolkata, etc.). There are several opportunities for commercialization of solid waste treatment process with the involvement of the private sector (see Box 31.12). As discussed in Box 31.12, these projects may not require capital subsidy and could be self-sustaining. The municipal waste could be treated to generate compost, pellets and energy and sold in the market. Such projects would fall under structure 1 in Figure 31.1. These projects could be replicated in most cities in India and would have a potential of bringing in private sector investment to the tune of Rs 10,000 to 15,000 crore (assuming that a typical waste-processing plant with capacity to treat 300 tonnes would cost Rs 45 lakh, excluding land).
The Rajkot Municipal Corporation (RMC) initiated efforts towards setting up of a waste-processing plant following the implementation of Municipal Solid Waste Management Rules 2000. Until then, the waste was being dumped at a landfill site located 8 km away from the centre of the city. RMC awarded the establishment of the waste-processing plant on a build, own, operate basis to Hanzer Biotech Energies Pvt. Ltd (HBEPL) following a competitive bid process. Land for the project was given to HBEPL on lease basis at the rate of Re 1 per sq metre per year. RMC has not provided any financial assistance to HBEPL for this project.

Under the agreement, RMC is required to deliver 300 Metric Tons (MT) per day of garbage to the plant for a 30-year concession period. All products received as output of waste conversion and processing from this plant are the assets of HBEPL. HBEPL is responsible for marketing and sale of recovered products, byproducts, co-products and is allowed to retain the entire revenue generated from the sale of such products.

The plant became operational in April 2006. HBEPL is currently utilizing nearly 85 per cent to 90 per cent of the waste, leaving behind only 10 per cent to 15 per cent of the total waste as rejects. These rejects are sent to the sanitary landfill site adjacent to the plant. The waste processed by HBEPL takes the form of bio-fertilizers or compost (40 MT), fluff (70 MT), eco-bricks (15000 nos) and recyclables, viz. plastic and metals. The compost so being generated is being sold to corporate houses including Reliance Industries at Jamnagar (Gujarat) and Reliance Energy at Dhanu (Maharashtra). The fluff is being sold to a cement factory at Kodinar and to paper mills at Vapi and Kuwadwa. The eco-bricks are being utilized for construction work.

The key reason for the success of HBEPL is its robust business model, which focuses on aspects such as a diversified revenue base and non-reliance on any tipping fees from the municipal corporation. The company also generates about ten per cent of its revenues from the sale of carbon credits. The success of the Rajkot plant has been replicated at four other locations.

Source: India Urban Portal and IDFC

The development of a landfill site on a PPP basis would require a capital grant or a subsidy. The biggest challenge for the development of landfill site is the availability of land.

Though a number of PPPs have come up in the SWM sector, most projects that are proposed for PPP are only a portion of the full SWM chain. This poses problems for the downstream projects. For example, a waste treatment plan faces a risk if collection and transportation is not well integrated. In going forward, it is important that solid waste management projects are conceived and bid out as integrated projects involving collection and transportation, and treatment and disposal.
Electricity distribution in urban areas, though a state activity, holds tremendous potential for public–private partnerships. A model that has been tried and has worked very well is the ‘Distribution Franchise’ (DF) model (see Box 31.13).

**Box 31.13: The Bhiwandi electricity distribution franchisee model**

The electricity distribution franchisee (DF) is a PPP arrangement wherein specific functions related to electricity distribution in a demarcated area are franchised out by the distribution utility to a private sector entity (known as the DF), while the state retains the ownership of assets.

The Maharashtra State Electricity Distribution Company (MSEDCL) appointed Torrent Power Limited (TPL) as the DF for the Bhiwandi circle in June 2006 for a period of ten years. The contract became effective on 26 January 2007. The DF model is structured such that the DF receives power supply from MSEDCL at designated input points, and pays to MSEDCL an annual rate for this energy input (agreed at Rs 2.04 per unit on a levelised basis for ten years). The private player is responsible for planning, O&M, metering, billing, collection, customer care and reducing the transmission and distribution (T&D) losses while investing in system expansion and upgradation. The DF is also required to achieve a minimum reduction in T&D losses and increase in collection efficiency.

Under this model, the DF has been permitted to keep the revenue collected from consumers as per the tariffs determined by the Maharashtra Electricity Regulatory Commission (MERC). The DF also receives the subsidy provided by the Government of Maharashtra (GoM) towards supply of power to subsidized consumer categories. MSEDCL provides the DF an incentive for the collection of arrears of 20 per cent and 10 per cent of the pre-takeover arrears collected from permanently disconnected consumers and current live consumers, respectively.

The DF is allowed to procure additional power from sources other than MSEDCL. It is required to pay MSEDCL wheeling charges specified by the MERC for distribution of such power. MSEDCL has committed capital expenditure (capex) of about Rs 12 crore per annum for five years in the franchisee area. However, the DF is also allowed to undertake capital expenditure, if required, for loss reduction and improved quality of supply while bearing the costs of such capex. In fact, Torrent has invested more than Rs 250 crore for improving network and services and installing accurate meters.

The arrangement in Bhiwandi is structured in a manner such that the entire business risk, after agreeing to the baseline information, is vested with the DF. The DF is insulated from the regulatory risk of retail tariff revision through a pre-defined tariff indexation ratio so that its cost recovery is not affected.

The outcome of the DF model in Bhiwandi is more than encouraging. The DF has been able to bring about dramatic improvements in the power situation and financial
In the DF model, the public sector owns and retains the ownership of the electricity distribution assets and partners with the private sector for O&M, metering, billing, collection and customer care. The revenue potential from reduction in transmission losses and improvements in collection efficiency are substantial, which makes these projects attractive for the private sector. Such projects would be categorized under structure 1 of Figure 31.1. Experience from Bhiwandi indicates that due to the DF the aggregate transmission and commercial losses have declined by almost 70 per cent. A replication of Bhiwandi at an all-India level has the potential for increasing the revenue by around Rs 43,000 crore which itself would pay for the private sector involvement and increase the energy realization by around 16 per cent.

**Education**

The role of ULBs in the education sector is through municipal-aided schools. For instance, Municipal Corporation of Delhi has 46 such aided primary schools. The problem that municipal schools face is of inadequate infrastructure. Internationally, PPPs have been used in delivering education infrastructure. The UK is home to the world’s largest PPP schools programme. Most new schools are built under the PPP structure. The role of the private sector in education infrastructure is to design, finance, build and manage facilities. The responsibility of providing education services is not transferred to the private sector. The challenge that this sector faces is that there is a lack of alternative revenue streams other than school fees. The PPP structure through which schools are developed falls in the fifth category in Figure 31.1 where the revenue model of the private sector is based on a performance-linked annuity scheme. Possibilities of alternative sources of revenue (school bus, meals) reduce the dependence on public purse.

**Hospitals**

According to a report in 2002 by PwC, the public sector accounted for nearly two-thirds of the 15,393 hospitals in India but for merely 18 per cent of the investment in healthcare in 2003. The rest of the investment was made by the fee-charging private companies. PPPs have also come up in the healthcare sector in India. One such example is the Rajiv Gandhi Super Speciality Hospital in Raichur, Karnataka. In this case, initial infrastructure (land, building, staff quarters and support

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Source: IDFC Policy Group Quarterly No. 4, 2009

health of the Bhiwandi circle in a very short period of time. Aggregate Technical and Commercial (AT&C) losses have reduced by more than 30 per cent; so have transformer failure rates. About 95 per cent of consumer meters are running accurately as opposed to the few accurate meters that existed prior to the DF arrangement. Quality of supply has improved sharply, as evident from the reduction in the frequency as well as duration of system failures and average duration of supply interruptions experienced by consumers.
infrastructure such as power, water, road connectivity, etc.) was provided by the Government of Karnataka and Apollo Hospitals is mandated to operate the hospital with its own resources. Hospital PPPs would require a combination of capital grant/subsidy and user charges. In terms of Figure 31.1, these would generally fall under the second structure.

Other urban infrastructure sectors like ambulance services, cultural facilities, street lighting, emergency services, public convenience facilities, etc., where the potential for recovery through user charges (with or without cross-subsidization among users of the services) is unlikely, would largely depend on government funding. The private sector could bring in operational efficiency in the delivery of these services in a PPP construct, but the investment would largely be from the public sector. However, if there is a possibility of alternative revenue sources (such as advertisement), the extent of reliance on government funding could be reduced (for example, Mehsana Nagar Palika Street Light project or Lodhi Road public toilets).

Ambulance services in India are provided largely by the state and to some extent by philanthropic organizations. Recently, two models of private sector provisioning of these services have been piloted in India (see Box 13.14). Ambulance services are essential but there is a large proportion of the population who would be unable to pay for the services and would have to be provided free services. User charges are not sufficient to cover the capital or the O&M cost of these services but can be supplemented by other sources of revenue.

Box 31.14: Private sector participation in ambulance services

Two revenue models of private sector participation in ambulance services have been tried in India: (1) a cross-subsidy model followed by Ziqlitzta for their ‘Dial 1298 for ambulance’ services in Mumbai and Kerala and (2) annuity payments to private sector for providing ambulance services.

Ziqlitzta Healthcare running the ‘1298’ ambulance services is a good case study for the cross-subsidy model. Their cross-subsidy model requires payment for these services based on users’ ‘ability to pay’ principle. The criterion used by them for evaluating the ability to pay is the destination or the origin of the patient. If the patient is headed towards or from a public hospital then he pays up to 50 per cent less than the patient who is headed towards or from a private hospital. Moreover, accident and disaster victims are provided service free of charge. Each ambulance serves on an average 1.5 to 2 calls a day. Around 18–20 per cent of the calls attended by them are either free or subsidized. User charges are supplemented by corporate assistance in the form of donation of ambulances, advertisements on the ambulances and corporate tie-ups for providing ambulance services. They derive around 46 per cent of their revenues from
user charges whereas 29 per cent of revenue comes from advertisement and 25 per cent from fixed contracts with corporate houses. The fixed contracts include a contract to provide two ambulances to the Mumbai airport on 24 x 7 basis for which it is paid a fixed annuity and a contract to provide ambulance services to Fortis Hospitals. The state does not provide any financial assistance to the ambulance provider. 1298 has grown from ten ambulances in Q1 of 2007 to 81 ambulances by Q1 of 2009. Out of these, 51 are deployed in Mumbai alone with a combined workforce of around 300 people. The total capital investment by Ziquitza in Mumbai stands at Rs 4.60 crore as on 31 March 2009 and the operating expenses for the financial year 2008–09 stood at Rs 1.75 crore. In allocation of services, Ziquitza follows a rule of giving priority to the emergency calls over the regular patient transfer calls. However, if their ambulance is not available to cater to a particular call, they redirect it to one of the other ambulance providers, like Topline and Sai Ambulance, that they have networked with.

The annuity model requires payments by the state to the private entity. Annuity-based concessions have been awarded to Fortis in Delhi and to Ziquitza in Bihar. In the case of Delhi, the government has agreed to provide up to 85 per cent of the capex incurred on the project up to a maximum of Rs 25 crore (disbursed in four equal quarterly installments) and also make annuity payments of Rs 1.23 crore per month to the concessionaire for a period of 6 years (The total concession period is 6.5 years. During the first six months of the concession, the concessionaire has to acquire half of the assets and also has to fully equip emergency response set up). As per the concession, certain categories of users are provided free service. The service charges for other users have also been specified by the government.

In Andhra Pradesh, Madhya Pradesh and Karnataka, GVK Emergency Management and Research Institute (GVK EMRI) has been given the contract to operate the services through MoUs on a no-profit basis. These MoUs provide for the state government to bear 95 per cent of the operating costs and 100 per cent of the capital expenditure to be incurred towards acquisition of ambulances equipment, call centre building, etc. However, in effect, the entire operating costs are borne by the state government leaving only the senior management salaries and research and training expenses to GVK EMRI. This amount is raised from private sponsors and is estimated to be approximately Rs 36 crore annually.

The cross-subsidy model of 1298 appears to be promising with a rising number of calls over the years. There are certain limitations to the cross-subsidy model (1) split between free or subsidized calls and non-subsidized calls (2) potential to increase the user fee, even for paying customers.

Source: IDFC research

In cities like Tokyo (Japan), the number of ambulances that are available per 1000 population is around 4.7. In comparison, only 6 per cent of the population in India has access to ambulances with emergency services. Even if we assume
2 ambulances per 1000 people in urban India, there is a requirement of around 600,000 ambulances or a capital investment of around Rs 90,000 crore (assuming that the cost of each ambulance is Rs 15 lakh). The private sector could bring in efficiencies by operating and managing ambulances but the public sector would need to meet the cost (capital and O&M) of the services. In cases where potential for other revenue streams exist (such as advertisement revenue on the ambulances), part of the O&M expenses could be covered. These projects would fit in the fifth structure in Figure 31.1.

PPPs have emerged in energy-saving street lighting as well. Municipal energy consumption on street lighting, water pumping stations and buildings is substantial. Installation of energy saving bulbs for street lighting and their O&M could be undertaken using a PPP model. Vijaywada Municipal Corporation has involved the private sector in saving energy in street lighting. The private sector installs and maintains energy-efficient equipment. A share of savings that the private sector is able to achieve for the municipal corporation forms the revenue for the private sector. The extent of saving in energy consumption in Vijaywada street lighting is more than 40 per cent. Such projects could be made more attractive for the private sector by assigning advertisement rights on the lamp posts during the concession period. These projects would fall under the first structure of Figure 31.1.

**What alternative structures are there for the public sector for providing subsidies/grants in PPP projects?**

At the local level, most ULBs are financially strained and would not have the necessary capital to make grants or subsidies. The question then arises: how can we better leverage resources from existing schemes so that a larger number of projects could be undertaken as PPP? What other structures are possible for raising capital so that the government can undertake more projects? There are several smaller urban projects (schools, hospitals) which are unattractive for private sector participation as the procurement costs of PPP for such projects is relatively high. What structures are possible that will allow such projects to be taken up?

**1) Alternatives for allocation of resources under existing schemes**

Below are some options that the government could explore further.

a) **Annuities instead of one-time capital grant under the existing JNNURM or viability gap funding (VGF) scheme:**

   Instead of an upfront capital grant, annuity payments could be made to the private sector. These may be a better mechanism of payment for the investment and delivery of infrastructure projects. Annuity payments can be linked to the performance of the private sector.
An annuity structure would require relatively more initial capital investment by the private sector compared to the structure where a capital grant is involved. The risks of construction, O&M and finance are higher for the private sector in the case of an annuity model than a model with an initial capital grant, but the revenue risk is higher for the public sector. Moreover, in comparison to a one-time capital grant, annuities can free up scarce public capital resources and enable governments to take up a larger number of projects. The subsidy structure under the VGF scheme could be spread over the project period in the form of annuity payments linked to performance criteria such as availability and quality of service. The mechanism for annuity would need to be carefully thought through. Since the partners in urban PPP projects are the ULBs and the private sector, an annuity-based structure under schemes like JNNURM/VGF would require a tripartite relation between central/state scheme, ULBs and the private sector. The payment of grant from the upper level of government would flow to the private sector in the form of annuity but the responsibility to monitor performance would be that of the ULBs. However, the experience with annuity-based PPP model of delivery of urban services has been that these generally make the projects more expensive since the costs of raising finance by the private sector are higher.

b) A combination of annuities and capital grant instead of a one-time capital grant under the existing JNNURM/viability gap funding (VGF) scheme:

A combination model which can take advantage of the strength of annuities (as they are linked to performance), without unduly increasing the cost of the project would be preferable. The provision of upfront capital grant would reduce the revenue risk for the private partner and the annuity structure would allow the public partner to monitor performance and get value for money.

(2) Alternative structure for raising capital for PPP projects: Pooled funds at the ULB level

An option for capital-intensive projects, which would not be attractive to the private sector without a capital subsidy, would be to create a pool fund at the state government level or for a group of ULBs (see the section on the international experience in debt financing—‘What does experience tell us?’). Instead of depending on central government subsidy (as under VGF), this structure would allow ULBs to create innovative mechanisms involving capital subsidy, revenue subsidies, and joint ventures with the private sector to finance urban infrastructure. Under this structure, the state government or a group of ULBs would raise debt from the capital markets to leverage a pool of urban projects financed by the private sector. In addition, the pool fund could also provide equity in the project.
A conceptual structure of this option is presented in Figure 31.2. A group of municipalities set up a pool fund and raised money for the fund through issuance of bonds. Given the current finances of ULBs, credit enhancement through escrows on ULB cash flows and intercept on state financial commissions’ devolution to ULBs would be needed. Depending on the size of private investment and project viability, a combination of annuity/revenue gap subsidy and initial capital subsidy or equity (in a JV type PPP structure) could be given from the pool fund.

Figure 31.2: Urban pool fund

An interesting example of a fund for financing urban infrastructure projects is the Tamil Nadu Urban Development Fund. This fund is unique as it not only directly lends to municipalities but also extends support for participation in the PPP projects (see Box 31.15).

Box 31.15: Tamil Nadu Urban Development Fund

Although the urban sector in India has witnessed very little equity participation from private players, one notable equity contribution is in the case of the Tamil Nadu Urban Development Fund (TNUDF). This fund was established in 1996 with an objective to improve quality of urban life in Tamil Nadu by facilitating efficient urban infrastructure asset creation and providing urban services through innovative project development, independent appraisal and sustainable financing. The TNUDF lends to the municipal sector and also provides advisory services to ULBs in
accessing market funds directly or through a pooling arrangement. The fund had initial equity capital contributions from the Government of Tamil Nadu (71.6 per cent) as well as the private sector (28.4 per cent) and is managed by a predominantly private fund manager.

In addition to the above equity contributions, the TNUDF also had access to World Bank funds of Rs 3700 crore. The fund also privately placed a bond issue of Rs 100 crore.

As on 31 March 2008, TNUDF had over Rs 324 crore of outstanding disbursals and their total assets have grown from Rs 322 crore in March 1998 to Rs 673 crore in March 2008. The smaller municipalities and town panchayats have hugely benefited from this fund. The fund has also lent to municipalities for participation in some PPP projects such as the Alandur sewerage treatment plant, Karur toll bridge and Madurai toll-based ring road project. TNUDF has financed almost all urban sectors such as solid waste management, sewerage and sanitation, water supply, roads, bridges, storm water drains, bus stations and markets.

In addition to loans, the borrowers are also eligible to obtain grant funds. These grant funds are sourced from the GoTN, but are operated and managed by the asset management company of the TNUDF and play a major role in ensuring access of civic services to the poor. A grant fund has also been specifically set up to provide assistance in technological upgradation, feasibility study, project preparation and consultancy.

Source: TNUDF

(3) Alternative structures for financially small urban PPP projects

a) Local improvement finance trust (LIFT) model

There are a number of small urban projects which cannot be structured as conventional PPPs as the private sector finds the small size unattractive. However, a number of small projects that provide services which are complementary and could be delivered from the same premises could be combined to make the project financially viable. Such projects would require technical capabilities, however, which ULBs lack.

In the UK, LIFT model has been promoted for urban infrastructure projects which are small in scale (such as hospitals, schools, community services). The objective is to carry out change in the local delivery of these services by leveraging private funding for the construction and maintenance of modern, integrated facilities, to provide an extended range of services in more accessible locations. LIFT has been developed as a mechanism for long-term joint ventures between service providers and private sector with a remit to deliver investment and property-related services over terms of 20–25 years.
The model involves setting up of a LIFT company at the national level, which is a partnership between relevant public sector organizations (such as education, healthcare, etc.) and private sector with equity stakes from each of these (see Figure 31.3). The LIFT company provides resources for planning, giving advice, providing standardised documentation, assisting in selecting private sector partners, investing in local LIFT schemes and holding shares in local LIFT companies. At the local level, local LIFT companies (LIFTcos) are set up for each of the projects with partnership from the private sector service provider, local authority and the national LIFT company. The private sector service provider holds majority stake in the LIFT company.

The local authority’s equity in the project may come from land transfer, either in terms of development sites for new schemes or vacant plots following decant from existing buildings. The public and private sectors jointly plan and deliver the services. LIFTcos also have the discretion to include commercial elements such as retail, health and fitness centres or residential units in a scheme if this contributes to the financial viability.

LIFTcos lease the premises to public entity. Their payments (rents) are performance-linked. The revenue stream from the project is on the basis of rents, with increases pegged to the retail price index.
LIFT is designed to be an incremental partnership. Over the 20- to 25-year term, the LIFTco will jointly draw up strategic service development plans with local authorities or government departments in response to local needs for the services. Once the plan is in place, an exclusivity deal gives the LIFTco the right of first refusal to develop all new projects, subject to financial viability. The refurbishment or reconfiguration of existing properties also counts as a new project. The LIFTco is responsible for the risk of residual value and retains all property transferred or developed at the end of the term. This gives the LIFTcos the flexibility to extend the agreement, sell the estate or start again.

A similar model could be used in urban infrastructure services in India. However, given the federal nature and size of our country, instead of a national level LIFT company, a more appropriate structure would be to set up such companies at the state level.

b) Buy-back arrangement

There are a number of urban projects where the project cost is low (such as schools, community services) and the revenue streams are not sufficient to cover the cost of investment. Such projects are unattractive for large private players but could be of interest to small private entities. In this case, the annuity model may not be appropriate for two reasons: (i) small players may not have the capital to deploy initially and recover over the concession period and (ii) raising capital from the market would increase the cost of the project.

One possible structure is that the public sector pays upfront capital grant to the private sector for the development and then a stream of performance-linked annuities for O&M. Another alternative could be that instead of paying upfront capital grant, the public entity buys back the asset after the construction is complete. In this structure if the construction of a project takes three years to complete, instead of paying the grant initially, the public sector buys the asset once the construction is complete. Such a structure is called a buy-back model (see Figure 31.4). In this model, the private sector finances and constructs the infrastructure. The government buys it back from the private sector once the infrastructure has been built at an agreed price and leases it back to the private sector for maintenance services. By entering into a buy-back arrangement, construction risk (due to time and cost overrun) is transferred to the private sector. Unlike a capital grant structure, the payment for the building on completion is linked to the
performance parameters. An advantage for the public sector is that they can balance the need for infrastructure today but pay for it on delivery. The private sector’s technical capabilities are leveraged first in the development and then in O&M.

Suggestions

Urban PPP projects in areas such as the development of bus terminuses, waste processing, urban electricity distribution, street lighting have potential for commercialization. Sufficient experience has been gained across the country in PPP projects like solid waste collection and transportation, and waste treatment which can also be undertaken in a big way.

Five broad PPP financing options for urban infrastructure have been presented. It should be noted that these are not watertight but merely indicative of the types of PPP structures under which different projects may fit given their characteristics.

(1) In a PPP project where full recovery of the capital cost is possible through user fees, supplemented by alternative sources of revenues, the private sector would finance the full project cost. Such projects include parking, bus terminus, road safety projects, some pedestrian facility projects, O&M of water supply, solid waste collection and transportation, waste processing plants, and even tollable urban roads and bridges.

(2) For those projects involving large capital investments for which user fees are not sufficient to recover the capital investment, the public sector may provide an initial capital grant, such as VGF, to subsidize the capital cost. Projects that could be financed through this structure are MRTS, BRTS, city bus service, and expansion of water supply and sanitation system.

(3) For projects of a strategic nature or those which have strong public interests and involve large capital investment, a joint venture between public and private sector is recommended. Projects that could be financed through this structure are airports, and expansion of water supply and sanitation system.
However, for transparency in JVs between public and private sector, it is necessary that the concessioning and project monitoring functions of the public sector are clearly separated from the project implementation function, should the same public entity form a JV with the private sector for project bidding and implementation.

(4) Another PPP financing option for projects in which user fees do not cover the project investment is that the public sector provides minimum revenue guarantees to the private sector. Projects where this structure is appropriate are O&M of water distribution system, sewerage projects, and urban transport system.

(5) For PPP projects in which user fees are not possible, shadow user fees or annuities paid by the public sector, equivalent to a return on capital investment by the private sector, could make the project financeable. Performance-linked annuities could be used for projects in water and sanitation, sewerage, urban transport, and non-tollable urban roads. Further, we recommend that a part of the (Rs 2 per litre) cess levied by the central government on petrol and diesel should go towards funding urban roads and public transportation, and that the cess amount should be increased if required. Additionally, the cities should be allowed to levy additional cess. Although this cess is not a user fee in its truest sense, it is progressive, as those who consume more fuel pay a larger share of funding the urban transportation infrastructure. Further, the cess would provide a valuable revenue stream to financially distressed ULBs.

Alternative proposals for implementation of PPP projects where user fees are unable to cover the capital cost by the private sector or where PPP is unattractive to the private sector due to the small size of projects are:

(1) For large projects which require a capital subsidy to become viable for private sector financing, a better way would be to provide the subsidy through a combination of capital grant and annuity payments instead of an initial capital grant.

(2) For smaller ULBs to support PPPs, they can access the capital market through a Pooled Fund and use the resources towards equity, viability gap funding, revenue gap, and so on.

(3) For smaller new projects for which PPP procurement costs may be prohibitively high, a JV project development company could be set up. After the company has developed a project, it leases the project assets to the ULB. The lease rentals are the revenues for the JV.

(4) Alternatively, a private entity develops a new project and the ULB buys it and then leases it to a private sector entity for O&M.

In situations involving provision or upgrade of infrastructure in an already inhabited neighborhood, the community residents should be actively involved in the project
inception, planning and implementation stage. This active community involvement would help the project implementation entities levy user charges that are acceptable to the community and yield significant revenues.

4. **LAND-BASED FINANCING OPTIONS**

Land is a promising source of infrastructure finance in a cash-strapped developing country like India where the property taxes are either non-existent (for example in some Tier II and III cities) or yield very little revenue, any increase in user fee is typically met with strong opposition, and the municipal bonds market and public private partnership are still in their infancy. In India two demand side factors that influence land prices—population increase and income increase—make land a valuable asset. The land-based financing options aim at using the value of land to fund infrastructure.

**Development impact fees**

Development impact fee is a one-time charge imposed on new development by the local government to fund a proportionate share of the capital cost of infrastructure facilities required by that development. Since the new development would only need to pay its share of the infrastructure, detailed studies need to be conducted to calculate the infrastructure needs generated by the new development (see Box 31.16). Usually the fee is levied on the developer by the local government at the time of granting a building or development permit. The fee is typically used to fund public infrastructure facilities such as roads, water supply, sewerage, storm water drainage, flood control measures, open space, solid waste management, fire protection, libraries, schools, police services, public buildings, and administration.

**Box 31.16: Use of development impact fees in the USA**

Development impact fee is a very popular infrastructure finance tool in the United States. Reduced federal and state infrastructure aid, coupled with increasing limitations on property taxes has meant that local governments in all 50 states in the USA have imposed impact fees in some form or the other. The national average total impact fees charged per single family home in 2008 amounted to US$11,239. The average shoots up to approximately US$50,000 in the case of California—a state where the residents have voted for strict limitations on the property tax rates. Anecdotal evidence suggests that the impact fees fund 30 per cent to 70 per cent of the cost of new infrastructure in the USA.

Although the local governments may be empowered to levy development impact fees, they must demonstrate that: a) there is a reasonable connection between the need for additional facilities and the growth resulting from the development; b) the fee charged is in proportion to the share of the cost to accommodate the development paying the
fee; and c) there is a reasonable connection between the fee and the benefits derived from them by the development. The local governments have to conduct detailed background studies (called nexus studies) to prove the above three points. A simple example illustrating the salient features of such a nexus study is as follows. A city may allow a private developer to construct 1,000 housing units that would accommodate 3,000 people. The city would need to provide a sewer system to this development. The nexus study would have to provide details of the sewer infrastructure needed to serve this development (for example, the new sewer lines, the sewer plant, etc.), and then calculate the cost of providing the infrastructure. The cost would include the full cost of providing the new sewer lines to serve the new development; and the proportionate usage of the sewer plant by the new development. For the latter, for example, if the existing sewer plant was constructed at the cost of US$10 million and could serve 10,000 people at full capacity, the new housing development, with 3,000 people, would share 30 per cent of the sewer plant cost.

This type of a fee has several advantages. First, it allows the local governments to diversify their revenue stream rather than rely heavily on property taxes, which may already be high and/or capped by the state government, or as is the case in several parts of India, a very minor source of revenue. Second, the local governments will receive the revenue generated from the development impact fees in one lump sum, as opposed to waiting over an extended period of time, which is the case with most of the standard taxes collected at the local level. As a result, the local governments will have readily available funds to pay for development of new infrastructure thereby reducing the need to raise resources from the market and incur debt-servicing costs.

In India, the ULBs do not use the actual demand for infrastructure generated by the new development as the basis for charging development impact fees. Instead they typically impose development charges based upon the area of land and building. In principle, these charges are used to fund infrastructure needs generated by new development. However, they are typically set very low and so are only able to fund a very small proportion of the cost of infrastructure needed to serve the new development. For example, Karnataka, under the Karnataka Town and Country Planning Act of 1961, charges development fees that range from Rs 20–75 per square metre (sq m) of land area, and Rs 2–10 per sq m of building area (Akhtar, J. 2009). However, realizing that the fees are presently set too low, the state government is in the process of revising it. The proposed fees would also see a shift in the basis of charging the fee—from the area of the land/building to their value. For example, earlier a fee of Rs 75 per sq m was charged in Bangalore for land use change from residential to commercial. The proposed fee equals 18 per cent of the guidance value of the land (the guidance value is the value of
the land as notified in the state’s Stamp Act). The proposed raise in the fees has been criticized by the developer community as anti-realty sector (source: The Times of India, July 29, 2009).

Part of the reason for not raising the fee is its incidence. Although the legal incidence of the fee falls on the developer, however, in times of strong real estate market, the fee is passed on to the consumers in the form of high property prices (for example, the fee is included in the final price of a house). Therefore, extant literature has argued that the fees may increase the cost of housing, and decrease the development of affordable housing. One way to address this situation is to waive impact fees for affordable housing developments. While this waiver would mitigate the negative effect of impact fees, it would mean that affordable housing developments would need alternate sources of infrastructure funding.

Another aspect that needs to be considered is that impact fees are one-time levies which usually help pay for part of the cost of the capital infrastructure needed to serve a new development. They do not cover maintenance or repair costs. Therefore, it is important to identify revenue sources to fund the ongoing operating expenses. Also, since the fees are used to fund only new infrastructure, they have limited utility in instances where the funds are needed to enhance the quality of existing infrastructure.

Further, the revenue yield from the fees is dependent upon the number of development permits issued, which in turn are dependent upon the condition of the real estate market. Therefore any development project funded using revenues from impact fees should take into account the dependency of the fees on the real estate market conditions. Finally, it is important that the fees are ring-fenced to ensure that the revenues generated from the fees benefit the development that generated the fees.

**Betterment levies**

Betterment levy focuses on taxing the increments in land value that can specifically be attributed to either a public decision (such as regulations) or a government action. The levy is determined by comparing the market values before the intended public decision with the new potential values that are created by enhanced possibilities or effects of decision. The rationale behind such a levy is that whenever a government agency implements an improvement scheme, there is an increase in the value of land and property in the area as well as in the neighbouring areas (see Box 31.17).

Betterment levies may often be confused with development impact fees. But there are differences. The major difference between a betterment levy and a development impact fee is that while betterment levies are based on the increased value of the
property, the development impact fees are based on the actual cost of the infrastructure required to serve the new development.

**Box 31.17: Use of betterment levies around the world**

Examples of betterment levies can be found in the UK, Australia, Brazil, Poland, Colombia and Israel. In Australia, a betterment levy was levied in 1969 in the Sydney metropolitan region to help finance public works and facilities required for metropolitan expansion. This levy was designated as the Land Development Contribution and was levied on lands to be rezoned from rural to urban uses so as to accommodate metropolitan expansion. The levy was however, abolished in 1973 partly because of mounting political opposition and partly because the levy was generally perceived to be driving up land prices, as landowners withheld land from development in anticipation that the tax would be abolished.

In Brazil, betterment levies were imposed as part of the municipal development projects in the states of Parana and Rio Grande do Sul to counter limited resource mobilization at the local level and limited access to long-term financing for investment programs. Though these charges formed a very small proportion of the revenues of the municipalities—not more than five per cent on average, it was reported that direct cost recovery through betterment levy met with several problems, mainly political. First, local mayors often complained that these charges are unpopular and difficult to administer fairly. Second, the levy required formal approvals from local councils on a case-by-case basis resulting in a process that involved lengthy political negotiations among opposing councilors.

Betterment levies have been used in India since the early 1950s. The Bihar Town Planning and Improvement Trust was empowered to collect a betterment levy in 1951. Several other states also have the legislative basis to impose a betterment levy. Karnataka, under the Karnataka Urban Development Act, 1987, empowers its ULBs to charge a betterment tax that should not exceed one-third of the anticipated increase in land value (source: Akhtar, J. 2009). Similarly, Maharashtra, Gujarat, Delhi, and Tamil Nadu, are collecting betterment levy in a number of cities under different names. For instance, Delhi calls it a ‘betterment levy’, Punjab calls it an ‘external development charge’, while Rajasthan calls it ‘development charges’. These charges are most commonly levied when agricultural land is zoned for an urban use (for example, residential, commercial or office use). It is also provided under legislation in Andhra Pradesh and Punjab, but its use is limited.

More recently, the National Urban Transport Policy of the GOI provides for a betterment levy on land owners, among other taxes, to meet urban transport needs within states. It adds that revenues from a betterment levy along new high capacity public transport corridors would be included as a component of the financing plan for such new public transport systems.
However, there may be practical difficulties in implementing and collecting such levies. First, these levies normally do not keep pace with inflation or actual cost of infrastructure provision. Second, there are difficulties in attributing the rise in land value to a particular cause and measuring this value, resulting in litigation by land owners (travel demand forecasting models could help assign benefits). Third, many landowners may argue about whether the levy should be collected from them at all, the logic being that completion of an infrastructure project may lead to only notional gains in the value of land. Therefore, tax, if any, should be levied only on actual transactions involving land. Finally, such levies may result in lowering the affordability of housing in the concerned area. In a housing market characterized by shortage, which is the case in many cities in the country, the levy would be passed on by the developer to the home buyer.

**Developer incentives/sale of development rights/transfer of development rights**

The value of a land parcel is significantly impacted by the type and intensity of use allowed on that particular parcel of land. In other words, the development rights associated with a land parcel significantly influence its value. The local governments, as regulators of development, control development rights, and in turn the land values by: a) specifying the use of land through zoning (for example, residential, commercial, office); and b) determining the intensity of land use by specifying the maximum floor area ratio (FAR) or floor space index (FSI), building height, and minimum setbacks allowed on a particular land parcel. FAR or FSI is the ratio of the total floor area of the buildings on a particular parcel of land, to the total area of that parcel of land.

Local governments can provide developers such incentives as higher FSI, building height, etc., in order to incentivize certain kinds of developments. For example, a developer may be allowed higher FSI in lieu of providing affordable housing, or in lieu of dedicating land for development of parks.

Several ULBs, especially the Mumbai Metropolitan Regional Development Authority (MMRDA) have also used the sale of additional FSI to raise funds. Although this strategy can raise valuable funds for the ULBs, critics (for example, see Pathak, V. 2009) challenge the legality of a local government selling something (FSI in this case), whose value the government has created by making scarce in the first place through regulation.

Further, development rights are associated with specific land parcels. However, over the last few decades realization has set in that the development rights can be ‘unbundled’ from land. Combined with the fact that the development rights significantly influence land values, this ‘unbundling’ has been used to influence
Transfer of development rights (TDRs) is based upon this principle of ‘unbundling’. Conceptually, a ‘sending area’ and a ‘receiving area’ are required for TDR to work. For example, a local government, in order to protect agricultural land, may prohibit any non-agricultural use on that land. However, as compensation to the impacted land owner, the government can grant him TDR credits, which the land owner can sell to a developer in the ‘receiving area’. The receiving areas are typically those pre-selected regions where the government would like to increase the intensity of development. For example, a developer in the central business district may own a parcel of land where the building regulations allow a FAR of 4.0 to develop an office complex. However, with the purchase of TDRs, the developer may be allowed a FAR of 5.0.

Some examples illustrating the use of TDRs are provided below:

- Seattle, Washington, USA, used TDRs to promote preservation of affordable housing. Property owners that provide affordable housing units are granted TDRs which they, in turn can sell to the purchasers who are typically the developers of commercial property in downtown Seattle. The TDR owners can also sell the TDRs to the City of Seattle. The City can hold TDRs in its ‘TDR bank’ for later resale.13

- Mumbai has provided TDRs equivalent to existing FSI to property owners who have surrendered land for slum rehabilitation. Further, the developers get a TDR equivalent of FSI 1.33 for developing the housing (Bhide and Bagal 2009).

Issues of concern

Since the use of developer incentives and TDRs influence the use and intensity of land use, care should be taken that these tools are consistent with the development objectives identified in the local government’s comprehensive/master plan. For example, providing higher FSI in an area already suffering from heavy traffic congestion would further worsen that area’s traffic problem.

Further, these mechanisms are primarily aimed at influencing the location and intensity of urban development. Over-reliance on the sale or transfer of development rights to garner funds can lead to their misuse by overzealous ULBs.

Finally, the local government should have the organizational capacity to assess the value of developer incentives/TDRs, provide the appropriate legal and administrative framework to carry out the transaction, and finally monitor the implementation of these programs.

Value capture through linkage

Commercial development of land can replace capital subsidies given by the government for improving the viability of private investment. Most government agencies possess valuable land that can be leveraged to create much-needed
infrastructure. By allowing exploitation of land, the government can enable a profitable commercial venture to be combined with a not-so-profitable infrastructure project, thereby making the entire package attractive for the private sector. This model, which entails the commercial exploitation of land, is popularly known as value capture through linkage.

**Land lease or sale to finance urban infrastructure**

Lease or sale of landholdings to raise finances for infrastructure development is becoming common in India as it can generate huge resources quickly. The MMRDA, for instance, has raised significant revenue through land sales in the Bandra–Kurla complex, which it is using to fund infrastructure investments in other parts of the city (see Box 31.18).

**Box 31.18: Sale of land in BKC by Mumbai Metropolitan Regional Development Authority**

The Mumbai Metropolitan Regional Development Authority (MMRDA) is responsible for planning, development, and infrastructure investment in the metropolitan Mumbai region. To overcome budgetary constraints that hindered infrastructure investments, MMRDA has used land available with it at Bandra–Kurla Complex (BKC) as a means of financing infrastructure.

The BKC is spread over 208 ha for which MMRDA paid Rs 956 crore to the state government over a period of time. Out of this 208 ha, 121 ha—comprising Block G of the area—is being developed as an international financial and business centre. MMRDA was developing property in this block and putting them on long-term leases. It earned annual rentals and development fees against such development of land. However, faced with difficulties in raising funds for major infrastructure projects, MMRDA decided to sell the land. This move from long term leases of developed property to outright sale of land was prompted by two factors. First, it was decided that BKC could be built out more efficiently by private developers. And second, the sale of land would generate significant amounts of capital up front that could be invested in Mumbai’s infrastructure.

On the whole, MMRDA has leased/sold 100 ha of land as well as 14.11 lakh sq m built up area in this block. Its earnings from lease/sale amount to Rs 8871 crore. This revenue is now being directed primarily to the transportation projects being undertaken by MMRDA such as suburban rail and bus systems, monorail, metro, roads and flyovers, and skywalks.

The FSI of land in the G block has been raised from 1 to 3 for residential and 2 to 4 for commercial purpose, making available additional built-up area (BUA) of 3.05 lakh sq m for residential and 33.11 lakh sq m for commercial purposes, which will be sold by MMRDA.

**Source:** ‘Unlocking Land Values to Finance Urban Infrastructure’ by George E. Peterson, ‘Unlocking Urban Land Values for Infrastructure Finances’ by Ashwini Bhide and Dr Satish Bagal, MMRDA.
Difficulties in using land leases or sales as a source of revenue for capital investments in basic infrastructure provided by municipalities arise when land is owned by different agencies of the state or national government, for example, railways or port authorities. In such cases revenues are retained by the selling agency and reinvested in infrastructure assets within its domain of responsibility, and none of the revenues are assigned to municipal corporations. Rajasthan is an exception. The new land-auctioning guidelines require that 15 per cent of all revenue generated by land sale within Jaipur metropolitan area accrue to Jaipur Municipal Corporation to help finance municipal infrastructure.

This method has significant potential as there are vast unutilized land resources owned by the Defence Ministry, the Railways, and other government agencies. There are, however, several issues that need to be resolved before the MMRDA model can become an effective means of financing infrastructure. The main issue is that public accountability is very weak. Proceeds from such sales, in some cases, continue to be used for meeting the operating expenses of ULBs, rather than for the development of infrastructure and housing. Neither the sources of funds for housing subsidies nor the amounts invested in infrastructure are clearly identified in their budgets. Unless ULBs adopt better accounting techniques and show the sources and uses of funds, separate operating and capital budgets, and balance sheets summarizing their assets and liabilities, it will remain difficult to hold ULBs accountable to use these funds for development projects.

An alternative to the approach of leasing/selling surplus land available with municipalities is to use land as collateral to raise money. This approach can be adopted for land that is available for commercial exploitation but does not have immediate commercial value due to the absence of basic infrastructure. For example, in China, municipalities have used this approach to borrow against the future anticipated value of land. The loans were repaid from future revenues accruing from the leasing of land after the completion of an infrastructure project. An example of this can be found in the Ring Road Corporation which was able to borrow about US$350 million from the China Development Bank and commercial banks against the future anticipated value of the improved land adjacent to the ring road.

However, borrowing against the future anticipated appreciation of land values can be risky given the volatility of land markets. In fact in the year 2003, China required that banks making loans to municipalities appraise land collateral at its present market value rather than at its future anticipated value (Peterson 2009).

**Bundling land resources in a PPP project**

A number of PPP projects bundle in an element of land for commercial use or additional development. The idea is to make the project more viable,
while at the same time reduce the cash-based support required from the government.

Some of these projects are:

• Bangalore International Airport
• Hyderabad International Airport
• Hyderabad Convention Center and Golf Course
• International Convention Center, Bangalore
• Bangalore–Mysore Expressway (Nandi corridor)
• Delhi International Airport

A number of urban facilities such as bus terminals and parking complexes are also being structured around the same model.

However, there are issues in the way land has contributed to the viability of the projects. To take the case of the airports, the additional land (beyond that required for aero operations), is of the order of 500 acres. In addition, for the airports, the Governments of Karnataka and Andhra Pradesh had provided cash-based (grant) support of an order of about Rs 300–400 crore.

The land values in the vicinity have significantly increased: for instance, near Bangalore airport land values increased from about Rs 5 lakh per acre, to about Rs 500 lakh per acre. However, despite this gain, the airports are still requesting (and have been granted) user development fees, citing viability issues.

The basic reason for this occurrence is that cash flows from land development are ‘valuable’ only after the basic infrastructure (airport in this case) stabilizes in operations (see Figure 31.5).

A similar request for an increase in airport charges, and for imposing new fees was made by the developers of Indira Gandhi International Airport (see Box 31.19). This time the request was prompted by the drop in real estate prices in the midst of the 2008–09 global recession.
Box 31.19: Real estate development associated with the Delhi International Airport Limited

The GOI has awarded the modernization and consequent operations and maintenance of the Indira Gandhi International Airport (IGIA) at Delhi to the GMR Group-led consortium, Delhi International Airport Limited (DIAL). The concession period is 30 years, extendable by another 30 years. As part of this project, DIAL has got land of approximately 5100 acres. About five per cent of this land can be used for commercial development in the form of hospitality and aviation-related facilities (commercial, retail, logistics, etc.).

It is understood that DIAL had plans for funding the capital expenditure for development of phase 1B of airport modernization through deposits to the tune of Rs 27–28 billion in lieu of leasing land to developers. Under the concession agreement, DIAL is required to share 45.99 per cent of its revenues with the Airports Authority of India, an agency of the GOI. However, DIAL argued that deposits obtained from real estate development were not revenue and therefore, not required to be shared with the AAI under the concession agreement—an argument accepted by the GOI.

With the fall in real estate demand and prices due to the economic slowdown that swept the world in FY 2008–09, deposits from real estate development were found to be inadequate, resulting in funding problems for the airport. GMR put forward the demand to AAI for charging airport development fees (ADF) and for a hike in airport charges to compensate for the delay in land developments and make up for the balance funding needs. The Ministry of Civil Aviation (MoCA) allowed DIAL to levy the ADF even though the concession agreement did not originally envisage such a levy.

The experience of DIAL is indicative of the role that real estate development plays in funding infrastructure projects. The revenue from these developments is not capped or regulated and thus, has immense potential for upsides, very often forming the basis of viability of the concession. The experience also highlights how, if real estate development falls short of plans, developers approach the government to levy user charges even though the same may not be permitted under the concession agreement.

Source: IDFC research

The Bangalore and Delhi airport examples point to the drawbacks of bundling land with a PPP project.

First, the subsidy element of land is bundled into the project, rather than being explicit. This gives rise to a non-transparent value gain. This is very sensitive especially in the case of land, in the long term. Second, the appraisal for viability needs a ‘double projection’—that of the basic project, and then of investment returns on land. Even single projections are difficult—so the double projection may not be very reliable, either on the upside or on the downside. Third, the subsidy is given in kind to an SPV that need not necessarily have the ‘land development skills’, such as
an airport company or a metro rail company. Fourth, the value gain is not properly captured by all the stakeholders—and the original land losers may end up feeling deprived of any value share. This would result in socio-political issues. Last, when the right to commercially develop land is bundled with an infrastructure project, the private developers may have little incentive to share the capital gains from the increase in value of land with the ULB.

Therefore, the possible approach could be to make the ‘subsidy’ explicit (cash transfer through a VGF) rather than implicitly building it in as land transfer. The government could hold the land in reserve, and set in place structures that capture the increase in land value (through a separate process). For example, the government can sell land in small increments—during and after the completion of a development project (for example development of an airport)—thereby directly benefiting from the land value increases realized due to the development project. Since these increments would be small in the earlier stages of project development, government would need alternate funding sources in these stages. Since commercial lending institutions might not be willing to lend based upon the future value of land, a special infrastructure development fund could be set up to finance such projects, or the state finance commissions or other similar central- or state-level financial institutions could provide the financing.

Risks in land-based financing of infrastructure

There is no doubt that bundling the development rights for land with an infrastructure project can improve the viability of an infrastructure project, making even an unviable project viable. But there are several risks associated with using land as a financing instrument to finance such projects.

First, as seen from the case of the modernization of the Delhi airport, external influences on the price of real estate may lead to land-based financing plans going awry. In other words, the inherent volatility in land markets poses the biggest risk to such financing. Second, there is a finite amount of land available with government agencies. It may be a lucrative source of revenue to begin with, but will dry up over a period of time. Moreover, not all land available with these agencies may be fit for infrastructure development or commercial exploitation.

Third, land, if sold or leased at the inception, could fund a part of the initial cost of development. It is only an alternative to any additional cash subsidies that governments may otherwise be required to provide to make infrastructure projects viable. It cannot be a substitute for user charges which would be required to meet the capital as well as the operation and maintenance costs of projects.

Finally, the sale of land often lacks transparency and accountability. This is accompanied by low accountability on the use of revenues accruing from such sale.
In some cases, government agencies may be accused of giving away prime land at low rates to the private sector, or giving more land than necessary in the garb of infrastructure development, prompting allegations of corruption.

**Land pooling and readjustment**

Urban land development through the use of eminent domain has faced several problems in developing countries on account of various reasons such as inadequate compensation for land and intense opposition from the displaced landowners. To counter these hurdles, many Asian nations—prominent among these are Japan, South Korea, Taiwan, Indonesia, Malaysia, Thailand and even Nepal—have used a technique called land pooling and readjustment (LPR).

LPR is a process whereby a public authority consolidates numerous small parcels of land, without paying compensation to the land owners, to carry out collective planning of their land. The authority designs and sub-divides the assembled lands for urban use while earmarking and retaining a portion of this land (within an overall share limit) for development of civic infrastructure amenities such as roads, parks and gardens or schools. Some portion of land is set aside for public sale to enable the recovery of development costs. The remaining land is returned to the original owners in proportion to the value of their land contribution (cost-equivalent land).

This technique has been used in India, but there is much greater potential for its use than is being realised. Examples of its application can be found in the state of Gujarat and Maharashtra. In Gujarat, it has been implemented as the ‘Development Plan–Town Planning Scheme’ (DP–TP mechanism) under the Gujarat Town Planning and Urban Development Act (GTPUDA), 1976. One of the biggest examples of LPR is the development of the Sardar Patel Ring Road in Ahmedabad (see Box 31.20).

LPR offers several benefits in the Indian context. It will help to (i) ensure the availability of urban land for controlled growth, thereby providing a solution to the problems of scattered and unplanned development and backlog in public infrastructure services; (ii) remove the disparity between those who lose land for infrastructure projects and those living in close vicinity of the project, who are not displaced and gain from the capital appreciation; (iii) capture the incremental value of land resulting from development projects and use it to finance such projects; and last, but not the least, (iv) it does not require the ULBs to go through the highly controversial and arduous land acquisition process. In fact, LPR has the potential to be a self-financing technique for urban land and infrastructure development.
However, for LPR to be effective, certain conditions must exist. First, the ULBs must do extensive advance planning, and coordinate with the effected property owners. Second, the property owners must trust the ULB with their land for the duration of the development. Finally, the affected property owners might have to be relocated for the duration of the development project.

**Box 31.20: Land pooling and readjustment for the Sardar Patel Ring Road in Ahmedabad, Gujarat**

The Sardar Patel (SP) Ring Road was conceptualized in the Revised Development Plan of the Ahmedabad Urban Development Authority (AUDA) published in 1997, as a road encircling the newly-extended areas of the Ahmedabad Municipal Corporation (AMC). The SP Ring Road is an arterial road, about 76 km long and 60 metres wide, facilitating traffic movement within the city by providing easy access to and from the city outskirts. After receiving numerous objections from land owners whose land would be acquired by government for the road, AUDA came up with a revised proposal which was published in 1999 and sanctioned in 2002. This proposal received very few objections.

AUDA declared most part of the ring road as a Town Planning (TP) Scheme area under the Gujarat Town Planning and Urban Development Act. Only 13.1 km of the total was acquired by the conventional land acquisition method where TP schemes could not be declared, namely areas designated as agricultural in the master plan. Under the TP Scheme, AUDA proposed reconstitution of the land belonging to the affected landowners and assured final plots in rectangular shape near the right of way (ROW) of the ring road. This encouraged land owners and tenants to hand over their land for development of the ring road without receiving any financial compensation.

It is estimated that out of the total land acquired, 60 per cent of the land was returned to the land owners, 20–30 per cent was used for development of public amenities like roads, schools and gardens, and the remaining land was sold by AUDA as separate plots. The land value appreciated due to the construction of the ring road as well as the development of land with civic amenities and AUDA earned about Rs 600 crore from the sale of plots retained by it. For development of the ring road, AUDA spent Rs 130 crore from its own resources and obtained a loan of Rs 100 crore from a consortium of six nationalized banks. AUDA is collecting toll, currently around Rs 1 crore per month, which goes towards its debt servicing.

The LPR mechanism is self-financing: AUDA could recover the full cost of acquiring the land, developing infrastructure and public amenities, and planning and administration by selling the developed land along the ring road.

What is the potential for land-based financing of infrastructure?

The land-based financing mechanisms discussed above can be broadly classified into two categories. On the one hand are mechanisms that require the developers or the property owners to pay fees to fund infrastructure. These mechanisms include development impact fees and betterment charges. On the other hand are mechanisms that use the present or anticipated value of land to fund infrastructure. These mechanisms include FSI/TDR; value capture through linkage; and LPR.

There are pros and cons to each of these mechanisms. The fees-based mechanisms could work well in instances where the proposed development would not need to be subsidized, and could very well pay for itself. Examples of such developments would include high-end housing, commercial and office developments. However these mechanisms are not suitable where infrastructure needs to be subsidized for social equity reasons. Such scenarios would arise in case of infrastructure serving lower income housing or such public infrastructure as parks and libraries. Further, the fees-based mechanisms would not help cover the existing infrastructure backlog. Finally, the fees charged under these mechanisms are currently set very low. To increase the fees, the ULBs should first educate the consumers about the rationale behind the fees increase, and after securing broad-based acceptance, raise the fees incrementally. Even with the above-listed concerns, globally the fee-based mechanisms have garnered wider acceptance among the general population compared to taxes (such as property taxes) to fund infrastructure and services. The reason behind the higher acceptance rate of fees is the direct link people see between the amount of the fees paid and the benefit derived from the infrastructure funded through those fees. That link is missing in the case of broad-based revenue sources like property taxes, income taxes and sales taxes.

The land value based mechanisms’ major strength—using future land values to fund infrastructure—is in some respect their biggest hurdle because predicting future land value could be difficult. Therefore these mechanisms could work well in the presence of financial and administrative structures that would enable the use of future land values to fund infrastructure. Since these mechanisms do not link the actual users of infrastructure with funding, they are well suited to provide infrastructure that would otherwise need cross-subsidization for social equity reasons. Further, these mechanisms could work well if the ULBs already own the land. In the case of LPR, where the ULBs need to work with the property owners, the ULBs need to do substantial advanced planning and coordination work. Even then as far as possible, LPR and other such alternatives to land acquisition should be used.

In summary, the ULBs should continue to explore ways to raise the fees, especially for the high-end residential, commercial and office development. However the total
quantum of revenue generated through fees may not yield substantial funds for infrastructure development. Hence the land-value–based mechanisms should be developed further.

A large amount of urban land is highly underutilized. This land is primarily under the ownership of Defense Ministry which is the single largest owner of prime urban land (the cantonment land), followed by the Railways. The Railways own approximately 4.3 lakh hectares of land, of which almost 45,000 hectare is unencumbered land. In several cities this land may be the primary source of open space. Second, it may be very difficult to convince the agencies that own the land to sell the land. Finally, the conversion of this land to other use would have to go through a use change process. However, even after considering the above caveats we believe that at least a part of this un- or under-utilized defense or railway land could be sold, and part of the revenue generated from the land sale should go to the ULBs for funding infrastructure. The criteria used to identify parcels of land for sale could include the estimated value of the land after the use change; and the environmental impact of the use change—with land that would fetch high value, and which would have minimal adverse impact on the environment, selected first for sale.

Next, the ULBs should continue to explore new ways to use future land values to fund infrastructure. We recommend that in the case of a PPP project, the government entities should retain ownership of substantial part of the excess land around the project, and sell that land in small and strategic increments. The incremental sale of land would enable the government to gain the full benefit of the PPP project-driven increase in land values.

Finally, we recommend that more ULBs explore the avenue of using LPR to fund infrastructure. As mentioned above, LPR has several advantages. First, it obviates the need for forceful acquisition of land. Second, it is equitable as all the property owners are impacted similarly and benefit from the increase in land values, and from the new infrastructure. Last, it does not create winners and losers as is the case with land acquisition.

5. CONCLUSION AND RECOMMENDATIONS

The financing requirement for urban infrastructure is enormous and yet there is very little funding being channeled for investment in core urban infrastructure. Besides the special need for long-term financing that is required for infrastructure and the usual project risks, urban infrastructure—perhaps more than any other infrastructure sector—has a strong public interest nature as well as significant externalities, which make private financing less forthcoming. Water tariffs are even more sensitive than electricity tariffs. Institutional capacity at the local level is also
an issue. ULBs have limited autonomy and arguably the least capacity, whereas they are now responsible for delivering all core urban services. A multiplicity of agencies exists with responsibility for various planning and administration functions; so decision-making and coordination issues become a stumbling block to smooth and speedy execution of projects. And overriding all the above, is the generally weak financial position of ULBs.

Undoubtedly, there needs to be substantial improvement in the major resource bases of the ULBs to shore up an internal surplus and to access market-based finance. Key reform targets for ULBs relating to improvements in property taxes and user charges have been articulated in the JNNURM. Further, it is recommended that a part of the cess levied by the central government on petrol and diesel should go to the ULBs to fund urban transportation projects. This cess is progressive in nature as those who consume more motor fuel would contribute more towards the development of urban transportation (including urban mass transportation). Through the cess the government would achieve multiple objectives: increase the cost of operating a car, provide funding for the more financially and environmentally sustainable public transportation, and shore up ULBs revenues. Finally, state governments also need to provide a predictable and sizeable revenue sharing arrangement and implement their State Finance Commission recommendations.

Bank and bond financing of ULB infrastructure projects is not significant and cannot be expected to be so if the ULBs are not creditworthy. While state governments, shouldering their own deficits, may not provide large-scale resources to ULBs, they need to use their resources judiciously to leverage private financing where possible. And raising the creditworthiness of the ULBs is a necessary condition to effectively leverage government resources. A few large MCs that have attained investment grade rating and started establishing a track record through bank borrowing and bond issues will be able to more easily obtain finance. But for the large majority, there will need to be greater government support.

Pooled financing has not taken off despite SPFEs being established in a number of states. Part of the reason is the 8 per cent cap on interest rate on tax-free bonds whereas taxable bonds are not receiving the requisite credit enhancement. Other reasons are to do with the under-developed state of the bond market in general, and illiquidity and riskiness of municipal bonds in particular. Some specific suggestions have been given in the section where we discussed the future steps in debt financing, to foster the municipal bond market. While market development is necessary, it will take time.

Moreover, while PPPs have achieved a few successes, not much private investment has come in to the urban sector. We have made some suggestions on the structuring of PPPs and the suitability of various structures for different types of urban sector
projects. We have also identified the key considerations for developing a PPP framework for urban mass transportation projects. Further, we have also proposed some models in which a JV project development company or a private entity develops a project and then either leases it to the ULB in the former case or the ULB buys it and leases it to the private entity for O&M in the latter case. However, all these will remain experiments or even isolated successes unless the underlying creditworthiness of ULBs is established and a number of bankable projects are designed. By its very nature, the private sector will be selective and the PPP process time-consuming as capacity is gradually built up at the local level.

Clearly, the government has a large role to play in funding urban infrastructure at this time. Financial markets will take time to develop as will the capacity of ULBs. Meanwhile, a special re-finance lending facility to ULBs would provide the financing boost. Whether it is a vehicle such as the already set up IIFCL or a proposed National Urban Infrastructure Fund being contemplated by the central government, it will need to ensure that the banks or state nodal agencies such as SPFEs that on-lend to ULBs conduct a thorough appraisal of projects and monitor their implementation. The government backing should not lessen the due diligence requirements. The facility could also contribute to credit enhancement and provide the necessary comfort for private finance. Over time, a repayment record of ULBs’ would be established through this process so that those that are creditworthy can ‘graduate’ to market-based sources of finance.

A second source that could contribute significantly at this stage is land-based finance. It has been posited that although the income stream of ULBs (from taxes and fees/charges) is weak, their balance sheets are stronger with land assets which could be unlocked to finance infrastructure. While it is not known how much land ULBs actually own, it is clear that other government agencies and parastatals have significant amounts of underutilized land. Using cantonment land or railways land to finance their own infrastructure as well as to contribute to municipal infrastructure should be considered on an urgent basis. Where it is in prime locations, it can be sold (or auctioned) without the need for development. In some cases, it is possible for ULBs to buy land from state governments or get occupancy rights and to lease the land after developing it. There are many models that can be used depending on the situation. Bundling land to make PPPs viable is also an option though we recommend that the government could hold the excess land in reserve, and set in place structures that capture the increase in land value (through a separate process) as and when required for the project (rather than give the land to the SPV).

One of the most promising mechanisms is the use of land pooling and readjustment, which obviates the need for land acquisition finance and has wider public acceptability because it is more equitable and increases the value of the proportion
of developed land returned to original landowners. Much of Ahmedabad has been developed through this method, some other state governments have the enabling legislation and are beginning to pursue it (such as Karnataka), and many Asian countries also use it.

In summary, while all the options of taxation, user charges, development fees, bond market development and PPP should be pursued, they will not likely be able to quickly yield the huge quantum of funds required for urban infrastructure development. In our view, the government needs to step in with a large refinance and credit-enhancing facility and the potential of land-value–based financing options need to be exploited more extensively.

REFERENCES


## Table 31.6: Revenue powers of municipalities across major states in India (2004)

<table>
<thead>
<tr>
<th>State</th>
<th>Compulsory</th>
<th>Discretionary</th>
<th>Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>Property (lighting, water, scavenging, drainage, general), vehicles, duty on transfer of immovable properties, animals</td>
<td>Advertisement</td>
<td>Advertisement fee, mutation fee, registration fee, market fee, trade licence fee, compounding fee, slaughterhouse fee, license fee</td>
</tr>
<tr>
<td>Gujarat</td>
<td>Property, vehicle, boats, animals, motor vehicles, octroi, dogs, special and general sanitation, lighting, sale of cattle in the market, betterment levy</td>
<td></td>
<td>Registration fee, licence fee, swimming bath fee, slaughter house fee, building construction fee, stock registration fee, water connection fee, cattle pound fee</td>
</tr>
<tr>
<td>Karnataka</td>
<td>Property, advertisement, boats, animals, lighting, toll on vehicles, duty on transfer of immovable property.</td>
<td>Property (lighting, water, drainage, general purposes, sanitary), transfer of properties, animals, profession, vessels, show, timber, advertisement</td>
<td>Licence fee (building, trade and hotel), building betterment fee, birth and death registration fee, food adulteration fee, slaughterhouse fee, compounding fee</td>
</tr>
<tr>
<td>Kerala</td>
<td>Property (lighting, water, drainage, general purposes, sanitary), transfer of properties, animals, profession, vessels, show, timber, advertisement</td>
<td></td>
<td>Licence fee, building fee, dangerous and offensive trade licence fee, market fee, slaughterhouse fee</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>Property, water, lighting, sanitary, fire, local body tax on entry of goods</td>
<td>Latrine, conservancy, drainage, profession, vehicles, animals, dogs, show, toll on vehicles and animals not mentioned above, betterment, pilgrim, persons occupying houses, buildings, land according to circumstances and property, toll on new bridges, terminal, entertainment, advertisement</td>
<td>Licence fee, market fee, animal registration fee, hotel/restaurant licence fee, composting fee, the bazaar fee, building application fee, compounding fee</td>
</tr>
<tr>
<td>State</td>
<td>Compulsory</td>
<td>Discretionary</td>
<td>Fees</td>
</tr>
<tr>
<td>------------</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>Consolidated property tax (general, water, lighting, sanitary) advertisement, profession, theatre, octroi</td>
<td>Vehicles, animals, dogs, boats, show, toll on vehicles, animals not mentioned above, dogs latrine, drainage, pilgrim, special water tax, special education tax, etc.</td>
<td>Licence fee, slaughter house fee, building permission fee, fee for sale of goods, water connection fee, warrant fee, prevent of food adulteration licence fee, cattle pounds fee, swimming pool fee, birth and death registration fee, bettenment/development fee</td>
</tr>
<tr>
<td>Punjab</td>
<td>Property, profession, vehicle, animals, menial domestic servants, scavenging, building application</td>
<td>Property, profession, vehicle, animals, menial domestic servants, scavenging, building application</td>
<td>Licence fee, slaughterhouse fee, building application fee, composition fee, bazari fee, water connection fee</td>
</tr>
<tr>
<td>Tamil Nadu</td>
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<td>Property, profession, carriage and animals, advertisement, servants (hill stations)</td>
<td>Licence fee (building, hotel, restaurant, dangerous and offensive trade), market fee, slaughterhouse fee, cart stand fee, encroachment fee</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>Property, trade, dogs, calling, vocation, entertainment, boat, vehicle, animals, inhabitants assessed on property and circumstances (water, drainage), scavenging, conservancy, transfer of property</td>
<td>Property, trade, dogs, calling, vocation, entertainment, boat, vehicle, animals, inhabitants assessed on property and circumstances (water, drainage), scavenging, conservancy, transfer of property</td>
<td>Licence fee, advertisement, building, planning/development fee, house connection fee, permission fee, market/slaughterhouse fee, birth and death registration fee, fees from burning ghats</td>
</tr>
<tr>
<td>West Bengal</td>
<td>Profession, property, advertisement, toll on ferries and bridges, vehicles</td>
<td>Profession, property, advertisement, toll on ferries and bridges, vehicles</td>
<td>Licence fee, advertisement, building, planning/development fee, house connection fee, permission fee, market/slaughterhouse fee, birth and death registration fee, fees from burning ghats</td>
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</tbody>
</table>

Table 31.7: Cost recovery of WSS and SWM services for select municipal corporations covered under JNNURM

<table>
<thead>
<tr>
<th>Water supply and sewerage</th>
<th>In 2004–05</th>
<th>As of 30 June 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total O&amp;M cost (Rs crore)</td>
<td>Total cost recovery (Rs crore)</td>
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<tr>
<td>Agartala</td>
<td>8.94</td>
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<td>Agra</td>
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<td>2.5</td>
</tr>
<tr>
<td>Ahmedabad</td>
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<td>23.17</td>
</tr>
<tr>
<td>Allahabad</td>
<td>27.97</td>
<td>21.1</td>
</tr>
<tr>
<td>Bhopal</td>
<td>49.18</td>
<td>9.67</td>
</tr>
<tr>
<td>Bhubaneswar</td>
<td>85.56</td>
<td>27.21</td>
</tr>
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<td>40.39</td>
</tr>
<tr>
<td>Dehradun</td>
<td>35</td>
<td>16</td>
</tr>
<tr>
<td>Faridabad</td>
<td>30.15</td>
<td>13.2</td>
</tr>
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<td>6.05</td>
<td>1.56</td>
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<td>264.83</td>
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<td>5.29</td>
<td>4.65</td>
</tr>
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<td>Nagpur</td>
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<td>55.1</td>
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<td>Raipur</td>
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<tr>
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<td>0.89</td>
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<tr>
<td>Surat</td>
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<td>35.63</td>
</tr>
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<td>Vadodara</td>
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<td>Vizag</td>
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</tr>
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<td>In 2004–05</td>
<td>As of 30 June 2008</td>
</tr>
<tr>
<td>------------------------</td>
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<td>-------------------</td>
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<tr>
<td></td>
<td>Total O&amp;M cost (Rs crore)</td>
<td>Total cost recovery (Rs crore)</td>
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<td>Dehradun</td>
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<td>Jaipur</td>
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<tr>
<td>Panaji</td>
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</tr>
<tr>
<td>Pune</td>
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<tr>
<td>Raipur</td>
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<tr>
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Source: Compiled from reports available under JNNURM
Table 31.8: Long-term credit rating of the ULBs/state pooled entities

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Urban body/municipal corporation</th>
<th>Long-term rating</th>
<th>Rating agency</th>
<th>Safety</th>
<th>Investment grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>BB-(IS)</td>
<td>CARE</td>
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<td></td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
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<td>Fitch</td>
<td>Adequate</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td>Allahabad Municipal Corporation</td>
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<td>CARE</td>
<td>Low</td>
<td></td>
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<tr>
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<td>ICRA</td>
<td>Moderate</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td>Asansol Municipal Corporation</td>
<td>BB</td>
<td>CRISIL</td>
<td>Inadequate</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Bhopal Municipal Corporation</td>
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<td>Fitch</td>
<td>Adequate</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td>Bhubaneswar Municipal Corporation</td>
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</tr>
<tr>
<td>9</td>
<td>Bruhat Bengaluru Mahanagara Palike</td>
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<td>10</td>
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<td>ICRA</td>
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<tr>
<td>12</td>
<td>Cochin Corporation</td>
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<td>ICRA</td>
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<td>Coimbatore City Municipal Corporation</td>
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<td>ICRA</td>
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<td>Faridabad Municipal Corporation</td>
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<tr>
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<td>Greater Hyderabad Municipal Corporation</td>
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<td>Greater Mumbai Municipal Corporation</td>
<td>AA(ind)</td>
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<td>17</td>
<td>Greater Visakhapatnam Municipal Corporation</td>
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<td>CARE</td>
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<td>18</td>
<td>Guwahati Municipal Corporation</td>
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<td>19</td>
<td>Howrah Municipal Corporation</td>
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<td>20</td>
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<td>21</td>
<td>India’s Water and Sanitation Pooled Fund</td>
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<td>Indore Municipal Corporation</td>
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<td>Jabalpur Municipal Corporation</td>
<td>BB+(ind)</td>
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<td>Kalyan Dombivili Municipal Corporation</td>
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<tr>
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<td>Kolkata Municipal Corporation</td>
<td>withdrawn</td>
<td>CARE</td>
<td>-</td>
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</table>
Table 31.8: Long-term credit rating of the ULBs/state pooled entities (contd...)

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Urban body/municipal corporation</th>
<th>Long-term rating</th>
<th>Rating agency</th>
<th>Safety</th>
<th>Investment grade</th>
</tr>
</thead>
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<td>BB(is)</td>
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<td></td>
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<tr>
<td>29</td>
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<td>ICRA</td>
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</tr>
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<td>Ludhiana Municipal Corporation</td>
<td>BBB-</td>
<td>ICRA</td>
<td>Moderate</td>
<td>Yes</td>
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<td>ICRA</td>
<td>Adequate</td>
<td>Yes</td>
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<tr>
<td>32</td>
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<td>Adequate/strong</td>
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</tr>
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<td>BB(is)</td>
<td>CARE</td>
<td>Inadequate</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>Mira Bhayander Municipal Corporation</td>
<td>A-(ind)</td>
<td>Fitch</td>
<td>High</td>
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</tr>
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<td>36</td>
<td>Mysore City Corporation</td>
<td>BBB+</td>
<td>ICRA</td>
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<td>Yes</td>
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<tr>
<td>37</td>
<td>Nagpur Municipal Corporation</td>
<td>AA(ind)(SO)</td>
<td>Fitch</td>
<td>Very high</td>
<td>Yes</td>
</tr>
<tr>
<td>38</td>
<td>Nanded Waghala City Municipal Corporation</td>
<td>BBB-</td>
<td>CRISIL</td>
<td>Moderate</td>
<td>Yes</td>
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<tr>
<td>41</td>
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<td>Fitch</td>
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<td>Yes</td>
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<tr>
<td>42</td>
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<td>Fitch</td>
<td>Very high</td>
<td>Yes</td>
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<tr>
<td>43</td>
<td>Puri Municipality</td>
<td>C</td>
<td>CARE</td>
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<td></td>
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<td>Yes</td>
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<td>45</td>
<td>Rajkot Municipal Corporation</td>
<td>A-</td>
<td>CRISIL</td>
<td>Adequate</td>
<td>Yes</td>
</tr>
<tr>
<td>46</td>
<td>Ranchi Municipal Corporation</td>
<td>BB-</td>
<td>CRISIL</td>
<td>Inadequate</td>
<td></td>
</tr>
<tr>
<td>47</td>
<td>Sangli, Miraj and Kupwad Municipal Corporation</td>
<td>withdrawn</td>
<td>Fitch</td>
<td>–</td>
<td></td>
</tr>
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<td>48</td>
<td>Shillong Municipal Board</td>
<td>B+(ind)</td>
<td>Fitch</td>
<td>Very low</td>
<td></td>
</tr>
<tr>
<td>49</td>
<td>Shimla Municipal Corporation</td>
<td>BB</td>
<td>ICRA</td>
<td>Inadequate</td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>Srinagar Municipal Corporation</td>
<td>BB-</td>
<td>ICRA</td>
<td>Inadequate</td>
<td></td>
</tr>
<tr>
<td>51</td>
<td>Surat Municipal Corporation</td>
<td>AA-</td>
<td>CRISIL</td>
<td>High</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 31.8: Long-term credit rating of the ULBs/state pooled entities (contd...)

<table>
<thead>
<tr>
<th>Sr. no.</th>
<th>Urban body/municipal corporation</th>
<th>Long-term rating</th>
<th>Rating agency</th>
<th>Safety</th>
<th>Investment grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>Thane Municipal Corporation</td>
<td>AA-(ind)</td>
<td>Fitch</td>
<td>Very high</td>
<td></td>
</tr>
<tr>
<td>53</td>
<td>Thiruvananthapuram Corporation</td>
<td>BBB-</td>
<td>ICRA</td>
<td>Moderate</td>
<td>Yes</td>
</tr>
<tr>
<td>54</td>
<td>Ujjain Municipal Corporation</td>
<td>BB(ind)</td>
<td>Fitch</td>
<td>Fairly low</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>Vadodara Municipal Corporation</td>
<td>A-</td>
<td>CRISIL</td>
<td>Adequate</td>
<td>Yes</td>
</tr>
<tr>
<td>56</td>
<td>Varanasi Municipal Corporation</td>
<td>B+(is)</td>
<td>CARE</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>Vijaywada Municipal Corporation</td>
<td>BBB+(is)</td>
<td>CARE</td>
<td>Moderate</td>
<td>Yes</td>
</tr>
<tr>
<td>58</td>
<td>Water and Sanitation Pooled Fund</td>
<td>AA(ind)(SO)</td>
<td>Fitch</td>
<td>Very high</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: Fitch ratings, Care ratings, CRISIL ratings and ICRA ratings

NOTES

1. The Twelfth Finance Commission Report states that India has 3723 urban local bodies (ULBs), of which 109 are municipal corporations for larger urban areas, 1432 are municipal councils for smaller urban areas and 2182 are nagar or town panchayats for areas that are in transition from rural to urban.

2. See Annez (2006) for international experience.

3. See Annexure Table 31.6 for the revenue powers of municipalities.

4. The abolition of octroi without assigning a substitute local revenue source (although they were given compensatory state grants) actually shrunk the revenue base of municipalities in Haryana, Orissa, Rajasthan, and seriously affected the revenue profile of municipalities in Gujarat and Maharashtra (Mathur 2006).

5. Cities and towns in the north-east and other special category states may recover only 50 per cent of O&M charges initially. These cities and towns should graduate to full O&M cost recovery in a phased manner.


7. In contrast, in some Latin American countries, legally guaranteed new revenue-sharing arrangements greatly increased municipal incomes and probably did more than any other policy action to expand local credit markets and to accelerate private entry into municipal lending (Peterson 2000).

8. To some extent, bond banks, which are a type of financial intermediary, can perform some of the functions of a municipal bank such as helping to strengthen a municipality’s
credit quality and assisting small ULBs with the paperwork necessary to borrow—as well as pooling the issues of smaller ULBs.

9. The AMC bond issue received a good response and was oversubscribed by 10 per cent. About 25 per cent of the issue funds were raised from the public and 75 per cent was privately placed with 13 banks and institutional investors. It carried a coupon rate of 14 per cent payable semi-annually.


11. Study by the Asian Development Bank (ADB) and Ministry of Urban Development (MoUD), 2007.

12. A recent guideline from the Secretariat of the Committee on Infrastructure has advised against the formation of a special purpose vehicle with partnerships between public and private sectors. This is due to the conflict of interest that arises in such partnerships. The problem with JVs arises due to the fact that a joint venture (JV) implies a two-level relationship between public and private sectors, i.e. a shareholders’ agreement for a JV between a public entity and a private company on the one hand and a concession/procurement agreement between the public entity and the JV on the other hand. These two parallel agreements pose issues that are more complex than those arising in case of a JV that sells its output in a competitive market and does not enter into other parallel agreements with the public entity. There could also be a perceived conflict of interest in awarding an infrastructure project to a JV in as much as the public sector entity which is the grantor of the concession is also a partner in the recipient JV which is a private sector company.

For more than half a century, the town planning scheme (TPS) has been the predominant mechanism in Gujarat to plan and develop new urban residential areas. The mechanism is an effective alternative to land acquisition under the Land Acquisition Act (LAA) 1894 as it is more equitable, self-financing, and enables planned urban expansion. It should be replicated across the nation.

**CONCEPT**

Strong landowner opposition to forcible land acquisition, combined with extremely limited fiscal capacity has left urban local bodies (ULBs) with very few options to develop well-planned and serviced urban land. Land pooling and reconstitution (LPR) is a tool that addresses both these issues by allowing landowners to share the gain in the land value post provision of infrastructure and services. In lieu, landowners pay betterment charges and contribute a part of their land to fund the infrastructure and services.

Simply put, in LPR, a number of small holdings are pooled together, a part of the land is taken from each plot for provision of infrastructure and public facilities, and the rest returned to the original landowners. Figure 32.1 illustrates this process. The original plots (outlined in dotted lines) are devoid of any road network. Once the infrastructure is planned, the landowners receive new smaller plots (outlined in purple).

An LPR scheme is developed by a public agency (typically a development authority or a municipal corporation) which:

* Prepares a detailed plan for a sector of a city. The plan identifies the location of major infrastructure (e.g. roads, water, sewers and street lighting) and services (e.g. schools, parks, and housing for the economically weaker section—EWS),
Land Pooling and Reconstitution allocates land use, reserves plots for future sale and provides a financing plan. The plan is consistent with the city’s master plan/development plan.

- Pools the various owners’ land holdings.
- Rationalises the property boundaries, and after deducting land for infrastructure and services, re-plots the land and allocates it back to the landowners.
- Finances the scheme through (a) betterment charges paid by landowners for increase in their land value due to the provision of infrastructure and (b) revenues from the sale of reserved plots.

**EXTENT OF USE**

Extensively used internationally, LPR can trace its roots to Holland and Germany in the 1890s. It quickly spread across the globe including Europe (e.g. Sweden, Finland, France and Belgium), Asia (e.g. Japan, South Korea, Thailand, Indonesia, India and Nepal), the Middle East (e.g. Israel, Lebanon and Palestine) and Australia. It is used primarily for peri-urban expansion.

In India, the Bombay Town Planning Act of 1915 allowed the use of LPR in the form of Town Planning Schemes (TPS) in the erstwhile Bombay Presidency. Later, it became the basis of the TPS-enabling act in Gujarat—the Gujarat Town Planning and Urban Development Act (GTPUDA) 1976.

TPS was widely used in Maharashtra in the first half of the twentieth century. For example, large parts of Mahim, Khar and Borivali in Mumbai were developed through TPS. However, its use declined when the Maharashtra Regional and Town Planning

*Figure 32.1: Section of LPR scheme depicting original and new plots*

*Source: TPS 50 Scheme, AUDA*
Act 1966 shifted the focus for the implementation of the city master plan from TPS to detailed Development Plans (DPs). Among the reasons for the shift was the long time taken between TPS initiation and final government approval (average of 15 years) and the fact that an ownership dispute over a single land parcel could hold up the entire scheme. In practice, DPs were rarely prepared, while the use of TPS declined. On the other hand, TPS found a favorable environment in Gujarat, especially after the 1986 and 1999 amendments to the GTPUDA, which enabled:

(a) Possession of land for construction of roads after approval of the Draft TPS—1999 Amendment (see Figure 32.2). Since land values rise with roads, this has helped ensure landowner support.

(b) Sale of plots (up to 15 per cent of scheme area) to finance the scheme (1986 Amendment).

(c) Tighter time limits in the process (1999 Amendment).

Further, the TPS process does not settle landownership disputes. It only transfers them to the newly reconstituted plot, thereby not holding up the TPS approval process. As a result, TPS has become the predominant urban expansion tool in all the major cities in Gujarat. For example, the Ahmedabad Urban Development Authority (AUDA) has prepared over 109 schemes and the Ahmedabad Municipal Corporation (AMC) has prepared 61 in the last four decades.

Apart from Gujarat and Maharashtra, a few other states, notably Andhra Pradesh, Karnataka, Punjab and Kerala, have TPS-enabling legislation, albeit with little use of the mechanism. Instead of using TPS, Punjab only permits conversion of large parcels of agricultural land to urban use. For example, a 100 hectare agricultural land may be allowed conversion if 45 per cent is used for public facilities and infrastructure, and the remaining 55 per cent for residential use.

**TP scheme preparation process in Gujarat**

(see Figure 32.2)

• Despite the 1999 amendments, the entire process can still take much longer than the stipulated 3–4 years mainly due to delays by the Town Planning Officer (TPO) and the state government.

• Development of roads can begin after approval of the Draft TPS (which is supposed to take 1.5 years). If considered a priority, the development of the remaining infrastructure—water, sewers, street lights—can also begin at this stage. Land for public facilities and plots for future sale is placed in the control of the development authority after approval of the preliminary TPS when sale of reserved plots can also begin.
There are four rounds of public inputs. The first round is initiated by the development authority at the Draft TPS stage. The other three rounds are initiated by the TPO in the preliminary and final TPS stages (the first two rounds focus on physical issues, such as location and size of plots, and the third focuses on financial issues, such as determination of plot values and betterment charges).

Although the TPS process provides ample public input opportunities, formal landowner consent is not required.

**Case Studies**

Three TP Schemes were chosen from Ahmedabad. Bodakdev 1B is an example of a pre-1999 scheme, whereas TPS 50 is a post-1999 scheme. Both schemes involve land use conversion from agriculture to urban. The third, Bopal 3, while also located in a peri-urban area, is one in which substantial urban development has already taken place. As a result, final plots are very similar in shape and size to the original plots. The scheme areas range between 200–300 hectares and the number of landowners between 250 and 800.

**Timeline:** While TP Schemes still take a very long time (10+ years) from initiation to final government approval, infrastructure provision has accelerated in schemes after 1999. Road development started 2.5 years after notification of scheme intent in TPS 50, as against 15 years for Bodakdev 1B (see Table 32.1). However, the
provision of other infrastructure is uncertain in TPS 50 as the scheme was transferred from AUDA to AMC in 2008 due to a change in the municipal boundary.

### Table 32.1: Actual TPS timeline

<table>
<thead>
<tr>
<th>Scheme</th>
<th>Scheme intent</th>
<th>Sanctioned draft TPS</th>
<th>Sanctioned preliminary TPS</th>
<th>Final TPS</th>
<th>Roads</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPS 50</td>
<td>Dec 2001</td>
<td>June 2004</td>
<td>–</td>
<td>–</td>
<td>2004–present (80% done)</td>
<td></td>
</tr>
<tr>
<td>Bopal 3</td>
<td>Apr 2001</td>
<td>Sent for approval in May 2009</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** TPS Reports, AUDA

**Deduction of land:** Whereas around 25 per cent of land was taken from the landowners in Bodakdev 1B, recent schemes such as TPS 50 are based on higher land deduction—up to 40 per cent. The actual amount deducted may be less, depending on the extent of structures on a person’s land (generally, up to 20 per cent is deducted from lands with built-up structures) and the usability of the land post deduction. Thus, an average of 36 per cent has been deducted in TPS 50, whereas as little as 15 per cent is deducted from the partially built up Bopal 3. The higher land deduction enabled creation of a larger land bank in the post-1999 TPS 50 scheme of 9 per cent compared with less than 4 per cent in the pre-1999 Bodakdev 1B scheme (see Table 32.2).

### Table 32.2: Land use in TPS (sq m)

<table>
<thead>
<tr>
<th>Land use</th>
<th>Bodakdev 1B</th>
<th>TPS 50</th>
<th>Bopal-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final plots to private owners infra. &amp; pub. facil.</td>
<td>1,556,866</td>
<td>1,157,591</td>
<td>2,509,221</td>
</tr>
<tr>
<td>Roads</td>
<td>275,963</td>
<td>311,685</td>
<td>289,978</td>
</tr>
<tr>
<td>EWS Housing</td>
<td>38,242</td>
<td>49,860</td>
<td>39,194</td>
</tr>
<tr>
<td>Others</td>
<td>144,053</td>
<td>125,740</td>
<td>63,986</td>
</tr>
<tr>
<td>Plots for sale</td>
<td>76,456</td>
<td>166,559</td>
<td>105,408</td>
</tr>
<tr>
<td>Total</td>
<td>209 ha</td>
<td>181 ha</td>
<td>300 ha</td>
</tr>
</tbody>
</table>

**Note:** Others include gardens, open space, social infrastructure, neighbourhood centres, schools and playgrounds.

**Source:** TPS Reports, AUDA
Calculation of plot values and betterment charges: Plot values are calculated to determine compensation to landowners for land taken and betterment charges payable by them. After notification to initiate the TPS, recent sales data of similar land parcels are analysed to assign original plot (OP) value, on which compensation is based. The future plot (FP) value is the hypothetical value of the plot remaining with the landowner once the infrastructure and facilities are provided. Both OP and FP are values as of the date of notification to initiate the TPS. The betterment charge equals one-half of the difference between the FP and OP value, and is only payable when a landowner applies for land use change from agricultural to urban use. The ratio of FP to OP value per square metre varies between 2 and 3 for the case study TPS (see Table 32.4). For example, it is 2.7 for TPS 50 with OP value of Rs 500/sq m and FP value of Rs 1,300/sq m.

Scheme costs and financing of infrastructure: Infrastructure is the single largest scheme cost under LPR. The cost for compensation is not as high compared with LAA as only a portion of land is deducted in LPR as against 100 per cent acquisition under LAA (see Table 32.3). Importantly, the ULB needs to come up with funds for acquiring land under the land acquisition scenario, whereas under LPR, net outflow for the ULB is negligible as betterment charges typically exceed compensation for land deduction.

Table 32.3: Scheme cost: TPS 50 (Rs crore)

<table>
<thead>
<tr>
<th>TPS 50 Scheme Cost</th>
<th>Actual under LPR</th>
<th>Hypothetical under LAA, 1894</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructure</td>
<td>38.9</td>
<td>38.9</td>
</tr>
<tr>
<td>Roads</td>
<td>19.1</td>
<td>19.1</td>
</tr>
<tr>
<td>Water</td>
<td>4.7</td>
<td>4.7</td>
</tr>
<tr>
<td>Sewer</td>
<td>12.3</td>
<td>12.3</td>
</tr>
<tr>
<td>Street lighting</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>Compensation for land deduction</td>
<td>21.39</td>
<td>90.5*</td>
</tr>
<tr>
<td>Publication and legal expenses</td>
<td>0.12</td>
<td>–</td>
</tr>
<tr>
<td>Cost of demarcation/salaries/other</td>
<td>0.25</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>60.66</td>
<td>129.5</td>
</tr>
</tbody>
</table>

Note: * Assuming all 181 ha is acquired at OP value (Rs 500/sq m)

Source: Draft TPS 50 Report, 2002; Form ‘G’ for actual cost.
As per the Draft TPS reports, betterment charges could finance 87 per cent to 98 per cent of the project cost if all expenditures are made and revenues realised in the first year itself (see Table 32.4). The remainder could be financed through the sale of plots. However, the reality is actually the opposite if we take into account the timing of cash flows. The FP value and, in turn, the betterment charges are set very low, determined at a very early stage and are not revised over time to account for increase in land value. Delays in implementation increase construction costs and reduce the net present value of betterment charges. As betterment charges are only payable when the landowner chooses to apply for land use change, they are realised over a very long period of time. In the case of Bodakdev 1B, betterment charges, set in 1978, started coming in from 1993 onwards and are still trickling in, resulting in their financing only 6 per cent of the scheme cost (see Table 32.4). In fact, even if the betterment charges were to be realised over a short time span of three years (from 1993–1995), they would have financed only a fraction (13 per cent) of the scheme cost.

Delays work in the opposite direction for land sales as land values increase over time. Thus, revenues from the sale of plots can pay a much larger share of the TP Scheme cost, and in fact can provide a surplus (estimated at Rs 60 crore in the case of Bodakdev 1B on an estimated scheme cost of Rs 67 crore in 2010 prices) that could go towards funding regional infrastructure like a sewerage treatment plant and water pumping stations that serve multiple TP Schemes.

Early infrastructure development would trigger land use conversion and, in turn, payment of betterment charges, thereby increasing their contribution to scheme financing. A sensitivity analysis for Bodakdev 1B shows if the receipt of betterment charges would have commenced three years after the notification to prepare the scheme (as was the case with TPS 50), the charges could have financed 28 per cent of the scheme. Indeed, a scenario analysis for TPS 50 shows that the betterment charges could finance almost half of the scheme cost (48 per cent) even if infrastructure development takes thirteen years and betterment charges are realised over twenty years from the date of Draft TPS sanction (2004). The sensitivity analyses clearly indicate that the contribution of betterment charges towards financing a greater share of the scheme cost hinges on the early start of infrastructure development.

**Potential for land bank:** Reserved plots in TP schemes form the land bank, which can help finance much infrastructure beyond the specific TP scheme. For instance, AUDA can realise at least Rs 450 crore if all the reserved plots (17 ha) in TPS 50 are sold at the current market rate of Rs 30,000/sq m.
### Table 32.4: Source of financing

<table>
<thead>
<tr>
<th>Scheme title</th>
<th>FP/OP ratio</th>
<th>As per draft TPS % of expenses financed through</th>
<th>Estimate of actual financing (assuming 10% discount rate and 15% cost escalation annually)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Betterment charges</td>
<td>Sale of land</td>
</tr>
<tr>
<td>Bodakdev</td>
<td>2.5</td>
<td>97%</td>
<td>3%</td>
</tr>
<tr>
<td>TPS 50</td>
<td>3</td>
<td>87%</td>
<td>13%</td>
</tr>
<tr>
<td>Bopal 3</td>
<td>2</td>
<td>98%</td>
<td>2%</td>
</tr>
</tbody>
</table>

*Note:* 1. For Bodakdev 1B it is assumed that construction expenditure and betterment charges are evenly spread over the period 1993–2005 and 1993–2012 respectively; for TPS 50 over 2004–2016 and 2004–2023 respectively; and for Bopal 3 over 2012–2025 and 2013–2032 respectively.

2. * Actual sales data are used for Bodakdev 1B.

*Source:* IDFC analysis based on Form ‘G’ of the TPS Reports

### REASONS FOR SUCCESS OF TPS IN GUJARAT

- Early provision of infrastructure
- Land ownership disputes transferred to the new plot
- Manageable scheme size which is large enough in area for planning and small in the number of plots to make the process manageable (including public hearings and reconciliation of revenue records with the site survey)
- Development authorities’ planning capacity to interconnect physical, financial and property rights dimensions of TPS
- Self-financing as revenues from sale of reserved plots supplement betterment charges, and act as a hedge against increase in construction cost
- Landowner satisfaction due to infrastructure provision and increase in own net land value (There are some concerns though, such as difficulty in understanding the TPS documents and of inequitable treatment as influential landowners sometimes get smaller land deduction, wider roads and higher FSI.)
- Political acceptability because of self-financing nature and high degree of landowner satisfaction, many of whom are also highly politically connected
ISSUES

• There is need for improved transparency in the process and accounting of revenues and expenses of the schemes.

• Firm deadline is needed for the government to approve the TPS to enable timely sale of plots and development of public facilities. The scheme should be considered approved if the government fails to take a decision within a reasonable time period.

• There is need for better quality infrastructure, for example, footpaths, medians and landscaping.

• There is a need for better, cohesive urban form as the scheme documents do not provide urban design guidelines.

• Architects and city planners need to develop a better quality urban environment.

CONCLUDING THOUGHTS

Gujarat has made great strides in the use of TPS. Improvements need to focus on timely provision of public facilities and sale of plots, as well as on the quality of infrastructure.

TPS holds immense potential nationally. All we need is the political will. Amendments to State Town Planning Acts may be required, especially if these do not currently allow plot reconstitution and levy of betterment charges. In other cases, existing provisions within the state and local planning acts can be explored to frame rules for LPR. Finally, promotion of LPR can be part of the JNNURM reform agenda.
Two pooled funds were structured in India as pilots—Tamil Nadu Water and Sanitation Pooled Fund (TNWSPF) in 2002 and Karnataka Water and Sanitation Pooled Fund (KWSPF) in 2005—to enable small and medium urban local bodies (ULBs) access the capital market for their debt requirements. Later in 2006, the Ministry of Urban Development (MoUD) introduced a scheme called Pooled Finance Development Fund (PFDF) with the objective of scaling up the TNWSPF and KWSPF pilots to facilitate market borrowing by small and medium ULBs across the country. However, not a single pooled fund has been structured since these two pooled funds. With the basis of analysis as TNWSPF and KWSPF, this note examines the main constraints that have held back the development of the pooled fund as an option for raising market finances for ULBs. The note also suggests a way forward for improving the PFDF scheme of MoUD.

**INTRODUCTION**

Over the years, some large municipalities in India have issued bonds to raise resources. However, small and medium ULBs face difficulties in raising resources from the market due to small issue size, which makes the cost of issuance almost prohibitive.

The pooled finance structure, which has been used extensively in the US and European countries, supports borrowings of small and medium ULBs by pooling their resource requirements together. A typical mechanism in the US is that a pooled fund entity, which is an intermediary, borrows from the market with some credit enhancement, and uses the proceeds to purchase debt obligations of ULBs. These bonds are rated instruments, and the rating depends on the diversification of pooled debt obligations and credit enhancement.
Demand side mechanisms complement the financing mechanisms in the US. These include preparation of Intended Use Plans (IUP), requiring ULBs to prepare a borrowing programme based on their investment needs and repayment capacity, as well as securing public consent. There are clear guidelines on user charges and interest subsidies for hardship communities. Moreover, the fiscal transfers from state to ULBs are rule-based, allowing rating agencies to estimate future cash flows with some degree of predictability.

**THE TWO POOLED FUNDS IN INDIA**

In India, although the demand side mechanisms are non-existent, similar pooled fund mechanisms were tried as two pilots. TNWSPF borrowed Rs 304 million by issuing the taxable 9.2 per cent coupon, non-convertible redeemable, 15-year bonds with put/call option after 10 years in December 2002. KWSPF raised Rs 1 billion from the market by issuing the tax-free 5.95 per cent coupon, 15-year bonds in July 2005 with a 3-year moratorium on principal repayment (with no put/call option). The funds raised by TNWSPF were meant for refinancing high-cost fixed-rate, 16-per cent interest, 30-year tenor loans for water and sanitation projects of 13 ULBs. These projects had either been completed or were in advanced stages of completion. The funds raised by KWSPF on behalf of 8 ULBs on the periphery of Bangalore were meant to part finance the water supply component of a greenfield project, Greater Bangalore Water Supply and Sanitation project (GBWASP). The project is being implemented by the Bangalore Water Supply and Sanitation Board (BWSSB), a state parastatal responsible for providing supply and sanitation services in Greater Bangalore at a project cost of Rs 5.36 billion. The financing mix for the project is market borrowings by KWSPF (19 per cent), mega city loans from GoI (28 per cent), grants (20 per cent) and a one-time beneficiary capital contribution (BCC) collected at the time of approval of building plans (33 per cent).

**Pooled fund structure**

The structure of TNWSPF and KWSPF is presented in Figure 33.1. These funds are placed under the management of state pooled fund entities (SPFE). The SPFEs (Tamil Nadu Urban Development Fund and Karnataka Urban Infrastructure Development Finance Company) are intermediaries that provide technical assistance to ULBs in identifying projects for the pool, undertake bond issuance related formalities and service the bonds. These pooled funds have an elaborate credit enhancement/structured payment mechanism as determined by the rating agency for a rating of AA, implying ‘high’ credit quality.

a. Escrow of revenues of ULBs: Each ULB will establish a no lien escrow on its current account through which its tax collections and other revenues including
state finance commission devolution (SFCD) are routed. Each month, ULBs would transfer 1/10th of their annual debt service requirement (DSR) to this account, which has precedence over other commitments of ULBs.

b. State Finance Commission Devolution (SFCD) intercept: Any shortfall in the monthly payments would be met from the SFCD to respective ULBs.

c. Bond Service Fund (BSF): In case the intercept of SFCD is insufficient or delayed, SPFE will ask a BSF trustee (an appointed bank) to transfer the shortfall to the Water Project Account.

d. USAID guarantee and restoration of BSF: USAID guarantee of 50 per cent of the bond’s principal would replenish the BSF, if needed. The cost of USAID’s guarantee was 0.75 per cent of the ceiling amount as origination fee and a one-time utilisation fee equivalent to 3 per cent of the ceiling amount.

Why did TNWSPF work better than KWSPF?

a. **Financial strength of pooled ULBs**

In relation to the DSR, ULBs pooled for TNWSPF were better positioned than those for KWSPF (see Table 33.1). In Karnataka, the revenue surplus of pooled ULBs

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**Figure 33.1: TNWSPF and KWSPF pooled fund structure**

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reduced by 59 per cent after 2002–03 as two sources of revenue—water development cess and development charge—were taken away and the additional duty on transfer of properties was reduced. Earlier, the revenue surpluses as a share of revenue receipts for ULBs in Karnataka were better than for ULBs in Tamil Nadu, but the ratio worsened substantially due to these changes (see Table 33.1, column 6). As a result, the revenue surpluses of pooled ULBs in Karnataka were insufficient to service the debt. Therefore, as part of the credit enhancement mechanism, an additional commitment was made by the GoK to make provision for Rs 130 million grant in the state budget annually.

In Tamil Nadu, on the other hand, ULBs already had experience of debt servicing and the bond proceeds were refinancing high interest loans by lower cost loans.

Table 33.1: Financial summary of pooled ULBs (%)*

<table>
<thead>
<tr>
<th>TNWSPF**</th>
<th>Surplus/ revenue</th>
<th>Debt service/ surplus</th>
<th>KWSPF</th>
<th>Surplus/ revenue</th>
<th>Adj. surplus†/ adj. revenue</th>
<th>Debt service/ adj. surplus***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambattur</td>
<td>48</td>
<td>5</td>
<td>Yalahanka</td>
<td>40</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Madhavaram</td>
<td>31</td>
<td>26</td>
<td>Byatarayanapur</td>
<td>83</td>
<td>26</td>
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<td>Tambaram</td>
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<td>K R Puram</td>
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<td>50</td>
<td>318</td>
</tr>
<tr>
<td>Rajapalayam</td>
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<td>66</td>
<td>Mahadevpura</td>
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<td>72</td>
<td>114</td>
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<td>Madurai</td>
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<td>63</td>
<td>Bommanahalli</td>
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<tr>
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<td>52</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes:
* Tamil Nadu—average of 2000–02; Karnataka—2002–03
** Four urban areas have not been included because their accounts were not available.
*** To make the debt servicing/revenue surplus comparable for TNWSPF and KWSPF, this ratio for KWSPF has been taken for the year 2006–07, the year when principal repayment starts (after 3 years of moratorium). In case of TNWSPF repayment (principal + interest) starts in year 1 (2002–03). Adjusted revenue surplus for pooled ULBs in KWSPF in 2006–07 are projected from the base 2002–03 on the assumptions that in general revenues will grow at 10 per cent and expenditure by 12 per cent. (assumptions made at the time of structuring of the project).
¤ These ULBs have no surplus.
† After adjusting for revenue loss.

Ultimately, though the objective of KWSPF to finance a water supply project covering 8 ULBs was well-founded, the debt component became quite large, well beyond the
means of ULBs’ debt servicing capabilities. The loss of revenue sources weakened their financial position. In hindsight, the role of BCC in financing the project was underestimated which caused heavy reliance on debt. As of March 2010, as against an estimated Rs 1.75 billion BCC, a contribution of Rs 3.32 billion has been raised.

b. **How appropriate was the pricing of bonds?**

TNWSPF bonds were better priced for investors than KWSPF. Even adjusting for tax-free status, KWSPF bonds had hardly any spread over G-Sec while TNWSPF bonds had a spread of almost 3 per cent (see Table 33.2). Fine pricing of KWSPF bonds suggests that pricing was out of place with market realities and was seemingly done to reduce debt servicing obligations for ULBs.

<table>
<thead>
<tr>
<th></th>
<th>10 years</th>
<th>15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>TNWSPF – Jan 2003</td>
<td>2.9</td>
<td>2.73</td>
</tr>
<tr>
<td>KWSPF (adjusted for tax-free status) – July 2005</td>
<td>0.47</td>
<td>0.07</td>
</tr>
</tbody>
</table>

c. **Were the bonds attractive to secondary investors?**

The initial investors in TNWSPF were 3 banks (2 of them subscribed Rs 300 million out of Rs 302 million issue), and 2 private provident funds (PFs). The issue has been listed, and the original 2 big banks have exited and have been replaced by 25 PFs. In the case of KWSPF, out of 12 investors, 8 are banks, 2 insurance companies and 1 a corporate entity. None of them have exited. This suggests that KWSPF bonds are not attractive to investors in the secondary market. Coupon on KWSPF has maintained a negative spread over 10 year G-Sec yield for most of the period (see Figure 33.2).
d. Testing of the intercept

The repayment to bondholders of TNWSPF and KWSPF has been as per schedule. In the case of TNWSPF, ULBs have made transfers to the escrow account, though not strictly as per the prescribed mechanism due to the seasonality in their own revenues. There have also been occurrences when ULBs have fallen short of their required contributions to the escrow, in which case the intercept on SFCD has been used. In the case of KWSPF, bond proceeds were not utilised for three years due to slow progress in construction, and since BWSSB took over the project in 2009, the debt servicing by ULBs remained untested.

ISSUES

In summary, from the ULBs’ perspective, municipal bonds seem to have worked better for refinancing loans than for financing greenfield projects. Though the bonds issued by two pooled funds were fully subscribed, investors viewed them cautiously due to a number of factors:

• Creditworthiness of ULBs was suspect for investors despite an elaborate credit enhancement mechanism because it was untested. Investors were apprehensive about enforceability of the intercept on SFCD.

  Interest rates were perceived inadequate to cover risks. MoUD has since issued guidelines, which caps the interest rate at 8 per cent on tax-free municipal bonds, thereby making pricing less flexible. Tax-free status is not attractive to long-term investors like PFs as these are tax-free entities.

• Liquidity of the bonds was an other important factor here. Long tenor and illiquid bond market is a deterrent to banks whose liabilities are shorter. Holding the instrument to maturity was unattractive.

• Regulatory norms permit investments by insurance companies in securities that are rated A+ or above. The practice, however, is that these investors choose instruments that are a couple of notches above the regulatory norms to provide a cushion for rating downgrades, making AA rated municipal bonds unattractive.

Pooled Finance Development Fund (PFDF) scheme of MoUD

In 2006, MoUD set up a PFDF scheme with a corpus of Rs 4 billion as a credit rating enhancement fund (CREF). Of this corpus, 5 per cent is to be utilised as project development assistance, and the rest is to provide a third tier of security (similar to BSF in the pilots) in case the first two tiers—escrowing of ULBs’ resources and any internal arrangements between a state and SPFE, including state interception—are
insufficient to meet repayment obligations. The extent of CREF contribution to credit enhancement is the lower of 10 per cent of the bond amount or 50 per cent of BSF as determined by the rating agency. Bonds issued under PFDF scheme are eligible for tax-free status, subject to approval by Central Board of Direct Taxes (CBDT). The contribution of MoUD to CREF is one-time and upfront, with no further recourse to MoUD. After bond maturity, the CREF funds would remain with the SPFE for leveraging other infrastructure projects.

However, to date no state other than Karnataka and Tamil Nadu has operationalised SPFEs. TNWSPF is the only one which has been approved central assistance of Rs 566 million towards BSF and project development cost.

The scheme has not taken off for a number of reasons:

• Grants from JNNURM (a reform-linked, grant-based scheme of MoUD launched in 2005 to fund urban infrastructure projects of ULBs in 63 cities) have crowded out demand for market debt.

• Expected increase in the weighted average cost of capital of ULBs due to market debt compared to traditional government grant-based financing has deterred ULBs from participating in the pooled fund.

• Rigid escrow account mechanism requiring ULBs to transfer annual DSR as monthly instalments add to their borrowing cost.

• The approval process is complicated and lengthy. There is too little credit enhancement support, and there are delays in obtaining tax-free status for bonds.

• Other constraints such as interest rate cap, long tenor and illiquid market for bonds reduce attractiveness to investors.

• There are delays in operationalising SPFEs in most states.

• Imbalance between responsibilities entrusted to the ULBs and power-delegated, multiplicity of institutions in providing urban services makes private equity and debt financing difficult.

• There is lack of a process guidance framework for ULBs, such as an Intended Use Plan.

**Proposed framework for pooled fund**

While market-based financing for ULBs will take time to develop, pooled financing can begin to play a role for technically capable ULBs that have revenue surpluses. Even for such ULBs, revenue surpluses are not sufficient to meet investment requirements, and hence grants should be leveraged efficiently. Accordingly, ‘grant based’ schemes (JNNURM) should be integrated with market debt.
Experience from the pilots suggests that in the nascent stages of pooled fund development, the framework could have following features:

- Bonds to refinance loans of ULBs. For new projects, bonds could refinance loans after project cash flows have stabilised and ULBs have established two years of debt repayment track record.

- Interest rates on bonds should be aligned to the debt instruments of similar ratings. The tax-free status, though it gives ULBs benefit of a lower rate, could be done away with since it is not useful to some long-term investors.

- To incentivise ULBs to participate in the scheme, interest earned on BSF could be utilised to subsidise interest on loans to ULBs.

- The state governments should not change any rules that affect the cash flows of the ULBs without bondholder approval.

- Put/call option after 5 years should be built into the bond structure to attract short-term investors like banks.

For ULBs that have debt servicing capacity, JNNURM could be modified to provide a combination of grant and construction debt finance. In addition, MoUD’s CREF should be linked to JNNURM with modifications (see Figure 33.3).

Construction finance of 3–4 years should be provided from JNNURM to ULBs, secured by state government guarantee to intercept SFCD to ULBs. Thereafter, during the first two years of operation, ULBs would repay this JNNURM loan. ULBs can approach a pooled fund entity to refinance their loan by issuing bonds. Two years of debt servicing track record would establish ULBs’ creditworthiness.

The following credit enhancement mechanism is recommended:

a. An escrow account, where ULBs would contribute necessary annual DSR. Any shortfall will be met by an intercept on SFCD.

b. BSF would transfer payments to the escrow in case of a shortfall. The size of the BSF from CREF could be 50 per cent of the bond amount (against 10 per cent in current PFDF scheme).

SPFEs would issue bonds of 10–15 years tenor with put/call option after 5 years. Bondholders would exercise put option if the market interest rate is higher than the coupon rate. Rising interest rate is detrimental to ULBs as they neither have the capacity to take interest rate risk nor the capacity to repay bondholders in case put option is exercised. Initially, the government may need to step in. A takeout financier like IIFCL could provide finance to the extent redemption on bond is sought.
CONCLUSION

Though market debt will increase the overall cost of financing urban infrastructure for ULBs, the proposed framework has the following advantages:

- It allows leveraging of government grants and own revenue surpluses of ULBs.
- ULBs should make use of BCC as a mechanism of financing. In effect, BCC could be viewed as PV of the foregone user charges, which are politically difficult to raise. In Karnataka, the BCC was simple, easy to enforce and became a major source of financing since the area was newly developing.
- It assigns project risks to entities that are best placed to assume them and addresses issues related to illiquidity of bonds.
- FIIs should be attracted to invest in pooled funds given that they have global experience in investing in similar funds.
- In the whole process, the government has to play a greater credit enhancement role.

Figure 33.3: Proposed framework integrating PFDF in JNNURM
As India’s demand for freshwater grows exponentially, so does the production of wastewater, which is currently disposed, largely untreated, into already limited freshwater resources—thereby further exacerbating scarcity conditions. Some industries are successfully treating and utilizing household wastewater to meet their water requirements. This paper looks at such initiatives to understand the conditions under which recycling wastewater is a viable alternative to fresh water supply.

INTRODUCTION

Wastewater can be broadly understood as the spent or used water discharged from households, industries, commercial establishments or agricultural activities. The quality of wastewater varies widely, depending on its source—contaminants ranging from biological (e.g. faecal matter) to chemical (e.g. pesticides) and may be pathogenic or benign. Although sewage water is technically the subset of wastewater discharged from households, the terms are often used interchangeably.

Ideally, different types of wastewater should be collected separately and treated prior to discharge into freshwater bodies. However, due to inadequate sewage infrastructure and weak enforcement, untreated industrial, domestic and other effluents often mix in nallahs and drains from where they flow into surface water bodies. Where wastewater stagnates in pools it leaches into groundwater tables and contaminates underground aquifers.

Contamination of our freshwater sources has serious health and ecological consequences. Water-borne diseases like diarrhoea, caused by consuming faecally contaminated water, are the largest causes of child mortality in the country. Similarly, ingestion of pesticides and heavy metals through drinking water is responsible for an alarming rise in the number of children born with congenital deformities.
Discharge of untreated wastewater in water bodies exacerbates our existing water scarcity because the water then cannot be used directly. Moreover, it is more difficult and expensive to treat freshwater that is contaminated by a mix of industrial and agricultural effluent and household sewage than to treat pollutants at the source.

The purity required of water differs according to its end use, with the purest form needed primarily for drinking water. In a water-scarce situation, using high quality water for non-potable uses is economically inefficient. Rather, recycling wastewater to the minimum level required for its subsequent use can preserve potable water for human consumption.

This paper looks at four initiatives—three by water-intensive industrial users and one by a municipality—where sewage treated water (STW) is used to meet industrial and other non-potable water requirements. The three companies were compelled to use recycled water due to lack of freshwater supply from their water supply authority. The municipality initiative is more recent and uses more advanced technology to produce a standard of output water that can be directly reused for most non-potable purposes.

On the whole we find that as technology has improved and costs reduced dramatically, treating sewage water to be used for non-potable purposes is becoming an increasingly viable and practical solution to the looming freshwater crisis.

**What does treatment and reuse of sewage water entail?**

Wastewater is treated in stages to progressively improve the quality of water. The most important water quality characteristics are total suspended solids (TSS), biological oxygen demand (BOD), chemical oxygen demand and nutrients (nitrates and phosphates).

There are several technologies to treat wastewater at the municipal level. One of the most basic is a Waste Stabilisation Pond (WSP) in which sewage water is allowed to degrade naturally in a series of shallow artificial basins. However, for numerous reasons including variable output quality, inability to manage mixed effluent and land intensity, it is only suited to rural areas where energy and capital is scarce but land easily available. WSP has largely been replaced by more advanced technologies.

Conventional Activated Sludge Process (ASP) is the preferred option for medium to large STPs (30 MLD and above) and when land is scarce. Treatment comprises three stages prior to which heavy solids like wood and grit that could choke the plant are removed (see Figure 34.1). ASP is suitable for Indian conditions as it can effectively treat both diluted and concentrated wastewater as well as mixed household and industrial waste. However it is highly energy-intensive.
Sequential Batch Reactor (SBR) is an advanced form of ASP. Since treatment takes place in a single basin it requires up to 33–50 per cent less land and has 40 per cent lower civil construction expenditure than a conventional ASP plant. Due to automated controls it consumes 35–45 per cent less power than conventional ASP, has lower chemical requirements and reduces manpower costs significantly. SBR has in-built nutrient removal although this can be added to conventional ASP.

For most non-potable uses, water must have certain minimum quality characteristics (see Figure 34.2). CPCB norms for discharge of wastewater into fresh water bodies fall short of these quality requirements. Sewage water treated by SBR can be directly reused whereas ASP output requires further treatment to achieve the minimum norms for non-potable use (see Figure 34.2). As the cases below will demonstrate, it is cheaper to use SBR to meet reuse standards than conventional ASP.

### Using STW in power plants: The case of PPCL

Thermal power plants are heavy users of water; a 2008 report conservatively estimates that power plants account for more than 75 per cent of total industrial water use. However, while they are highly water-intensive, power plants do not require high quality of water for most of their processes. For instance, gas-based thermal power plants use over 90 per cent of their water for cooling, and coal-based plants use more than 70 per cent of water for ash handling and cooling towers—all of which requires water at low-end industrial use standards. Only a fraction of water, 5 and 30 per cent respectively, is required at the high-end level which requires de-mineralization (DM).

One of the earliest wastewater recycling initiatives by industry was undertaken by Pragati Power Corporation Limited (PPCL), which is a Delhi-based power station operating as a subsidiary of Indraprastha Power Generation Corporation Limited. PPCL commenced operations of its 330 MW gas-based power plant in mid-2004. At its planning and development stage, PPCL was denied a freshwater linkage, but given the option to operate and use two 10 MLD-each sewage treatment plants (STPs) built atop nearby nullahs just 1 and 3 kilometers away.
Figure 34.2: Technology choice and reuse standards

Source: Interviews with SFC Environmental Technologies Ltd, Central Pollution Control Board, IDFC analysis

Note: BOD and COD are indirect measures of the amount of organic and inorganic material in sewage water. TSS measures the concentration of suspended, non-filterable solids. Nutrients (N=nitrogen, P=phosphorus) are measured as they encourage growth of algae and other aquatic plants. Membrane Bio Reactor (MBR) is an advanced sewage treatment technology that is currently more expensive than ASP and SBR.

These STPs were two of nine ASP plants built along the Yamuna River under Japan International Cooperation Agency (JICA) funding as a pilot project for the Delhi Jal Board (DJB) in 2002. The STPs used by PPCL treat only 5–10 per cent of the sewage that flows through the nallahs, and the rest is discharged untreated into the Yamuna.

Initially, it was agreed that DJB would provide free STW to PPCL in return for free electricity to run the plants. However, since DJB had little interest in running the plant they signed an MOU with PPCL in 2004, in which PPCL had the right to use the STPs for as long as required provided they took care of operation and maintenance (O&M) responsibilities.
PPCL has outsourced the O&M contract to Degrémont, an international water treatment company who had built the plants for JICA. The STP treats water to the secondary level with output parameters of BOD <10, COD < 25–30 and TSS <15. After that 19 MLD of STW is pumped to the PPCL power plant where it undergoes lime-softening treatment.

The bulk of the water is utilized within the PPCL plant at this level of treatment. Only 1–1.5 per cent of lime-softened water is sent for DM so it can be used in boilers. While DM is an expensive process that adds to the cost of production, this step is required even if freshwater were used.

Lime-softening and DM take place within the power plant and utilize electricity generated by the plant itself. Moreover, since both processes are required regardless of water source, the costs in Table 34.1 are only for secondary level treatment. However, PPCL engineers note that given the quality of Yamuna freshwater they receive, further treatment costs are lower when using STW.

PPCL’s O&M contract with Degrémont is renegotiated every two years; for 2010–12 it is Rs 1.26 crore per year for both plants combined. As the STP is not located on PPCL premises they must buy electricity from the grid at commercial rates to run the STP and pump treated water to the power plant. This comes to a cost of Rs 1.6 crore.

The current O&M cost of producing STW, including electricity, is ~Rs 4/kL. However, since variable costs change over the life of a plant Table 34.1 calculates the levelized annual cost of treatment over a 20-year period.

### Table 34.1: Levelized annual treatment cost, PPCL

<table>
<thead>
<tr>
<th></th>
<th>Levelized costs*</th>
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<tbody>
<tr>
<td></td>
<td>Rs/kL</td>
</tr>
<tr>
<td>Total costs (including ROE)</td>
<td>~17</td>
</tr>
<tr>
<td>Total costs (excluding ROE)</td>
<td>~15</td>
</tr>
</tbody>
</table>

**Source:** Interviews with Degremont and Pragati Power Corporation Ltd; Delhi Electricity Regulatory Commission Tariff Order 2008–11, IDFC analysis

**Note:** *Levelized costs are calculated by dividing the net present value of the total cost into an equal annual per unit cost. A 10% discount rate is used.

**Assumptions:** All non-fixed costs escalate at 5.5% per year over 20 years. Capital expenditure is Rs 2.5 crore per MLD, debt–equity ratio is 70:30, loan is for 10 years at 12.5% interest and Return on Equity (ROE) is DERC-approved at 14%. All estimates include pumping costs from the STP to PPCL.
At present, most power plants in the country receive subsidized water or are required to pay a nominal cess to use surface water for their operational requirements. At the subsidized rates, their freshwater costs are 2–4 paise per kWh. In comparison, even when capital expenditure is included it costs PPCL just 5 paise per kWh to utilize STW. Against this cost the benefits are two-fold. One, freshwater is released to meet the needs of human consumption. The opportunity cost of drinking water can be priced at the cost of tanker water which ranges from approximately Rs 50/kL to upwards of Rs 90/kL in the larger metros. Two, in a water-scarce situation where industries compete with households for freshwater and there is the risk of not having water for power generation, the benefit of electricity at ~Rs 4 per kWh (average electricity tariff) can be weighed against the cost of unserved electricity (which can be valued at Rs 15–20 per kWh as the cost of diesel-based captive generation).

**Using STW for higher quality industrial use**

Process industries such as chemicals and fertilizers, need a large and assured quantity of water which is also of consistently high quality.

Madras Fertilizers Limited (MFL) and Rashtriya Chemicals and Fertilizers Limited (RCF) are public sector fertilizer plants that faced major disruptions to their industrial processes in 1992 due to severe water cuts in Chennai and Mumbai. As reported by newspapers, RCF’s financial losses due to water supply disruption were almost Rs 50 crore. To avoid losses in the future, both decided to find alternative sources to municipal freshwater supply. MFL is purchasing STW from the Chennai water board for further treatment while RCF buys raw sewage from the Mumbai municipality.

MFL constructed their 16 MLD tertiary treatment and reverse osmosis plant (TTRO) in 1992 at a cost of Rs 30 crore. Unlike most other municipalities in the country, Chennai’s water board, Chennai Metro Water (CMW) treats all sewage to the required CPCB level. Therefore, MFL agreed to purchase 12 MLD of STW from CMW at Rs 10.20/kL, which they would then treat further to their specifications and 3 MLD of freshwater at Rs 60/kL. To receive the STW, MFL built a 1.6-km pipeline from CMW’s nearest STP to the TTRO on their premises. From the TTRO they must then pump the treated water over 5 km to reach their plant.

RCF’s STP, which is located in the heart of Mumbai, came on line in 2000. RCF constructed a 5-km pipeline to receive raw sewage at approximately Rs 0.60/kL from BMC’s Ghatkopar pumping station. They also buy 11 MLD of freshwater from BMC at the commercial tariff of Rs 40/kL.
RCF and MFL undertake O&M themselves and require a high share of water at the DM level. MFL utilizes 60 per cent of its water at the tertiary treatment level while 40 per cent is sent for RO and DM. Of the total water they receive from BMC and their STP, RCF uses 73 per cent at the RO level and 27 per cent at DM stage. Stage-wise cost of treatment and weighted average incremental cost of treatment are given in Table 34.2.

<table>
<thead>
<tr>
<th></th>
<th>MFL</th>
<th>RCF</th>
</tr>
</thead>
<tbody>
<tr>
<td>At plant gate</td>
<td>10.2</td>
<td>60</td>
</tr>
<tr>
<td>At TTP plant</td>
<td>28</td>
<td>Not req.</td>
</tr>
<tr>
<td>At RO plant</td>
<td>70</td>
<td>Not req.</td>
</tr>
<tr>
<td>At DM plant</td>
<td>100</td>
<td>130</td>
</tr>
<tr>
<td>Weighted average</td>
<td>47</td>
<td>28</td>
</tr>
<tr>
<td>treatment cost</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Interviews with Madras Fertilizers Ltd, Rashtriya Chemicals and Fertilizers and Chennai Metro Water, IDFC analysis

Clearly, it costs more to bring sewage treated water to the DM level than it does freshwater—in MFL’s case these costs are Rs 90 (100–10.2) and Rs 70 (130–60) respectively. However, cost differences should be weighed against having a reliable supply of water and control over quality which is highly valued by these kinds of industries.

Moreover, there is scope to reduce cost differentials. For instance, MFL is able to use tertiary level STW rather than RO water for cooling which is more cost-effective.

A municipal-led initiative: The case of NMMC

The Navi Mumbai Municipal Corporation (NMMC) is one of the first municipalities to treat its sewage to levels higher than CPCB standards. Using SBR technology, with its higher output parameters, NMMC can directly sell the STW produced for low-end industrial uses (see Figure 34.2).

NMMC’s first plant at Nerul was built in 2008 at a cost of Rs 67.9 crore for 100 MLD capacity. NMMC has given service contracts to private operators to run its STPs, but pays the electricity bills directly. The current 3-year O&M contract is Rs 70 lakh per year, which will be bid out again when it soon expires.
The Nerul plant is currently operating at 45 MLD with O&M and electricity costs of Rs 1.2/kL. Total costs are lower than conventional ASP although it seems that a significant part of the difference is due to economies of scale (see Table 34.3).

### Table 34.3: Levelized costs for treatment and pumping (Rs/kL)

<table>
<thead>
<tr>
<th>Levelized treatment cost</th>
<th>Levelized pumping costs*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASP (20 MLD)</td>
<td>Nerul (45 MLD)</td>
</tr>
<tr>
<td>Total costs (incl ROE)</td>
<td>~17</td>
</tr>
<tr>
<td>Total costs (excl ROE)</td>
<td>~15</td>
</tr>
</tbody>
</table>

Source: Interviews with SFC Environmental Technologies Ltd; IDFC analysis

Assumptions: All non-fixed costs escalate at 5.5% per year over 20 years. Capital expenditure for the Nerul STP is Rs 67.9 crore while for pipelines of 1 meter diameter (carrying capacity 132 MLD) it is Rs 3 crore/km, pumping costs are Rs 1 per kL for 10 km, debt–equity ratio is 70:30, loan is for 10 years at 12.5% interest and Return on Equity (ROE) is 16%. Electricity costs for 100 MLD operations were assumed to increase proportionately.

NMMC wants to actively promote use of STW. This has several benefits. It will free up freshwater required for potable use while supplying water to industry at a significant discount relative to the current industrial and commercial tariff of Rs 30/kL. Sale of STW will also let NMMC partially recover the costs of complying with discharge norms. In terms of environmental benefits, it reduces use of tanker water which is pumped indiscriminately from underground aquifers and transported by road.

NMMC has two types of selling arrangements in mind. Under the first, they hope to supply STW directly to bulk consumers who would construct pipelines to their plant themselves. For example, they could supply STW for construction of the new Navi Mumbai airport, which would otherwise require about 500 tankers of water per day (5 MLD) at Rs 50/kL.

Under the second, a private contractor would be responsible for the sale and marketing of STW to end-users. The contractor could buy the STW on an ‘as is/ where is’ basis but since he would be responsible for the quality to the end-user, he should preferably operate the STP as well. NMMC is exploring the option that the private operator also pays to construct the pipelines for delivery.

Building a separate STW pipeline network is expensive. Constructing a 1-meter
diameter pipe costs Rs 3 crore/km and current pumping costs are Rs 1/kL for 10 kilometers over a normal gradient. Since NMMC does not have much large industry, most potential users of STW would be shopping malls and large commercial establishments who could purchase STW for Rs 9/kL instead of the commercial tariff of Rs 30/kL. However, for households to purchase STW for gardening or flushing it would have to be priced below the cost of drinking water which is Rs 4.75/kL. NMMC has shown some initiative in this regard. For example, they have laid pipelines to an NRI colony in Nerul and are supplying 1 MLD of STW at Rs 2.5/kL. Table 34.4 shows the cost of supplying STW under a mix of public and private arrangements.

Table 34.4: Levelized costs of supplying STW under different arrangements, including pipeline costs (Rs/kL)

<table>
<thead>
<tr>
<th>Levelized costs* (at 100 MLD)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NMMC only</td>
<td>~8.3</td>
</tr>
<tr>
<td>Private operator only</td>
<td>~9.8</td>
</tr>
<tr>
<td>NMMC treatment + private pumping</td>
<td>~8.9</td>
</tr>
<tr>
<td>Private treatment + NMMC pumping</td>
<td>~9.2</td>
</tr>
</tbody>
</table>

**Source:** Interviews with SFC Environmental Technologies Ltd, IDFC analysis

**Assumptions:** See Table 34.3. We assume the STP is operating at full capacity so that total costs (including ROE) are Rs 4.7/kL and total costs (excluding ROE) are Rs 3.8/kL.

Given the profile of potential customers in Navi Mumbai, the private sector may not find enough commercially viable opportunities to sell all the STW produced. NMMC should at least partially finance a pipeline distribution network commensurate with the large STP capacity they have built. Indeed, instead of building excess STP capacity NMMC could have used part of the money on pipelines. Already the sewage pipeline network at 341 km lags that for water supply by 327 km. Total treatment capacity across their 6 plants will be 420 MLD this year, which is in excess of current sewage generation of 252 MLD. Although the recent clearance for the Navi Mumbai airport at Panvel is likely to spur faster growth in the area, current projections indicate that NMMC will generate 400 MLD of sewage only by 2042. By then the STPs might need replacement.

Around 32 municipalities across India have chosen to treat sewage beyond CPCB discharge standards using SBR. Based on our estimates of treatment and pumping costs, this should allow them to treat and supply STW to industry at well below industrial tariffs. This not only reduces municipal freshwater demand but might also incentivize industries previously using ground or tanker water to choose this
cost-effective option. Yet, whether industries should undertake recycling themselves depends on certain factors.

**Viability conditions for industry to set up an STP**

- **Scale**: Due to economies of scale and high capital expenditure, producing STW will be viable for large industries or clusters of small industries. If industries do not want to operate the STP they can outsource the O&M.
- **Proximity of sewage**: Industries will require access to sufficient sewage quantity within reasonable proximity.
- **Land**: Industries will require a significant amount of land to accommodate an STP.
- **Cost and availability of alternatives**: Industries will not choose to produce STW if an alternate water supply source is both cheaper and reliable.

**Considerations for a municipality to supply STW to industry**

- **Loss of creamy customers**: Some municipalities have been reluctant to forgo their revenue from the industrial tariff on freshwater. For example, the BMC has begun construction of a 160-km pipeline from Upper Vaitarna to bring freshwater to the city. Instead, they could explore the potential to meet industrial demand through STW.
- **Market for STW**: Municipalities will have to evaluate their market for non-potable water. If bulk consumers (large industry or clusters) are not present, the municipality will have to proactively create the market for STW.

**Policy recommendations**

- **Enforcement**: Stringent enforcement is necessary to ensure that municipalities comply with norms. Besides penalizing municipalities with penalties, widely publicizing their lack of compliance or personally fining a culpable municipal commissioner, an incentive mechanism could be put in place that is linked to central fund allocation.
- **Mandate STW reuse**: Industries requiring bulk water (including power plants) and located close to urban areas should be mandated to use STW and not given freshwater linkage. Water authorities should facilitate this, for example, by supplying raw sewage or STW at cost of supply.

Industries located further away from urban areas, should be mandated to reuse their own sewage water to meet part of their own overall water requirement.
• Power plants producing STW should be allowed to get electricity required for STP operation from their own generation. For all other STPs, whether industry or water authority, electricity from distribution companies should be at cost of supply not at high industrial rates.

• **Tariff adjustment**: For industries located away from urban areas where freshwater linkage is an imperative, tariffs should reflect the opportunity cost of drinking water forgone for example, the cost of tanker drinking water. Moreover, STW should always be priced lower than freshwater supply to encourage its use.

• **Town planning**: STW reuse should be an integral component while planning new cities, townships, industrial areas and special economic zones. Land for STPs and separate pipelines for freshwater, sewage and STW should be developed. Building codes should mandate dual pipelines to carry STW and freshwater.
The Indian green building industry has grown rapidly from its inception in the early 2000s to the present day. This paper is an attempt to understand the motivations and market dynamics in the industry, particularly the response by the main industry players—developers, investors and tenants. It examines three green initiatives in Mumbai, Hyderabad and Navi Mumbai and finds that green office buildings do not enjoy the rent premiums and higher asset valuations seen internationally. Yet, growing interest in green office buildings in larger cities indicates that premiums might develop as the market matures.

**INTRODUCTION**

India is facing a long-term construction boom. Despite the recent slowdown in the real estate market, projected levels of economic growth and urbanisation indicate that the bulk of the country’s building stock is yet to be built—whether residential, commercial, recreational or some other. For example, it is estimated that 66 per cent of the commercial building stock that will be required by 2030 is yet to be built.

The pace and scale of this construction has severe implications for our energy and resource security. In their construction and operation, buildings consume large amounts of water and electricity, generate waste, and have an environmental impact through the construction materials and techniques they employ. In 2009, the total building stock consumed 29 per cent of the electricity used in the country.

In recent years, the idea of ‘green’ buildings has gained popularity as a way to reduce the resource footprint of traditional buildings. As defined by the Indian Green Building Council (IGBC), a green building is ‘one which uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building.’ Green
buildings must be environmentally responsible from siting and design to construction, maintenance, renovation and demolition.

This paper focuses on green office buildings and examines three initiatives in Mumbai, Hyderabad and Navi Mumbai to understand their current viability and uptake amongst investors, developers and tenants. Therefore, we focus on projects held by investors but leased to tenants. The projects are Grade A structures with LEED Core and Shell certifications (see next section). We conclude with policy recommendations that could encourage green building development to go forward.

**The Institutional Framework for Green Buildings in India**

Over time, ratings systems have developed that classify green buildings according to their performance on a number of set parameters. The first and most widely used ratings system internationally is the American ‘Leadership in Energy and Environmental Design’ (LEED). In India, the IGBC has adapted LEED to create LEED India and is responsible for certifying buildings under this system.

At present, the IGBC offers two certifications for office buildings. The first, LEED for New Construction and Major Renovations is for buildings where the design and operation is fully in the scope and control of the owner or the developer. LEED India for Core and Shell certifies buildings where the owners or developers do not control all aspects of design and construction. These are typically leased spaces like malls or offices where tenants have control over internal space and may opt for additional green interiors.

LEED points are awarded under five categories—sustainable sites, water efficiency, energy and atmosphere, materials and resources, and indoor environmental quality—for a total of 100 points. There are 6 additional points under innovation in design and 4 for regional priority. Buildings qualify for four levels of certification—Certified: 40–49 points, Silver: 50–59 points, Gold: 60–79 points and Platinum: 80+ points.

The Energy and Resources Institute (TERI) has developed its own ratings system—Green Rating for Integrated Habitat Assessment (GRIHA). GRIHA differs from LEED mainly in that it accounts for features unique to India—for example, the use of non- or partially air-conditioned buildings—and puts emphasis on local and traditional construction knowledge. Therefore LEED and GRIHA ratings might not be directly comparable. To date 124 buildings are being evaluated for GRIHA and 8 have been certified.

In 2007, the Bureau of Energy Efficiency (BEE) launched the voluntary Energy Conservation Building Code (ECBC) that sets minimum energy standards for new commercial buildings having a connected load of 500 kW, or a contract demand of
600 kVA or more. In alignment with the priorities of the National Action Plan on Climate Change, BEE is considering making ECBC mandatory by 2012. For existing buildings, the BEE has set up energy service companies that help owners make their traditional buildings energy efficient in a financially and technically viable manner.

**THE GREEN BUILDING SPACE**

Green buildings occupy a small but growing share of the Indian real estate market. At present, there are 187 LEED-certified projects and another 1350 projects that have been registered with the IGBC for possible certification at a later date. Including registered and certified space, the IGBC reports a total of 857 million square feet (msqft) of LEED green buildings in 2011, including airports, hospitals and factories.

More disaggregated information is available on the office building market. Of the roughly 175 msqft of total office stock in the 10 major cities, around 17 per cent of buildings are registered and about 4 per cent certified so far.

The major developers appear to be re-orienting their portfolios towards green buildings. Some of the largest national and regional developers active in the 10 major markets—K. Raheja Corp., Kalpataru, Godrej Properties, Mahindra Lifespaces and Unitech—have committed to including sustainability features in the bulk or all their projects going forward.

Broadly speaking, the main players in the Indian green building space are developers, investors and tenants. Developers ultimately take the decision to build green buildings and may do so for various reasons, including responding to market demand from tenants. Once built, some developers hold the building themselves, but increasingly commercial buildings are sold to an investor who will then earn rent from leasing the property to tenants.

Tenants may play an active or passive role in the green building market. Some, such as Novartis, drive the market in that company policy requires them to occupy a certain grade of green building. Other tenants are more passive, occupying green buildings as a matter of preference but not requirement, or as a condition secondary to location or rent.

The cases below are located in cities with markedly different commercial real estate markets. Mumbai is a competitive market with short office space supply and high rental rates. As the commercial capital of the country, commercial space by all sizes of tenants is in high demand. Navi Mumbai is a rapidly growing satellite city to Mumbai, with moderate commercial space supply and demand. Hyderabad is an oversupplied market, but also has increasing demand due largely to a growing IT sector housed mainly in Special Economic Zones (SEZs) earmarked by the Government of Andhra Pradesh.
247 Corporate Park, Mumbai—Gold certified
This mixed-use office and retail complex was developed by Hindustan Construction Company Ltd (HCC) in Vikhroli with a total of 1.8 million square feet of built-up area, of which 1.1 million square feet is leasable.

To meet the requirements for LEED Gold, the Park has used double-glazed glass for the entire outer surface, low-volatile – oxygen compound paints, fly ash bricks, and low-flow tap fittings, amongst other green compliant materials. The Park undertakes rainwater harvesting and has a sewage treatment plant, that recycles wastewater for gardening, flushing and the ventilation and air-conditioning systems.

For the past year, HCC achieved 23 per cent reduction in annual electricity costs and an 85 per cent reduction in fresh water consumption. Other than for drinking water, HCC does not rely on municipal water. To achieve these savings, the construction costs were 7 per cent higher compared to traditional construction. Maintenance costs are marginally higher due to the use of specialised cleaning materials.

At present, the building commands a 10 per cent premium on rents and leases at Rs 80 per square foot (psqft). However, HCC anticipates that as awareness of the benefits of green buildings grows, they will be able to charge a 15–20 per cent premium. Demand comes from large Indian and international companies who are conscious of choosing a green building. Anchor tenants for HCC include the Future Group, DHL, Tata Consulting Engineers and Food Bazaar.

The building is held by HCC together with Milestone Capital Advisors who paid Rs 295 crore in 2010 for a 74 per cent stake. The lease agreements are structured so that tenants pay the management a common area maintenance fee (CAM), but pay their individual electricity and water bills themselves. Except for the property tax, tenants are responsible for all rent- and maintenance-related taxes.

Mindspace Airoli, Navi Mumbai—Gold certified
This K. Raheja Corp developed property is located in Airoli, Navi Mumbai. On completion it will comprise thirteen buildings with 4.3 msqft of leasable area. This SEZ is one of the three in the Mumbai Metropolitan Region for the IT sector.

Building number 7 is LEED-Gold certified and almost entirely occupied by CapGemini. The building offers energy savings up to 40 per cent and water savings up to 85 per cent. Construction costs for this building were 3 per cent higher than a comparable traditional construction. Despite the green tag, the building is not currently renting at a premium relative to other buildings in the area.

The building is held by K. Raheja under their subsidiary, Serene Properties. The lease commenced in July 2008 for an area of 280,484 square feet at a monthly rental of Rs 32 psqft. The initial lease period is 10 years, with rent increases of 15 per cent
every three years. CapGemini pays CAM and taxes (except property tax) to the developer. Electricity and water utilities are paid by the tenant separately.

**Mindspace, Hyderabad—Platinum certified**

Also developed by K. Raheja, Mindspace Hyderabad is an SEZ located in Madhapur in the heart of Hitech City.

Building number 6 was built to meet the requirement of Novartis Ltd and is rated LEED Platinum. Being a Platinum building, construction costs were 12–13 per cent higher than for non-green construction. Novartis fully occupies the building and spent an additional Rs 46 crore in fit-out costs to develop green interiors.

Novartis pays a monthly rent of Rs 32 psqft for an area of 340,000 sq ft. Raheja does not get a premium on this rent. As the sole tenant, Novartis does all maintenance and security themselves and does not pay CAM. They, however, reimburse the relevant non-property-related taxes. As is typical, Novartis got a three-month rent-free period for fit-out.

**COST ECONOMICS OF A GREEN BUILDING**

*Construction costs:* On average, estimates show a gold-certified building in India costs between 3 to 7 per cent more to build, while platinum costs 12 to 18 per cent more, and silver only about 2 per cent more. Based on international experience these costs are likely to fall significantly over time as building materials become locally manufactured and scale economies drive down the cost.

*User savings:* In terms of running-costs savings, green buildings save 25–35 per cent on energy use on average and 30 to 85 per cent on water consumption annually.

**Do current valuations reflect ‘green-ness’?**

The commercial viability of a building is captured in its valuation—the estimated price ascribed to a building if it is to be bought by an investor. The ‘valuation’ or price that a professional real estate valuer assigns to a building is the present value of all expected cash flows discounted at a rate called the capitalisation rate (cap rate). The cap rate takes into account the risk-free rate of return, the risk premium for investing in real estate and the expected growth in capital values. Valuations use two cap rates. The first is the initial cap rate which accounts for the risk at the current time and is used to discount cash flows over the lease period. The second is called the reversionary cap rate where the risk premium also reflects the risk of re-letting the property at the end of the lease term. As a rule of thumb, the reversionary cap rate is about 1 per cent higher than the initial cap rate.

Cap rates vary by market to reflect the specificities of risk in each. For example, Hyderabad’s cap rate of 11 per cent is higher than Mumbai’s of 10.6 per cent because
the risk perceived by investors for investing in real estate in Mumbai is less compared to Hyderabad. This is because the office market in Hyderabad is supply driven, while Mumbai is a demand-driven market.

Although there are a number of methods to value buildings, for example using comparative sales transactions or income capitalisation methods, the discounted cash flow method described above is generally preferred. Yet to see whether valuations currently reflect the ‘green-ness’ of a building, we first need to understand what is happening in three sub-markets—the user, the developer and asset markets.

No, as there is no explicit rent premium in the user market

In the user market for green buildings, we would expect to see an increase in the rents for green properties because of the expected savings. At present only one of the three cases surveyed reports a green premium. Property valuers report that with the exception of the Olympiad Tech Park in Chennai, few developers are seeing rent premiums on their green buildings relative to non-green properties in the area.

Yet the effective rent for green buildings is higher

There are some differences being observed in the rental market for green and non-green buildings. Green building investors are able to lease their buildings to tenants quicker and with better covenants. Vacancy is also reportedly lower. These factors impact the valuation of the building because they change the effective rent. For example, if a green and non-green building both lease at a rent of Rs 32 psqft, but the green building is able to lease three months faster than the non-green property, the effective rent for the green building over the life of the lease is Rs 32.80 psqft. This rate is effectively a 2.5 per cent premium on the market rent which results in an increased valuation of about 2 per cent. This implicit premium will only be observed if there is an increase in demand for green over non-green buildings. Non-green buildings may be forced to give additional discounts to attract tenants in this scenario.

So why are developers choosing to build green?

A positive reaction to green buildings is being reflected in a significant portion of new and pipeline projects being registered with the IGBC. As discussed above, many of the larger developers who represent a significant share of the real estate market are committed to building green. Why?

Because investors see a future in green buildings

In asset markets, investors are concerned about their future returns. In this case, returns will be affected by three main factors. One, the risk premium that investors
factor into their valuation is impacted by the type of tenants the green building is able to attract. Decreased risk enables investors to discount their cash flows less and receive a higher valuation than if they held the same property with riskier tenants. If investors believe green buildings will attract more stable tenants than traditional buildings, then they would prefer the former. In India, it is being observed that most green building tenants are Fortune 500 or large Indian companies who are required to rent green where possible.

The second factor impacting future returns is the likelihood that the investor will see escalations in rent at the time of lease renewal. At present, since no leases have come up for renewal, we cannot observe how rents will correct for a green premium. However, there is potential for correction. Under current lease agreements, where tenants reimburse CAM and pay utility bills themselves, the major savings from green investment are effectively transferred to the tenants and away from investors. Going forward, investors might be able to negotiate an increase in rent as a return for the savings their capital expenditure affords the tenant.

The third factor investors will consider is the revertionary value. As described before, the revertionary cap rate is a function of the risk that the investor will be able to find another tenant. If the risk is higher, the cash flow will be discounted more and result in a lower valuation. Again, we cannot say at present whether green buildings have lower risk than non-green assets in this respect, but this has been observed internationally. If tenant preferences gradually begin to shift in favour of green buildings, then they will have a lower risk of being re-leased and can use a lower revertionary cap rate.

At present, it does not seem like the Indian asset market has responded to the green building industry. In contrast, in the US, as the green building market has matured, investors are seeing a 30–35 per cent sale price premium and an approximately 6 per cent premium in rents.

Valuation versus worth

Professional valuers must rely on rental values and other information that is available at the time of valuation and, hence, are not valuing green buildings differently than their non-green counterparts. However, investors may assign a higher worth to green buildings if they factor in their expectations of higher rent or lower revertionary rate.

The table below compares the standard valuation of the cases with two scenarios that reflect worth as may be perceived by investors. Therefore, in Scenario 1 we factor in a three-month faster leasing time. In Scenario 2, we also add in the effect of using a lower revertionary cap rate. These differences alone raise the valuation by 3–4 per cent.
Moreover, current valuation techniques rely heavily on rental values and do not factor in changes in operating costs, which are in fact quite significant. The analysis below compares the net present value (NPV) of the electricity and maintenance costs of two offices in Mumbai where one is LEED Gold-certified and the other is a traditional building.

### Table 35.2: Comparison of net present value (NPV) of expenditure in green versus non-green office (Rs/sq ft)

<table>
<thead>
<tr>
<th></th>
<th>Electricity (NPV)</th>
<th>Maintenance (NPV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>83</td>
<td>159</td>
</tr>
<tr>
<td>Non-green</td>
<td>208</td>
<td>179</td>
</tr>
<tr>
<td>Savings</td>
<td>149%</td>
<td>12%</td>
</tr>
</tbody>
</table>

**Source:** IDFC Internal building data, IDFC analysis

**Assumptions:** We assume that all costs will escalate at 5 per cent a year. We use a discount rate of 10 per cent over a 10-year lease period.

We find that electricity and maintenance costs are 149 and 12 per cent more respectively over the lifetime of the traditional asset. Water costs are included in maintenance. Annually, electricity costs are 0.9 per cent of total rental for a non-green building as compared to 0.3 per cent for a green building. Therefore, new valuation techniques are developing to reflect the often large operating savings.

**So what do we find?**

New valuation frameworks that incorporate savings transferred to tenants will be needed.

**And what should be done?**

- Adopt policy recommendations to incentivise the expansion of the green building industry: These fall into three categories—technology adoption, market-based incentives and policy incentives.
- Modify the building code: The ECBC should be incorporated in the mandatory building code. Additionally, certain design specifications such as the use of
low-flow taps or certain materials could be enforced through the building code or promoted through professional industry associations. An organisation like the Building Materials and Technology Promotion Council could act as a national clearing house on technology and incentives and help building owners exceed minimum code requirements or avail of any incentives for green construction that may be available in the future.

• Make mandatory energy performance certificates: These should be required for all buildings being sold, built or leased to allow buyers or tenants to make an informed decision. This certificate should be updated every three years against the baseline established in the first year.

• Reduce stamp duty charges: JNNURM has already mandated that states reduce stamp duty to 5 per cent although not all have complied. Reduction could help offset the higher construction costs faced by developers. For example, on the Airoli property, the additional construction costs for being green are just 3 per cent of the total valuation, which could be easily offset by a corresponding stamp duty reduction.

• Reduce property tax: As green buildings save energy and water, they should receive property tax rebates on the components that cover water and electricity consumption. To incentivise state and local governments to do this, the central government can allow states to bid competitively for a pool of reimbursement funding. An additional tax rebate could be provided for the use of renewable energy.

Box 35.1: International policy interventions

Many governments, particularly the USA and in the EU, have taken an active role in promoting sustainable real estate. In the US, individual states encourage businesses to adopt green construction practices through income tax credits, financial grants, expedited permit processing, property tax rebates and relaxations of zoning restrictions for green buildings. Initiatives are typically implemented by local governments but supported by state and federal programs.

The EU considers sustainable construction the obligation of both business and the government. As part of their extensive programmes to encourage green building they have developed their own green ratings system and enforce strict green building codes and energy labelling. They provide subsidies for sustainable construction and levy heavy taxes on polluters.
The Indian debt market has witnessed metamorphoses in recent years. These have been brought about through a marked change in the nature and the character of instruments and the investor base. However, the Indian debt market continues to be in a nascent stage of development, and as a result, remains relatively overshadowed by the equity segment of the securities industry. While there has been some realignment in the primary and secondary yields on debt paper, little impact has been felt in the secondary market for debt.

The major component of the debt market continues to be the government securities market. Although the outstanding stocks of government securities and treasury bills have shown significant growth, there has not been commensurate growth in the total traded volumes of these instruments. An active secondary market is yet to develop in many of the new instruments introduced during the last couple of years.

There is a need for a vibrant and liquid domestic debt market. This would help in the following ways: (a) it would enhance allocative efficiency in the use of domestic financial resources; (b) reduce the cost of both public and private sector borrowing; and (c) given the gap between domestic savings and demand for capital, would also facilitate inflows of foreign capital, which are dependent on an active domestic bond market.

The major areas for reform can be put under the following categories: (a) revamping the clearing and settlement systems; (b) imparting liquidity through the introduction of repos; (c) availability of instruments for hedging of interest rate risk; (d) creation of benchmark rates; and (e) reform of the corporate bond market.
CLEARING AND SETTLEMENT SYSTEMS

Among the main factors impeding the development of the secondary debt market have been the problems faced by investors in the settlement of trades. Currently, there is no common agency for the settlement of debt market trades, especially securities held in physical form. Transfer of physical paper can take up to three weeks. As a result, the trades are settled directly between the participants, which leads to extensive complications and non-standardisation in the transfer of securities, as the facility of delivery versus payment (DVP) is still not available for such trades. The settlement and clearing systems could be improved through the following measures:

• The National Securities Depository Limited (NSDL) should be allowed to accommodate treasury bills and government securities. It should also be linked to the clearing system at the RBI to enable all investors to access the book-entry systems at the RBI.

• In order to facilitate settlement for entities such as mutual funds, limited access to inter-bank/RBI clearing may be officially allowed for money market and securities trades. Access can be provided to these institutions through commercial banks.

• Initially, commercial paper (CP) and certificates of deposits (CDs) should be dematerialised through a depository. Currently, the Depositories Act exempts stamp duty payable on trading in equities if the transfer of ownership takes place in the depository; however, this benefit is not available to debt securities, and it is desirable that debt securities be put on a par with equities in the depository. This measure would enable retail investors to enjoy the benefits of depository trading and enable trading across different centres, which would, in turn, widen the market.

In order for the system to function efficiently, settlement should be executed through upgraded technology. There should be an electronic connection with other regional centres to facilitate nationwide trading on a DVP basis. In the US, all transfers of securities are settled electronically, as all major banks are electronically linked to the Federal Reserve Bank (Fed Wire). In sum, the present system must be upgraded to conform with international standards, operating with short settlement periods and DVP mechanisms.

LIQUIDITY

Liquidity is essential to increase both domestic and foreign investor participation. It is also essential for market confidence, volumes and reduced transaction costs and ensures the most cost-effective borrowing terms for issuers. The absence of
liquidity in the Indian market is illustrated by the low levels of trading, where the percentage of total outstanding government securities traded daily in India is 0.25 per cent compared to 6.5 per cent in the US. The government issuance programme in India is not structured, and bonds are issued on an ad hoc basis, which constrains liquidity. Market liquidity can be increased in a number of ways, which are briefly enunciated below.

**Provide a Viable Liquidity Mechanism through Repos**

Once proper clearing and settlement systems have been put in place, an active repo and securities lending market should be developed and all market players should be permitted to participate. Currently, repos are only permitted in a limited number of government securities and only among select participants. The repo market offers opportunities for institutional investors, both for cash investors and bondholders, and will help market makers refinance their requirements and open positions. The development of a repo market would also help the RBI to more efficiently conduct open market operations for monetary policy measures.

The problems relating to controls over repo trading could be tackled through a proper monitoring of outstanding positions, exposure limits, margining and certainty of settlements. In order to create an efficient repo market, market participants must be allowed to enter into repos with maturities longer than 14 days, and more players should be allowed to conduct repo transactions. Increased participation will result in a liquid debt market and an integrated yield curve, both of which may reduce the overall level of interest rates.

**Provide a Hedging Mechanism through Interest Rate Futures & Derivatives**

There is a need to develop interest rate futures and derivative products of fixed income securities. These would allow market participants to hedge their interest rate exposure and would allow traders to create positions tailored to their forecasts of the overall level of yields while minimising the level of risk. Market makers would be able to hedge interest rate risks on their inventories and, as a result, hold larger inventories. These instruments would also facilitate the growth of swaps and over-the-counter derivative markets. Since market makers need to take short/long positions based on their needs, present NSE restrictions on the transactions settlement periods need to be modified.

With the creation of a short-term benchmark rate (reference rate), more floating rate paper is likely to be issued. In such a situation, there is a need for an active floating-fixed swap market. Active swap markets allow better matching of assets
and liabilities, reduce exposures to risk by allowing the management to concentrate on business risk, and reduce funding costs.

**Development of a Benchmark Rate**

An efficient and transparent term inter-bank rate provides a reference rate for the short term in the economy, and acts as a benchmark for floating rate instruments, which in turn would help in the development of a domestic interest rate swap market. The introduction of an inter-bank rate would considerably enlarge the scope for differing perceptions among the main money market participants, and would further help the development of an inter-bank term market. In order to improve the efficiency of the inter-bank call market, non-bank entities who are permitted to lend in the call market through primary dealers should be allowed to lend through satellite dealers to increase the depth of this market.

A reference rate may be introduced in the following ways. The RBI could constitute a panel of selected banks who would be the determinants of the reference rates, where the banks would be chosen according to the selection criteria stipulated by the RBI, and representative of nationalised, private and foreign banks. Another approach could be to use the average of the bid and offer rates of these banks to determine the inter-bank reference bid and offer rates for different tenors. This would result in the true, near risk-free, short-term inter-bank rates which would serve as an effective benchmark for floating rate instruments.

**Reform of the Corporate Bond Market**

The process of reform should also encompass the corporate bond markets. There is a need for increased participation by diverse investor segments and removal of restrictions on existing participants which currently hamper market liquidity. To facilitate this process, a number of measures could be introduced: (a) Provident Funds should be allowed to invest a percentage of their funds in highly rated debentures of private sector companies; (b) permission should be given to public trusts to invest in highly rated paper; (c) withholding tax on FII investments should be removed; (d) limits on primary issuance to FIIs should be removed and; (e) investment guidelines for public sector companies should be reconsidered, allowing them to invest selectively in highly rated bonds.

Corporates should be allowed to issue paper on tap after getting shelf registration in order to take advantage of funding opportunities throughout the year. On-tap issuance would provide the ability to issue on a continuous basis, allow for better targeted issuance to investors, provide the ability to structure instruments to cater to the needs of diverse investors, and reduce the cost of financing.
Although securitisation of debt has started recently in India, it has not gone beyond a few transactions. Financial institutions and banks have a good amount of securitisable assets which they can offload to prospective investors. Securitisation of assets should be encouraged by (a) amending investment guidelines of investors like Provident Funds to allow them to purchase securitised paper; (b) making the necessary legal and regulatory changes for the issuance of securitised paper; (c) recognition of SPVs for purposes of asset securitisation; (d) setting up of a central National Guarantee Company to act as a credit enhancement agency for securitised paper; and (e) the rationalisation of stamp duties.

NOTES

1. Currently, on the NSE all transactions need to be settled within ‘T+5’ days, and there is a restriction as per the Securities Contracts (Regulations) Act that transactions have to be settled within ‘T+14’ days.

2. The first step towards the creation of an inter-bank market has been taken by the move to reduce reserve requirements on inter-bank borrowings to the minimum.
INTRODUCTION

In a “paradigm change” in the infrastructure sectors, private provision of these services is now generally acknowledged to be more efficient, both for investment and operations. Infrastructure sectors are now also being thought increasingly in terms of “activities” and “services”. While each sector had hitherto been thought of as monolithic natural monopolies, it is now recognised that distinct services within these sectors may be amenable to competition. There still remain, however, segments where economic and/or technological characteristics render competition infeasible and hinder contestability for these markets. Efficiency in these activities requires competition for the right to provide services. Transparency in the award for these projects is crucial. Ill-designed concessions and award procedures have frequently led to sub-optimal performance and consequent renegotiations and delays in implementation and operation. There still seems to be a lack of clarity in India about the objectives of competitive bidding. An unfortunate tendency in awarding these rights has been an attempt to maximise revenues for the government, and to achieve this in the worst possible way (by bidding on the highest revenue share, as in the case of port concessions). Moreover, there are ongoing attempts to artificially restrict entry into sectors amenable to competition (like long distance telephony and airlines) and to use competitive bidding to limit entry.

This paper advocates competitive bidding as the most efficient and cost-effective means of awarding rights to provide infrastructure services. It is not a step-by-step guide on negotiating concessions or allocating scarce resources. The aim, rather, is to assist policy makers in understanding the economics of competitive bidding for contestable markets and the resulting design of optimal bidding procedures.
The paper has been written from the perspective of conceding authorities or sellers of scarce public resources, with the intention of optimally transferring the rights to provide infrastructure services to the private sector.

Section 1 is a brief motivation of the now well-recognised and accepted need for private provision of infrastructure services. Section 2 deals with the risks associated with these projects, their identification and allocation to the parties best able to bear them. It then summarises issues associated with the design of one such set of contracts, which is one of the most widely used for awarding infrastructure contracts—concessions. Section 3 is the core of the paper, and discusses the design of bidding processes and procedures. The bidding mechanism for awarding the concession is intimately related to the economics of the design of the concession itself, including allocation of risks and building in incentive mechanisms, which are an integral part of both concession design and the bidding process. Section 4 discusses in some detail the design of the structure of the bidding process in the road sector, which incorporates most of the complexities in the awards of infrastructure concessions. Section 5 outlines the recommendations that follow from the analysis of the bidding process.

1. THE NEED FOR PRIVATE PARTICIPATION IN INFRASTRUCTURE SERVICES

1.1 Objective: Most efficient service to users at economic cost

Private investment in infrastructure services is primarily meant to increase both investment and operational efficiencies in the provision of these services. Maximising revenues for the government should not be a consideration in the process, although this may be a secondary objective in the occasional case during the sale of an existing asset or the award of rights to use scarce public goods. The incentive structures for the private sector in providing more efficient services are more pronounced and robust than for the public sector. This is generally true, however, only when the service provider operates in an environment where more efficient providers can contest for the market. Competition is already a reality in many countries in segments like power generation and supply, telecom, port and airport services and urban transport. Many other segments—water supply and sanitation, the “wires” segment of the power sector, and provision of road services—unfortunately, are not amenable to competition and market contestability, for reasons stated above. Competition in these segments has to be for the right to provide services. Concessions to provide these services must be awarded in a manner that furthers the objective of efficiency. Mechanisms that mimic competition should assign provision of services to the party that can provide them most efficiently. Concessions also facilitate the regulation of natural monopolies.
1.2 How can private investment be attracted to infrastructure?
Given the characteristics of infrastructure projects and required investments, summarised above, governments have hitherto offered many incentives to private investors to make their investments more attractive. These included the grant of exclusive rights, guarantees, subsidised loans, exemptions to any requirement for redistributive social goals, etc. Delivery of infrastructure services can, however, be achieved more efficiently through addressing policy problems that underlie investor concerns and thereby a properly designed mechanism of allocating risks to the parties best able to bear them and then transferring the appropriate risks to the private investors.

2. The rights being awarded through bidding
2.1 What is being sold?
Throughout this paper we use “contracts” to refer broadly to any arrangement in which a firm obtains from the government the right to provide a particular service or control over some asset or scarce resource which would enable them to provide infrastructure services. These contracts set out the rights and performance obligations of the parties and the risks and incentives under which they operate, including pricing arrangements. The design of incentives and risk allocation will affect first the intensity of competition and then the sustainability of the original contract. The nature of the service to which the rights of provision are being sold—the associated market structure and institutions, the policy environment and the rights and responsibilities of the winning bidder—determines a proper identification and allocation of these risks to the entity best able to bear it. This allocation is at the core of concession design and hence the bidding process. The following is a brief exposition of the main forms of services or assets that are bid out by the government.

2.1.1 Concession contracts
This category of contracts gives the private sector responsibility for not only for operations and maintenance (O&M) but also for investments in infrastructure improvements. The government normally retains ownership and residual rights to all assets, and the contracts are normally for 25–30 years. All the generic forms of long-term concessions (BOT, BOOT, BOOM, BLT, DBFO, etc.) belong to this category. The award of this form of contracts will form the bulk of this paper.

2.1.1.1 Service/management contracts
This is the most limited form of rights transfer; there are no ownership rights transferred and very limited investment responsibilities. The contract transfers just
O&M responsibilities, generally for relatively short periods of 3 to 5 years. Examples are retail electricity supply services, ground handling services at airports and selected harbour services. Since these are awarded on fixed fee bases and usually do not transfer any commercial risks to the contractor, there are little incentives for cost minimisation and quality improvement. The paper’s ambit will disregard this form of contracts.

2.1.1.2 Providing services to uneconomic areas
A frequently cited objection to reforms in infrastructure sectors is a presumed adverse impact on residents in areas that are deemed to be commercially non-viable for private operators. Various direct and cross subsidies are currently provided to such areas. The magnitude of current subsidies is one of the reasons why fiscally constrained governments are being forced to reform infrastructure programmes. Moreover, regulatory agencies, in the course of devising means of maintaining universal service objectives using the traditional cost-of-service approach, have had to estimate the size of market intervention necessary and the funding needed to address it. The process often gets mired in endless disputes over data and methodology, driven both by the inherent difficulty of measurement and the interests of the parties. The challenge is to design a system for administering subsidies that does not give a special advantage to some competitors or some technologies. Competitive bidding offers a solution to determining the most efficient means of providing such services and assigning a value to universal service—the process elicits the valuations placed on the universal service by the companies themselves by bidding against one another to serve an area at the lowest price.

2.1.2 Allocation of scarce resources
To efficiently allocate scarce public resources like the electromagnetic spectrum, or carbon emissions entitlements, the government needs to determine how much private firms value such resources. Competitive bidding achieves such an allocation by revealing information on not just how valuable bidders believe the resource to be, but also which bidder values it the most.

2.1.3 Sales of existing assets
Public assets are transferred to private ownership, with only regulatory and oversight responsibilities retained by the government. Though not a focus of the paper, it is worth noting that such sales are meant not just to transfer ownership to increase efficiency, but also to reveal information about the true value of assets, which is critical for effective regulatory oversight. Sales of electricity generating assets in the USA were meant to serve this purpose.
2.2 How best to transfer these rights

The concession contract document is critical to the successful implementation of the project. The clarity with which these terms can be defined determines whether there is likely to be re-negotiation later on, which may undermine the significance of the initial award.

2.2.1 Market structure: how can bidding discover the value of a service?

Some infrastructure sectors and activities, as pointed out above, do not permit competition and free entry or exit of operators. Replicating competitive forces in these activities, and hence getting the best deal for consumers and taxpayers, requires

(i) Allocating the right to provide services in these segments to those entities that are best suited to do so most effectively (what is known as “competition for the market”), and

(ii) Regulating the performance of these entities in a manner consistent with the efficiency gains that normally result from competition.

The market structure of the sector in which the service is to be provided is, therefore, critical to understanding the risks associated with the provision of the service and hence the design of the bidding process. For instance, the issues in divesting generating assets of existing vertically integrated utilities are distinct from those of assigning the limited frequency spectrum for cellular services, and yet still from those of concessioning road services or electricity distribution zones. The timing of asset sales or service concession, the means of sales, the environment in which the concession is granted, including the regulatory structure, will determine the value of assets or the concession. Many of the services being concessioned are also parts of networks, and an inadequate attention to the consequent externalities will impact the commercial viability of the concession. This is particularly true of services in the telecom sector, and to a lesser degree, in electricity transmission and roads.

The optimal method of transferring the rights or the assets would be driven by the very different economics of each of these activities. In some, activities should be combined (e.g. EPC and O&M contracts for providing road services, and water supply and sanitation activities in urban water services), in others separated (generation from wires and supply services in the power sector, port and airport services from port infrastructure, etc.).

2.2.2 Regulatory environment and market power

Regulation is tied in with market structure. Competitive markets generally need only light-handed regulation. Markets with natural monopoly characteristics need
independent regulation. However, effective regulation is expensive.\textsuperscript{16} A well-designed bidding mechanism (and hence concession contract) has in-built incentives for efficiency and cost control, so that only light handed regulation is required. The lack of a well-thought regulatory framework, on the other hand, can delay project implementation significantly.\textsuperscript{17}

### 2.3 Risk \textsuperscript{18} identification, allocation and mitigation

Differing forms of private participation reflect varying risk-sharing arrangements between the investors, consumers and the government. At the cost of belabouring a point mentioned above, the risks of a project are predominantly a function of the market structure and the nature of the service that the project offers. These can be broadly classified as design, finance, construction, operation, market and commercial, policy (political and regulatory) and force majeure. In some cases, private investors operate projects, but do not own them.\textsuperscript{19} In others, private parties take on only the operating and collection risks.\textsuperscript{20} In one of the most prevalent forms of risk sharing, they also take on investment and financing risks.\textsuperscript{21} There are also less common approaches where the private sector only constructs and finances, but the public sector operates.\textsuperscript{22}

#### 2.3.1 Transferring risk

In the initial stages of private initiative in infrastructure sectors, many governments have attempted a mitigation of commercial risks through various forms of guarantees, including long-term take-or-pay contracts in power purchase agreements (PPAs), traffic guarantees for road projects, etc.\textsuperscript{23} These mechanisms, however, were structured predominantly on a cost-plus basis, and there were no incentives to reduce costs, and pass on the reductions to customers of the services. There is no intrinsic reason why any attempt should be made to reduce the commercial risks of a service provider through guarantees or other mechanisms, when the provider can control to any significant extent the revenues for his service (and hence his profitability, through reducing costs). However, in some of these sectors, the extent of demand may largely be determined by factors outside the control of the concessionaire.\textsuperscript{24} To prevent the cost of financing these projects making them commercially unviable, some of the risk has to be shifted away from the concessionaire. But these mechanisms need to be incentive-compatible so that the concessionaire is incentivised to reduce cost. The use of annuities from a dedicated road fund funded through fuel taxes is one such avenue. Innovative bidding procedures based on the least present value of revenue (LPVR) is another.
Box 37.1: Design of the concession structure

- **Duration of concession.** If a significant capital investment is required, then the contract has to be for a period sufficient for the concessionaire to recover his capital costs. O&M contracts may be for smaller durations.

- **Termination/renewal.** The termination and renegotiation of the concession should be formulated in a manner that minimises the (dis)incentive for the concessionaire to lower investments.

- **Performance monitoring.** Performance clauses in the contract have to specify minimum standards that the asset has to meet. A more endogenous incentive is to structure the bidding for renewing the concession in a manner that allows the incumbent concessionaire to retain part of the value of the asset should they be outbid by a new entrant.

3. **The process of bidding: Design, structures and procedures**

3.1 Modes of award: Concessions and ownership transfer of existing assets

Together with light-handed regulatory oversight, competition for the right to provide services in the sector can be generated through competitive bidding. Many emerging countries now use competitive bidding to award concessions for infrastructure projects to private firms, in sectors such as water, waste disposal, transport and power distribution.

3.1.1 Negotiated routes

Till only recently, rights to provide various infrastructure services, including concessions, were usually awarded through negotiated (or administrative) mechanisms, including memoranda of understanding (MoUs). While these may have had the advantage of speed, and avoided the costs normally associated with preparing for the bidding process, the biggest drawback was a lack of transparency. Inadequate information about opportunity costs for (alternative use of) the funds being invested in the project that is being concessioned more often than not results in sub-optimal use, and encourages lobbying for the concession, and default and re-negotiation later.

3.1.2 Competitive bidding

Most countries have shifted to competitive bidding as the preferred method of awarding contracts. The arguments of transparency and valuation by the markets that favour bidding is sometimes sought to be countered by the expected costs for potential service providers in preparing for the bids. This is somewhat specious, since a detailed project analysis would be needed for even a non-competitively
awarded project. Moreover, standardised concession and licence contracts are being increasingly prepared, which lower the costs of preparing for the bid.29

It may be argued that there was no alternative to awarding some projects through a negotiated route.30 It is a debatable point that the outcome in these would have been more efficient through competitive bidding.31 Had a thorough project analysis been conducted beforehand, though, or bidding procedures thoughtfully designed,32 it is likely that the difficulties faced in many of these would have been obviated or at least considerably mitigated.33

3.2 Design of the bidding mechanism

Experience shows that a wrong design of the bidding mechanism results in inefficient outcomes, distorted values, lost revenues and regulatory and public criticism. The rules of bidding should be complete, consistent, and free of loopholes. A proper design is necessary, but by itself is not a sufficient condition for achieving the objectives. In addition, the rights or assets being bid have to be clearly defined and characterised so that they accurately reflect their value in the context of the market structure of the rights. The procedure of implementation of the bidding design is equally important. The rules, rights, obligations and other terms of participation must be credible and enforced strictly. Bidders need to be provided sufficient information, and uncertainty about the effect of common factors on their valuations has to be minimised.34

3.2.1 Objectives of competitive bidding

If carefully designed, the bidding mechanism can address multiple objectives.

3.2.1.1 Discovery of value

The bidding process should result in pricing the concessions that reflect their true market values and are arm’s-length underlying valuations of the benefits, costs, and risks associated with the contract.35 Related to this is the notion of economic efficiency, which is established when the concessions are held by those who value them the most, an outcome that arises endogenously from the bidding.36

3.2.1.1.1 Common value versus private value

The design of the process of awarding the rights to the winning bid will depend on the valuation that is placed on the concession. In many concessions, the bidders’ valuation of the rights to the concession will depend not just on their own competence, but also on other factors that will affect all bidders,37 e.g. the willingness-to-pay of consumers, or the future behaviour of regulators. Cases where the value depends on factors that affect all bidders are called common value bids. Those where the bid values depend
only on the characteristics of the bidder, or on factors that are within the bidder’s control, are private value bids.\(^3\) Two issues arise from this.

First, what is the appropriate bidding process that will maximise the objective of the award, given the valuation that the bidders assign to the contract? If the concession is being awarded for activities like project construction, whose completion is largely under the bidder’s control, the valuation of the contract would be to a large extent private. A sealed-bid award would produce the best results in these cases. When the costs of construction depend on the operation of the concession, as in the case of network rollouts for telecom services, there is a large element of common valuation built in. These concessions are best awarded through open bidding since this maximises the process of value discovery by the bidders.

Often, the services being bid display both private and common value characteristics. Consider a road concession based on an annuity-based contract that is awarded to the bidder quoting the least amount. The concessionaire’s EPC costs are a private value. The common value component is his O&M expenditures, which would depend on the projected traffic flows over the road. These costs are a relatively small component of EPC costs. In such a scenario, the best bidding format would be a sealed-bid one, since information disclosure through an open bidding process would not be a critical factor in the concessionaire’s bid.

On the other hand, the costs of a firm bidding for a spectrum licence to build a cellular network depends to a large extent on the speed of the network roll-out, which in turn depends on the call traffic growth. This is largely a common valuation, as is the bidder’s revenue projections. In this scenario, an open bidding system for valuing the licence will lead to a more efficient use of the spectrum, since the bidder can incorporate the information disclosed over the bidding rounds to sharpen his own estimated projections of traffic growth.

Second, does the aim of better achieving the objective of the contract justify a modification of the nature of the valuation\(^4\) from a common value bid to a private value one? In some concessions, there may be significant market risks beyond the control of the concessionaire. Assigning these risks to the concessionaire might make the project commercially non-viable. An example is a toll road concession. The projected toll revenues will depend on exogenous factors like the state of the economy, and road network externalities, making bidders’ valuations of the concession to a large extent, common. Limited numbers of bidders, as is typically the case with road projects, limits the disclosure of information through open bidding, and possibly abets collusion. An alternative in this case may be to award the contract through a sealed bid on the basis of annuities or capital grants, which transforms the bidders’ valuation to a mostly private one.
3.2.1.1.2 Transparent assignment of risks
The process of assigning concessions to winning bidders should be conducted in an open and transparent manner that assures all participants of equal treatment. Such a transparent process encourages participation by reducing bidders’ uncertainty and simplifies regulatory oversight of the assignment process.

3.2.1.1.3 Mitigation of market power
The bidding process should mitigate market power and promote competition, whenever possible, in the provision of the specific service. This will result in better price signals for the concession that accurately reflect real resource benefits and costs. In turn, this will lead to market-driven commercial decisions with regard to investment in new capacity, efficient use of existing capacity. An optimal bidding design addresses the objective of mitigating market power and promoting competition by imposing restrictions on the amount and type of capacity that each bidder may hold.

3.2.1.2 Optimisation of bid revenues
A well-designed value discovery process should optimise bid revenues, especially in the case where a scarce resource is being allocated. Note that we say optimise, not maximise (see more on the section on tradeoffs in the objectives). In other words, the proceeds to the public should be maximised subject to the constraints imposed by other objectives. The primary objective should always be the allocation of the asset or the right to the party who can provide the service most efficiently. When a scarce public resource, like the frequency spectrum, is being bid, a properly designed bidding procedure will achieve a congruence of the objectives of revenue maximisation with the most efficient use of the resource.

3.2.1.2.1 Restructure before concessioning?
While many public sector asset sales in the UK and in Latin American countries have been preceded by extensive restructuring before their sell-off, in general, and especially for infrastructure utilities and assets, it is better to concession or sell these without restructuring. The premise is that the operator of the concession is the best judge of restructuring, and has the maximum incentive to optimise the choice of technology and financial structure to provide the lowest cost service to the user. In a similar context, the enforcement of a tough competition policy to prevent concentration in the market structure before the bidding process may ensure a better allocation of the rights or assets. Usually, combinations (as joint ventures or takeovers) between potential entrants and incumbents should wait till after the bidding process is complete to prevent a reduction in the number of serious bidders.
Box 37.2: The Orissa electricity distribution privatisation experience

Orissa undertook comprehensive reform of its power sector including a partial divestment of equity in the distribution business units to the private sector, starting in 1996. The reform experience has underscored several important lessons for competitive bidding, especially on regulatory uncertainty and information asymmetry. Effective 1 April 1996, the Orissa State Electricity Board (OSEB) was split into three entities, viz. Orissa Power Generation Corporation (OPGC), Orissa Hydro Power Corporation (OHPC) and Grid Corporation of Orissa (GRIDCO, for transmission and onward supply to the distribution companies). The state government also re-valued the transmission and distribution assets of Rs 1200 crore (the book value plus capitalised interest and expenses) by an additional Rs 1194 crore (134%) when revesting them with GRIDCO.

Effective November 1998, the distribution-related assets, liabilities, proceedings and personnel of GRIDCO were transferred to four wholly owned subsidiary companies which were subsequently privatised through the sale of 51% GRIDCO’s equity. Three distribution companies (distcos) were bought by Bombay Suburban Electric Supply (BSES) in April 1999, and a joint venture (JV) between Jyoti Structures and AES Corporation bought the fourth in September 1999. In its first year of operations, BSES expects the combined loss figure in these companies to be about Rs 174 crore, mainly on account of discrepancies between the information provided in the Information Memorandum at the time of privatisation (the basis for the regulatory decisions) and the reality.

The Orissa Electricity Regulatory Commission (OERC) regulates retail tariffs, takes into account parameters like the cost of power procurement, capital base, reasonable return, acceptable level of losses, employee cost, interest and depreciation. BSES finds that its subsidiaries’ operations are not viable at the tariffs fixed by OERC, which were based on a transmission and distribution (T&D) loss level of 35%, because the actual losses are higher at 45% to 47%. According to OERC, this was done with a view to provide strong incentives to reduce T&D losses. Similarly, GRIDCO, in its enthusiasm to show lower distribution losses, estimated higher billings that are not based on meter readings. Even if the regulatory commission is willing to accommodate the demand of the distcos to base tariffs on a more realistic estimation of losses and receivables, the scope for a drastic upward revision of tariffs is limited.

Private operators, at the time of privatisation, bid in an uncertain environment about the regulator’s view regarding the valuation of the existing asset base, the likely profile of prices or performance levels. Some bid under the presumption that the regulator would use the sixth schedule of the Electricity (Supply) Act, 1948, and accept the government’s overvaluation. The bidders did not see any apparent reason to contest the overvaluation of assets, assuming that it would be reflected in the subsequent tariff. Similarly, bidders took into account the assumptions and data in the Information Memorandum since the government had set an implicit reserve price equal to the par
value of the share, which was arrived at based on those assumptions. These do not appear to conform with reality. A due diligence conducted by consultants to BSES also appears to have been flawed. The combination of regulatory uncertainty, over valuation and information asymmetry limited the number of bidders whereas others did not put in their bids, who found the regulatory risk unacceptable. Not surprisingly, BSES and Applied Energy Services (AES) have already started raising these issues for consideration by the regulator.

The government did benefit by being able to set off its dues to the erstwhile OSEB. It also managed to sell these assets for the stated book value. But it harmed the process of privatisation whose primary aim should be to improve the performance of the sector and not to increase revenues for the government. The revaluation has not made the distribution companies any more creditworthy.

In view of the above, privatisation of distribution should be preceded by a clear statement from the regulatory commission detailing its regulatory approach, including its views regarding what constitutes an appropriate valuation of rate base, likely profile of prices and expected performance levels. The government’s reserve price, if any, should be arrived at based on the same transparent regulatory framework; this information should be available to all potential bidders.

3.2.2 Tradeoffs among the objectives

The bidding design problem is complicated somewhat because the objectives above are often not perfectly consistent with one another. One objective may not be achieved fully without sacrificing the complete attainment of another objective. Two objectives that involve an explicit tradeoff are mitigating market power and maximising the bidding revenue proceeds. The value of holding the right or asset is greater to the bidder if he expects to charge monopoly prices for providing a service. A bidding procedure designed to allow this outcome will achieve higher revenues than one that excludes the outcome. While consumers (as taxpayers) might be better off in the short run, they will eventually (as consumers of the service) be worse off by paying higher prices that do not accurately reflect the benefits, costs and risks of that service.

**Box 37.3: FM radio frequency auctions in India**

A repeat of the telecom story?

At the conclusion of the final round of the FM radio auctions in New Delhi on 15 March, 2000, the government had collected Rs 4.25 billion as licence fees. Private players who bid huge premiums for the radio frequencies claim that the high value of the licences may render private radio business unviable and be a repeat scenario of the glitches that dogged the telecom sector after its bidding outcomes. Consider the premium paid on some of the frequencies at the last auction round. The FM licence
for a small town, Tirunelveli, was bid for over Rs 32.2 million to Sumangali Publications, while Rajkot was awarded to New Media for Rs 40 million. The government’s reserve price for these two stations was a mere Rs 2 million each. Earlier in the bidding process, 10 Mumbai frequencies were auctioned for Rs 97.5 million each against a reserve price of Rs 12.5 million while 11 Delhi stations were allotted for Rs 71.25 millions each. Hyderabad and Nagpur FM frequencies were allotted at a higher price than Delhi at Rs 77.2 million and Rs 74.0 million, respectively. The licence fees will moreover go up by 15% every year. Analysts feel that at such high prices several companies are likely to default on payments of the annual licence fee and others may go bankrupt.

3.2.3 Bidding formats
There are two broad formats for bidding—sealed and open. If there are a group of similar concessions or licences being awarded, there are two sub-possibilities for open bidding—sequential or simultaneous.

3.2.3.1 Single-round sealed versus multiple-round open bids
A sealed bid award can be a single-step one based on a combined technical and financial criteria, or it can be a two step process, with an initial technical pre-qualifying round, and a second financial one. An advantage of a two-step sealed bid process is the recognition that estimating the value of an asset or right involves high due diligence costs, and limiting the second round to a short-list makes these bidders willing to incur these costs with better odds of winning against fewer bidders. The concessions may be awarded based on either the highest price, or the second highest one. A simultaneous bidding procedure can be conducted in a single round, or it can be over multiple rounds. Most infrastructure concessions have hitherto been awarded through two-step first price sealed bids.

3.2.3.1.1 First price versus second price sealed bids
A second-price sealed bid format is one where the winner has to pay only the second highest bid. The primary drawback of first price sealed bids designs is its susceptibility to the “winner’s curse”. Bidding is less aggressive, and true value discovery might be hampered. An auction for spectrum frequencies in New Zealand (which was a debacle) was based on the second price design.42

3.2.3.2 Sequential versus simultaneous bidding
A novel bidding process based on a simultaneous, multiple round ascending structure was devised for auctioning parts of the spectrum in the US starting 1994, and its use in awarding concessions across many more sectors is gaining popularity.43 (see Appendix 1 for a detailed exposition on this method). The simultaneous format provides bidders maximum flexibility to acquire their desired aggregations as prices evolve through the bidding, while at the same time auditing the bidding outcome.
It allows bidders to observe and respond to prices as they emerge, which improves the accuracy of their forecasts and improves the efficiency of outcomes. The transaction costs of implementing the complex format of the auction, for both conceding authority and the bidders, are also manageable due to the extensive use of information technology in the conduct of the auctions.

Box 37.4: Could an alternative method to conduct FM frequency auctions have been used?

FM radio frequencies were awarded in March 2000 in India through a variant of the ascending auction—the open exit method. The number of licences in various cities was pre-determined, and these licences for each city were awarded in sequential rounds of bidding. Although the government raised Rs 4.25 billion through auctions, it is likely that the outcome of the auctions would have been different had they been conducted under the simultaneous ascending format. One of the driving motivators for aggregating licences across metros is leveraging of advertising revenues. Operating FM stations in separate metros may provide the operators an advantage in negotiating for advertisements, and a consequent advantage over competitors whose sole operations are in one metro.

3.2.4 Congruence of bidding formats with objectives

The primary yardstick for assessing the relative advantages of the alternative bidding formats is the efficiency in valuation of the award by the bidder. As pointed out before, as a broad rule, valuations with a predominant common component should be awarded through open bidding, a format most likely to result in prices that reflect fundamental market values and avoids pricing errors associated with the winner’s curse and with guesses that bidders must make in sealed bid designs. Those with a predominant private valuation should be through an appropriate sealed bid. Consider the toll road example of Section 3.2.1.1.1. The bidder’s valuation is, to a large extent, common and the bidding process should be open. However, the typically limited numbers of road services contractors would render this ineffective in disclosing information, and possibly abet collusion. An alternative is to award the concession through a sealed bid but with a different bidding parameter, which mitigates the traffic risk of the concessionaire. Annuities or capital grants are recommended parameters. An innovative new parameter, least present value of revenue (LPVR), has been used in awarding road concessions in Chile (the concept of LPVR is discussed in more detail in the section on bidding parameters and in Appendix 2).

Next, wherever similar services are being bid which can be used as networks, the bidding process should allow bidders to form their preferred aggregations of services. It is very difficult for one-shot sealed-bids, two-step processes or even sequential
open bidding to provide sufficient flexibility to bidders to accomplish this. Third, sealed-bid formats generally do not address the information disclosure problem as well as open formats. There is little, if any, objective contemporaneous price revelation through bids for related items and little, if any, opportunity for bidders to respond. Moreover, regulators and other stakeholders in the bidding generally prefer more transparency rather than less. An open bidding system provides a record that is open to inspection at each round of the bidding process. Fourth, as a consequence of the winner’s curse, serious bidders are unlikely to bid as aggressively in sealed-bid formats and the outcome is likely to be characterised by distorted market valuations, reduced revenues, inefficient outcomes, and different winning bids for similar concessions.

In addition to the winner’s curse problem, revenue can be reduced if bidding itself suffers from collusive behaviour by bidders. The rules can affect the ability of bidders to act collusively to reduce prices. The specific rules that we recommend limit the bidders’ ability to communicate, to form bidding consortia, and to retaliate against other bidders who violate collusive agreements, thereby promoting higher, more competitive prices for the concession sold. Moreover, open simultaneous bidding, by ensuring that similar valuations are established for similar concessions, allows buyers with significant market presence to exercise some market power, thereby undermining the efficiency of the outcome. However, within the class of standard formats that do set a uniform price, the simultaneous ascending auctions maximises efficiency by minimising bidder error.

### 3.2.5 The bidding process

To encourage efficient performance and to minimise post-award re-negotiation, it is crucial to consistently and comprehensively define performance specifications and the parameters of incentives and risk-sharing. A characteristic of most infrastructure concessions is that there are only a limited number of players globally, and even fewer that are likely to participate. Collusion among bidders is difficult to preempt and requires exhaustive project preparation. Multiple round simultaneous bidding may be occasionally used for O&M contracts on selected road stretches to exploit network externalities.

Concessions may also be re-awarded by way of further bidding, although somewhat arbitrary bid preferences may have to be set. The bid authority for complex concession contracts should operate at arm’s length from all interested parties, including politicians. It may make sense to let independent agencies that regulate the concession scheme conduct the bidding.

The success of the spectrum sales in the US is often cited as evidence of the efficacy of competitive bidding, but there are enough instances of glitches in the same process in other countries that arose due to the lack of attention to technical details.
Box 37.5: The importance of correctly designing bidding procedures

- **Prequalify bidders and penalise default heavily.** In the Australian first price bidding for satellite TV services in 1993, the licences were won by two unknown companies whose winning bids were around A$200 million. They then promptly defaulted, since there were no default penalties in the contract. They had also put in a series of lower bids (20 descending bids in steps of A$5 million) and continued to default over the year. They finally paid roughly A$100 million, which they later sold to another company for a profit of around A$20 million.

- **Can incumbents bid?** Market power is addressed in the bidding design primarily in terms of ownership and cross-holding restrictions. The rules specify restrictions on which bidders can bid on which concessions. Ongoing monitoring and antitrust laws and regulations are required to enforce market power restrictions after the award.

- **Credibility of bids.** The Indian DoT decided to restrict the monopoly power of the bidders in the bidding of cellular mobile services for 19 circles after the results of December 1994, as a result of which some circles were vacated by the winners, and the second highest bidders failed to match the winning bids, requiring re-bidding. Highest bidders for radio paging services failed to provide the requisite bank guarantees within the stipulated time, the second highest bidders again failed to match the highest bids, again requiring re-bidding.

- **Bid bonds and bid withdrawal rules.** Although not all governments are in favour, bid bonds have been used in almost all bidding in emerging countries. Bid withdrawal rules are more relevant for open bidding, and are very complex when multiple units are being auctioned simultaneously.

- **Reserve prices.** In one of the New Zealand second price bids for radio, television and cellular licences, one company that had bid NZ$100,000 paid the second highest bid of NZ$6. However, reserve prices entail tradeoffs between revenues and efficiency. Only when the conceding authority has very limited performance objectives should reserve prices be a strict commitment.

- **Cost sharing.** One way of limiting the costs of bid preparation is to limit competition among bidders by shortlisting them based on the highest performance bond amounts the bidders are willing to post, ensuring the most confident and creditworthy entities participate in the final bid. Another way is to share the cost with users in the final tariffs for the service.
Table 37.1: Comparison of actual conduct of bidding for Indian infrastructure services with this paper’s recommendations

<table>
<thead>
<tr>
<th>Sector</th>
<th>Activity</th>
<th>Tenders/projects</th>
<th>Pre-specified fees/terms</th>
<th>Bid parameter(s) used</th>
<th>Bid procedures recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Generation licences</td>
<td>Various plants awarded</td>
<td>Lowest tariff per unit of electricity supplied, besides other technical parameters specified.</td>
<td>No bidding necessary; competitive generation and free entry of generating units should be allowed, and attempts to develop electricity markets</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>through competitive tenders</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Distribution licences</td>
<td>Orissa distribution zones 1999</td>
<td>Maximum value for 51% of the shares of the privatised distribution zones</td>
<td>Regulation uncertainty and flawed asset valuation distorted the bid values</td>
<td></td>
</tr>
<tr>
<td>Telecom</td>
<td>Basic service licences</td>
<td>Licences for circles 1995</td>
<td>License fees payable to DoT (72%), share of rural lines in total (15%), use of indigenous equipment (3%), network roll-out plan in first 3 years (10%)</td>
<td>No bidding; competitive generation and free entry of operators</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cellular service licences</td>
<td>Licences for metros 1992</td>
<td>Licence fees plus per subscriber charges</td>
<td>Lowest rental charges for subscribers</td>
<td>Spectrum, rather than specific uses for it, should be auctioned. Per subscriber fees, even if non-bid, are incompatible with efficient operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Licences for circles 1996</td>
<td>Per subscriber charges</td>
<td>Highest licence fees</td>
<td>Obligations should be awarded through competitive bidding</td>
</tr>
<tr>
<td></td>
<td>Universal service obligations</td>
<td>Access to rural and remote areas</td>
<td>Procedure yet to be decided</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broadcasting</td>
<td>FM stations</td>
<td>Frequency licences for 40 metros and cities March 2000</td>
<td>License fees for stations in individual cities</td>
<td>Simultaneous rather than sequential city-wise bidding should have been used</td>
<td></td>
</tr>
</tbody>
</table>
Table 37.1: Comparison of actual conduct of bidding for Indian infrastructure services with this paper’s recommendations (contd...)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Activity Description</th>
<th>Tenders/projects</th>
<th>Pre-specified fees/ terms</th>
<th>Bid parameter(s) used</th>
<th>Bid procedures recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roads</td>
<td>BOT concessions with direct tolls</td>
<td>Jaipur Kishangarh section of NH 8 (in process)</td>
<td></td>
<td>Least capital grant</td>
<td>Use of least present value of revenue might be considered.</td>
</tr>
<tr>
<td></td>
<td>BOT concessions with annuities</td>
<td>Panagarh Palisit section of NH 2 (in process)</td>
<td></td>
<td>Least annuity for EPC plus O&amp;M</td>
<td>Proper concession structure (which should be replicated for other road projects)</td>
</tr>
<tr>
<td>Ports</td>
<td>BOT concession</td>
<td>Chennai container terminal June 2000</td>
<td>Upfront fee of Rs 10 crore</td>
<td>Share of revenues as royalties with guaranteed minimum traffic</td>
<td>Bidding should have been on the basis of flat licence fees or NPV of annual cash flows</td>
</tr>
<tr>
<td></td>
<td>BOT concession</td>
<td>New Mangalore bulk handling terminal with 1–2 jetties</td>
<td></td>
<td>Highest NPV of cash flows to Trust from royalties per tonne (or TEU) on guaranteed traffic from berths/terminals</td>
<td>Proper bidding procedure employed but exclusivity clause for JNPT terminal has built-in disincentive for improving efficiency through intra-port competition</td>
</tr>
<tr>
<td></td>
<td>BOT concession</td>
<td>Kandla dry bulk and non-POL liquid terminals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-year BOT concession</td>
<td>JNPT 2-berth container terminal</td>
<td>Exclusivity clause till a minimum traffic level is reached</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airports</td>
<td>Cityside service contracts</td>
<td>Duty free and jewellery shops at international airports</td>
<td>Space licence fees</td>
<td>Highest flat royalty (not as a share of revenue) to be paid to AAI, with a guaranteed minimum turnover</td>
<td>Proper bidding employed</td>
</tr>
</tbody>
</table>
3.2.6 Who conducts the bidding? Can the regulator?

Is the conceding authority (the government) or the regulator a better choice for conducting the bidding, once the bid procedure has been designed? In principle, the owner has the right to decide the procedure of sale. If the bidding is for the sale of an existing asset, government has the right to decide all the parameters of the sale to maximise the sale value of the asset. In the case, however, of assigning the right to provide services in the infrastructure sector, once the broad parameters of the objectives are determined by the conceding authority, designing the sale procedures are best left to an independent authority. Given the residual discretion in even very tightly structured bid designs, the sector regulator as an independent authority who is not susceptible to political or bidder interest is the most obvious choice, especially if the bidding is meant to be a mechanism for information disclosure. On the other hand, the regulator might need to arbitrate in disputes between the service provider and the conceding authority. Overall, if dispute redress is left with courts or dispute tribunals, then the regulatory authority may be the best choice.

3.2.7 Bidding parameters

The design of incentive mechanisms will vary according to the nature of the asset or service and the market structure of the service that is being sold or concessioned. In bids for infrastructure service concessions in sectors like roads, ports, water supply or sewage disposal, the parameters usually are

i) the shortest duration of the concession

ii) the lowest tariff to be charged to consumers

iii) the largest amount of new investment to be undertaken by the operator

iv) the highest revenue offered to the state for existing infrastructure (a share, or a flat offer)

v) the lowest total (present value) of revenue required by the concessionaire

vi) the lowest subsidy that the government must provide for a commercially non-viable service

vii) the lowest cost to the government for constructing or operating services or facilities

viii) the lowest income guarantee requested from the state

Bidding on the shortest duration for the concession, given a predetermined tariff rate, is now generally considered to be exceedingly prone to re-negotiation, and is rarely now used as an award criterion. A feature of most forms of concession bidding nowadays is that the duration of the contract is pre-specified by the government.
The primary defect with fixed term concessions is that they create unnecessary risk for the concession holder. Since demand is uncertain and competitive bidding results in \textit{ex ante} rents being extracted away, the winner faces significant losses if demand projections were (over) optimistic. Because of this risk, high-risk premiums are demanded\textsuperscript{58} and make lenders uncomfortable without government debt guarantees or minimum revenue guarantees. These reduce incentives for lenders to screen projects and monitor their performance. In addition, when demand is less than projected, contracts are often renegotiated and losses shifted to users or taxpayers. The expectation of re-negotiation prompts firms to bid artificially low tariffs. It is difficult to agree on the fair compensation (the expected income foregone over the remainder of the concession) to be paid to the licensee in these cases.

While bidding based on direct user charges is the most common, there are other possibilities. Telecom licences in India were in the past assigned both on bids submitted on licence fees, in the case of cellular mobile services, and on the lowest prices that would be charged to customers given a fixed level of licence fees determined by the government. Concession offers can similarly require bidders to bid on licence or entry fees, with a fixed revenue share. The experience of bidding licences for basic telecom services is exemplary of the problems that can occur if the conceding authority attempts to maximise revenues from artificially erecting barriers in markets where competition is feasible or selling a public asset which is not scarce.

An example of indecisiveness is the recent discussions on the parameters of entry of operators in the national long distance (NLD) segment of the telecom sector. Although the Telecom Commission has now decided to allow free entry\textsuperscript{59} into the inter-state long-distance segment, it was a close call. Various options for restricting the entry of operators, based on upfront licence/entry fees, revenue shares and combinations of the two had been discussed, based on a presumed (and mistaken) non-viability of a large number of operators in this segment.

The initially proposed methods for restricting entry into NLD operations were contrary to some very fundamental precepts of the economic theory of incentives. First, restrictions to free entry and exit in sectors (through competitive bidding or administrative means) where competition and free entry are feasible will lead to inefficient service provision in the sector. Second, in markets with natural monopoly characteristics, or for sales of scarce public assets, the rights to the service provision (or the asset) has to be allocated in a manner that minimises the distortions in the incentives. This is normally through a flat fee, which does not skew relative prices of assets or services.\textsuperscript{60} If entry does need to be restricted, bidding on the largest entry fee should be used rather than a revenue share.\textsuperscript{61}
In the worst case, if revenue-sharing is mandated by the conceding authority, it should be pre-specified rather than bid.

**Box 37.6: The folly of using revenue shares as a bidding parameter**

Port concessions in India: Chennai Port container terminal

Bidding with the objective of maximising revenues for the government is usually responsible for breakdown of contracts by building in the maximum disincentives for investment for increasing revenues. Further, a draft document to concession port services in India stipulates that revenue shares from port services will be one of the bidding parameters, the worst means for this objective. The Ministry of Surface Transport has recently decided to award a bid for developing and managing a container terminal facility at Chennai Port (CPT) to Peninsula and Oriental (P&O) ports of Australia on the basis of its winning bid of 37% share of revenues to be transferred to CPT.

The bid document framed extremely stringent and non-negotiable performance guidelines relating to investments and container throughput. The award of the right to operate the terminal was unfortunately determined on the basis of the highest revenue share that the bidders were willing to give the government as royalty. This proposed revenue-sharing arrangement for the port concessionaires (by bidding on the highest revenue share) is worse than specifying a priori a revenue share. The incentive-incompatibility of improved efficiency in the case where providers bid on revenue shares is compounded by the gaming possibilities during the bidding itself. The expectation of renegotiation encourages bidders to bid artificially high revenue shares. The potential for rendering the concession non-viable through these unrealistically high bids in turn actually increases the prospects of renegotiation. This approach seems bereft of the lessons of the telecom franchising experience of the early nineties.

**Moral:** If revenue shares have to be a criterion for awarding bids, the best the government can do is to pre-specify a revenue share and have the concessionaire bid on a flat fee.

A new form of bidding is being tried for road projects in Chile based on least present value of revenue (LPVR). The use of LPVR as a bidding parameter is promising for concessions which have a significant private value component, i.e. where the concessionaire can to a large extent control the construction and operation risks of the project. But if there is also a common value component, for example, a traffic risk, for the concessionaire, he would include a risk premium in his bid thereby increasing project costs. Who amongst the conceding authority, the concessionaire or the lender is best equipped to handle this risk? As we shall see in the section on road concessions below, the conceding authority might adopt a non-toll based concession structure that finances the project costs through an indirect cess or other fuel levy. However, this might be inequitable to non-users of that particular project.
Lenders and financial institutions, on the other hand, have various instruments that can diversify financial risks in the capital markets and their individual portfolios. Revenue risks are essentially financial risks. The fundamental insight of LPVR bidding is to shift the majority of the concessionaire’s traffic risk into a financial risk for the lender.

The process is as follows. Instead of bidding for the lowest tariff for the road user, given a fixed concession duration, the concessionaire bids on the present value of revenues, and the term of the concession adjusts endogenously to the traffic flow, and therefore revenues from tolls. If traffic and revenues are lower than expected, the concession duration is extended till the concessionaire’s revenue requirements from the project are met. If traffic is higher, the duration contracts.

This revenue uncertainty translates into loan repayment uncertainty for the lender. The more developed the country’s capital markets, the better the lender is equipped to mitigate this risk. Variable duration loans are already part of many financial institutions’ portfolios. Moreover, bidding being based on single transparent parameter, the scope for re-negotiations is reduced on the bidder’s part and of creeping expropriation on the part of the conceding authority. (See Appendix 2 for a detailed description of this method, as well as an overview of its operation in the road sector in Chile.)

### 3.2.7.1 Multiple parameter bids

Bidding for concessions can also be based on a combination of parameters. The bidding parameters of a toll-road concession, for instance, might be a combination of toll rates, the payment of a share of revenues from toll collections to the conceding authority, and/or a flat fee. It is generally agreed, however, that bidding on a concession with more than three parameters usually defeats the purpose of optimising multiple goals by making the outcome too complex, and introduces administrative arbitrariness and inevitable renegotiation.

**Box 37.7: The dangers of multiple parameter-based bids**

One of the first concessions to be awarded in Chile’s highway concessions programme, the El Melon Tunnel, used a weighted average of seven variables, including the toll level and payments offered to the state. These two turned out to be the critical factors in the outcome of the bidding process. The winning consortium offered a high toll level (set at the upper end of the allowed range) and a high payment to the government. (The government expected the tunnel to be unprofitable at the maximum tariff level and expected the project to go to the bidder soliciting the lowest subsidy, but the winning firm offered to transfer resources to the government instead.) The resulting high tolls created a significant traffic diversion to the free alternative road over the mountain.
where the tunnel was located. This lowered the revenues of the concessionaire and in an inefficient allocation of traffic between the tunnel and the mountain road. The concessionaire had subsequently lowered tolls, and negotiations are underway to reduce payments to the state in exchange for yet lower tolls.

3.2.8 Optimal number of bidders

In many bidding models, the expected revenues to the conceding authority increases with the number of bidders. By having bidders participate only when they make a prior calculation comparing the probability of winning with the cost of bidding increases the expected revenues. Bidding methods then yield the result that, beyond a point, an increase in the number of bidders could decrease expected revenues. There is thus an optimal number of bidders for expected revenue maximisation.64

3.2.8.1 Pre-qualification criteria for bidders

As a rule, the successful conduct of competitive bidding requires the maximum possible numbers of credible bidders. The basic principle is the maximum possible disclosure of information on the value of the asset or the service during the process of bidding.65 However, the world over, an enormous amount of effort is expended on designing the structure of the concession or the nature of the scarce public resource that is to be bid. As we had discussed in Section 2.2.1, a proper structuring of the contract is necessary for reducing the possibility of default and renegotiation. A proper balance between ensuring the largest number of bidders and the credibility of their bids needs to be attained, and the formulation of pre-qualification criteria is the key to this balance.

A mix of enforceable (or bankable) penalties and performance incentives can be expected to achieve better results than arbitrary entry barriers.66 Very stringent qualification specifications (as, for example, set for eligible bidders for port projects including container terminals) might have the effect of excluding firms that would otherwise be capable of executing the project.67

3.2.9 Anti-collusion measures

Competitive bidding could be subject to potentially significant distortions and gaming problems. The primary objective of competitive bidding is an efficient revelation of the true value of an asset or service. Collusive arrangements are likely to distort this valuation. There are broadly two kinds of distortive bidding behaviour. One is collusion among a bidding cartel in some form or the other. The other is manipulating the bidding procedures, either through price or other signals, to send strong signals to competitors about his bidding behaviour in the future. Therefore, incorporation of procedures that ensure that bids are credible and prevent gaming
is an integral part in the design of the bidding process. A number of sealed-bid awards are also, *de facto*, open, due to corruption driven information leaks.

4. A TOUCHSTONE SECTOR: COMPETITIVE BIDDING FOR ROAD SERVICES

The road sector is illustrative of most aspects and problems of awarding a concession for providing services, and it is worth taking a look at the design of a concession structure, and the resulting bidding procedures to get a feel for the complexities inherent in the process. In many parts of the world, the major problem of roads has been the significant inadequacy of funds for maintaining roads. In India, this is made worse by the poor initial construction, due in large part to the absence of incentives for minimising the lifetime costs of maintaining the road. The major risks for projects in the road sector are (i) construction (ii) operation and maintenance (iii) traffic (iv) political and regulatory (v) currency (vi) financing and (vii) *force majeure*.

To mitigate the first two, roads project concessions should club EPC and O&M contracts together. The design of an appropriate concession structure and bidding mechanism can considerably mitigate traffic risk, arising from projected traffic flows not materialising, impacting the cash flows of the project, and a consequent default on debt service payments to the project lenders. Wherever possible, especially bridges, tunnels, high traffic density corridors, or in the presence of alternative roads where access control is feasible, toll rates should be (one of) the bidding parameter(s). When direct tolling is not possible, but monitoring traffic is feasible, an alternative is shadow tolling, where payments are made by the conceding authority to the concessionaire based on the traffic flow that is estimated over the road. This avoids the drawbacks and expenses of direct tolls, but generates instead issues of “monitoring” risk and monitoring expenses. Shadow tolling has built-in incentives to increase traffic and revenues, but does not encourage transparency. The least present value of revenue (LPVR) is the most effective bidding parameter.

For roads where monitoring is expensive, the concession may be awarded to the party that bids the lowest amount for implementing the road project. This is an alternative source of cash flows to the concessionaire through fixed payment(s) which can be either through capital grants or a stream of annuity payments. These diminish demand risk for the concessionaire by assuring a stream of returns (or an equivalent capitalised value). These can be funded through a dedicated road fund financed through a tax or cess on fuel consumption. While a capital grant addresses the problem of front-loaded project costs, and are likely to lower financing costs, they are likely to significantly increase the O&M risk, thereby increasing
maintenance costs over the life of the road project and offsetting the initial lower cost of capital. Annuity payments incentivise the maintenance of the road more effectively by maintaining the incentive structure over the project life and allowing the conceding authority to enforce performance and maintenance parameters through retaining control over the cash flows to the concessionaire.79

Residual political, policy and regulatory risk (i.e. the residual after a well-designed enforceable concession contract) can be largely controlled by constituting an independent road board, that would be tasked with careful project selection and rigorous project appraisal among other regulatory and monitoring functions.80

5. **Recommendations**

1. Whenever possible, allow competition in the provision of infrastructure services, with free entry and exit of service providers.

2. If the services cannot be delivered in competitive markets due to natural monopoly characteristics, award of rights to provide infrastructure services, including concessions, should be made through competitive bidding rather than administrative allocation. This should be a rule, unless there are overwhelming reasons to do otherwise, such as excessive transactions costs (relative to the size of the contract) or very special requirements for speed or innovation.

3. The market structure in which the concession will operate or the service be provided will determine the risks involved. The design of the concession, or the method of allocation of the scarce resource, and hence the bidding procedure, should reflect an appropriate allocation of risks. This is critical for the commercial viability of the project, and minimises the chances of eventual re-negotiation of the contract.

4. The objective of the bidding process is the award of the right to provide the service to the party that can provide it to the final user most efficiently. Maximisation of revenues and fees from the award should always be a secondary objective; only when existing public assets are being sold into competitive markets should this be the sole objective. A well-designed bidding process will automatically lead to a discovery of the value of the service to the private firm. In case of a conflict between the two objectives, efficiency of service provision should be the priority.

5. Clarity about the rights being awarded, and about the responsibilities of all parties to the contract is essential for ensuring the best outcome for the bidding process. Proper implementation of the bidding procedure is as important as
the design. The structure of penalties, reserve prices, bidding intensity and bid increments all contribute to a successful outcome.

6. Competitive bidding produces the best outcomes if there are a sufficient number of bidders. Keeping the process simple, and eschewing onerous pre-qualification norms for bidders will ensure this. However, the design of a bidding process should also filter out non-serious bids and non-qualified bidders, attaining a balance between the two criteria. Clearly defined, stiff and credible penalties (bid bonds, bid withdrawal rules, etc.) and performance specifications, with a two-step procedure for sealed bids, can be a sufficient deterrent for frivolous bids.

7. If the service to be awarded is such that the provider has control over a significant portion of the factors for successful implementation of the project, the use of a sealed-bid bidding procedure is recommended. For services where the revenues of the provider depends on common exogenous factors as well, the use of open bidding is likely to lead to a better choice of the service provider following more efficient disclosure of information of valuation of the exogenous factors.

8. If a sufficient number of bidders to ensure disclosure of valuation information through open bidding is not available, the concession structure should be suitably changed to make sealed bids the appropriate bidding format.

9. The use of simultaneous, rather than sequential, bidding is recommended for cases where the rights to provide many similar services are being awarded, so that bidders can exploit the complementarity between the services to determine their valuation of the contract. Simultaneous bidding should also be used when the service is part of a network where the valuation of the concession will depend on forward and backward linkages.

10. Simplicity in the selection of bid parameters and the bidding process is paramount. Whenever possible, a unique bid parameter should be used: this minimises arbitrariness in renegotiation and dispute resolution. If multi-parameter bidding is necessary, use of no more than three parameters is recommended.

APPENDIX 1

Simultaneous, multiple-round ascending auctions for spectrum licences

The “simultaneous ascending auction” was first introduced in 1994 to sell licences to use bands of radio spectrum in the United States. Much of the attention devoted to the auction came from its role in reducing federal regulation of the radio spectrum...
and allowing market values, rather than administrative fiat, to determine who would use the spectrum resource. This also followed the debacle of the spectrum auctions in New Zealand, and the problems with those in Australia. Many observers were also fascinated by the extensive reliance of the auction on web-like information technology. The large amounts of money involved were yet another source of interest. The very first use of the auction rules was a US$617 million sale of ten narrowband paging licences in July 1994, which was completed in five days. In the broadband Personal Communications Service (PCS) auction, which began in December 1994, ninety-nine licences were sold for a total price of approximately US$7 billion. Once the auctions had been conducted, it became much harder to ignore the tremendous value of the large amounts of spectrum allocated to uses such as high definition television, for which Congress had demanded no compensation at all. Moreover, the perceived successes with the new rules inspired imitators to conduct similar spectrum auctions in various countries around the world. The UK auctions for five 3G Universal Mobile Telecom Service (UMTS) licences, which raised a staggering US$35.5 billion, reinforced this perception, as well as emphasising the importance of correct implementation of the new auction form.

Various reviews suggest that the new auction design is realising at least some of the theoretical advantages that had been claimed for it. Several parts of economic theory proved helpful in designing the rules for simultaneous ascending auction, and in thinking about how the design might be improved and adapted for new applications. The basic insight of the new mechanism was in realising that some or all of these licences could be complements or substitutes, and a simultaneous open bidding would enable bidders to use information from others to optimise his aggregations of the available licences. There is a fundamental difference between situations in which the licences are mutual substitutes and others in which the same licences are sometimes substitutes and sometimes complements. When the licences are mutual substitutes for all bidders, straightforward, “myopic” bidding leads bidders to prices and an allocation that are close to competitive equilibrium.

However, if even one bidder has demand in which licences are not all mutual substitutes, then there is a profile of demands for the other bidders, all of which specify that licences are mutual substitutes, such that no competitive equilibrium prices exist. There is an inherent limitation in the very conception of the auction as a process for discovering a competitive allocation and competitive prices in that case.

One of the main issues in the early debates about the spectrum auction was whether all bidding should be for individual licences or whether, instead, bids for combinations of licences should be allowed. According to one combinatorial bidding
proposal, bids would first be accepted for certain predetermined packages of licences, such as a nationwide collection of licences, and then bidding on individual licences would ensue. After all bidding had ceased, the collection of bids that maximise total revenues would be the winning bids, and licences would be assigned accordingly. The primary economic argument against allowing combination bids is that such bids can give rise to a free rider problem among bidders on the individual licences, leading to avoidable inefficiencies.

One of the most frequently expressed doubts about the spectrum auctions is that the form of the auction matters at all. After all, the argument goes, one should expect that if the initial assignment resulting from the auction is inefficient and if licences are tradable, the licence owners will be motivated after the auction to buy, sell and swap licences until an efficient assignment is achieved. There are both theoretical and empirical grounds for rejecting this argument. Briefly, the argument combines two theoretical observations from the theory of resource allocation under incomplete information in private value environments. The first observation is that efficient bargaining outcomes in such an environment are generally impossible to achieve. The older theoretical literature shows this for the case where there are just two parties to the bargain and the efficient allocation of the licence is uncertain. Recent work suggests that the efficient outcomes become even less likely when there are multiple parties involved, as is the case when a bidder needs to assemble a collection of geographically diverse spectrum licences from multiple owners to offer the most valuable mobile telephone service. The years of delay in developing nationwide mobile telephone services in the US, despite the value that customers reportedly assign to the ability to “roam” widely with their phones, testify to the practical importance of this theoretical effect. An inefficient initial assignment cannot, in general, be quickly corrected by trading in licences after the auction is complete.

APPENDIX 2

Least present value of revenue (LPVR) as a bid parameter for road concessions in Chile

The combined effects of special features of the highway business and the type of concession contracts that have typically been used have led to serious problems. Firstly, traffic forecasts are notoriously imprecise. Secondly, most concessions awarded for fixed terms have been independent of demand realisation. This led to the origin of an innovative bidding parameter, the LPVR.

The mechanics of LPVR bidding are as follows:

(a) Regulator sets a maximum toll.
(b) Concession is won by the firm that bids the least “present value” (PV) of toll revenue.

c) Concession ends when PV of the toll revenue equals the winner’s bid.

d) The toll revenue is discounted at a predetermined rate specified in the franchise contract. The discount rate should be related to the loan rate faced by the concession holder.

The central tenet of LPVR bidding is that the concession holder should not make losses when the long-run demand for the highway is sufficient to pay all costs. Basically, the length of the concession period increases if traffic is less than expected, and shortens for the converse eventuality. The LPVR auction endogenously adjusts the duration of the concession to the realisation of demand. Risks are lowered, and the winner’s curse is mitigated. Ipso facto, users, on average, pay less. Advantages include: (i) the winner’s bid reveals the income required to earn a normal return (which can be used as a benchmark); (ii) renegotiations are less likely since the probability of financial distress is reduced; and (iii) in case of termination, the difference between the PV of revenue earned and the original bid represents a relatively transparent compensation.

There can be two main objections to LPVR auctions: (i) for lenders it may be difficult to structure financing where the concession term is not fixed (a contingency financing type of structure needs to be contemplated; on the flip side, equity holders would view the LPVR method favourably; therefore debt-equity ratios may end up being lower) and (ii) disincentive for demand-enhancing activities, including investment in road quality and maintenance (this issue can be mitigated by regulatory agency-imposed minimum quality standards).

APPENDIX 3

3a. Sales of existing electricity generation plants in the USA

In the process of the rapid deregulation of the electricity industry forcing electric utilities to compete at both retail and wholesale levels, most states in the US will compensate utilities for the difference between costs incurred on past capital investments under regulation and the profits they can expect to earn on these assets under competition. These “stranded costs” are the difference between their market values of their assets and their book value. One study estimated the current stranded assets at US$88 billion and estimates of projected stranded costs range from US$10 billion to US$500 billion. Most utilities will recover stranded costs from consumers in the form of a “competitive transition charge” (CTC). The magnitude of the CTC depends on the market value—the higher the estimate, the lower the CTC.
To estimate the current market values of their plants, utilities can either negotiate with regulators or obtain a market price for the assets by divesting them. Several states have required utilities to do the latter, since first, they are less controversial than appraisals and less likely to get bogged down in litigation. Second, plant asset divestitures serve the purpose of alleviating regulator concerns of vertical market power in a deregulated industry and can be designed to disperse asset ownership to reduce horizontal market power. Divestments can be achieved through a negotiated sale, spin-offs or sales through competitive bidding.

Although competitive bidding is generally perceived as equitable, efficient and revenue maximising, some designs produce better outcomes than others. The process most commonly used by utilities selling their generation assets was the first-price sealed bid method. In Appendix 1, we have described how the simultaneous ascending auction (SAA) design achieves the objectives of mitigating market power and promoting competition, optimising sale revenue, establishing market values and achieving economic efficiency, and providing for a transparent assignment of assets to those able to most efficiently utilise them more efficiently.

3b. Auction of PPAs in Alberta, Canada

In 1993, the Government of Alberta began the process of restructuring the province’s electricity industry. The objectives of the Electricity Utilities Act (EUA) 1995 were

1. Establish an efficient market for electrical power generation;
2. ensure that the benefits and costs associated with existing regulated plants would continue to be shared equitably by current and future customers;
3. ensure that investment in new generation is guided by competitive market forces; and
4. where regulation would remain, minimise its cost and provide incentives for efficiency.

The Alberta Energy and Utilities Board, as part of the process of restructuring, decided to bid out the 13 PPAs that were established for thermal (coal- and gas-fired) units in August 2000. The PPAs were determined by an independent assessment team (IAT) appointed by the Alberta Department of Resource Development (ADRD). The Alberta Energy and Utilities Board (EUB) approved the PPAs at the end of 1999. Purchasers of the PPAs will acquire the rights to the capacity of previously regulated thermal generating units in Alberta. With these rights, PPA holders can market and sell the electricity into the marketplace as they see fit either through the power pool of Alberta or directly to customers, starting in January 2001. The PPAs specify the rights and obligations of the buyers—including
the capacity committed to the buyer as well as the fixed and variable costs to be paid by the buyer to the generator-owner. The benefits to the PPA buyers are:

- PPAs provide access to significant electricity supply in a growing market and economy.
- The PPA buyer is free to sell power without having to operate a plant.
- Specified fixed and variable cost schedules enable bidders to better estimate profit potential.
- Through the PPA auction process, the PPA buyers have flexibility in developing a portfolio of plants and time horizons, with PPAs terminating in different years from 2003 to 2020.
- The PPAs can be resold and will have market-determined prices providing PPA buyers with flexibility.
- PPAs can be used to hedge against fluctuations in energy prices.
- PPAs enable marketers to develop unique products and services to target these products and services to specific segments of the electricity market.
- PPAs enable marketers and distribution companies to hedge their short positions in the market.

One hydro PPA will be the balancing pool and will not be auctioned. It was decided to use a SAA format, where multiple PPAs are open for bidding at the same time, and remain open so long as there is some bidding on any of the PPAs. The bidding process has begun at the time this paper was written.

**APPENDIX 4**

**Technical note on bidding formats**

**Single round sealed versus multiple round open bidding.** Most infrastructure concessions are awarded through a two-step, first-price, sealed bid mechanism, but open bidding is generally used for award of licences for the spectrum. Sealed bids often have a significant spread between bids, engendering a notion in governments that high revenues or low tariffs would emerge as a result. The academic profession, on the other hand, feels that open bidding generates more aggressive (but more credible) responses. Bidders have less information on others’ valuations, exacerbating the problem of “winner’s curse”.

**First- versus second-price bidding.** This is an issue only in single round (sealed) bidding. Second price bidding is also known as Vickrey auctions, and are designed to mitigate the “winner’s curse”.

A process of escalating (or descending) bids to award a right to the highest bidder is open bidding. The principal advantage of a multiple round bidding is the information that it provides bidders about the value other bidders place on the item. This information increases the likelihood that the items are assigned to the bidders that value them the most. They will also typically yield more revenue than bidding where there is uncertainty about common factors that affect the value of a licence for all bidders, i.e. who bid and how much. Theory shows that multiple round bidding tends to increase revenues by reducing the incentives for bidders to be overly cautious while bidding while trying to avoid the “winner’s curse”.

Ascending or descending formats. The difference between the two is the process of information disclosure (and hence presumably revenue generation). An ascending auction better enables the participants to find out who values the item the most, and how much. In a descending (as well as first-price) auction a bidder knows that he only wins if his bid is higher than that of everyone else. He must also decide upon his bid without knowing what others will do.

Sequential versus simultaneous bidding. If a number of similar licences or concessions are being awarded (e.g. spectrum licences for wireless applications, electricity distribution franchises, road stretches in contiguous areas for rights-of-way, or airport slots for airlines that have to be aggregated into routes), or a series of assets are to be sold (electricity generation plants), simultaneous bidding is a more effective means of discovery of market valuation of these externalities present. The market decides how to aggregate pieces of a system most efficiently. The items to be bid on may be either substitutes or complements. Complementary licences are worth more as a package than individually. The benefits of aggregation, however, need to be balanced by the need to mitigate market power.

Simultaneous, multiple round bidding. Simultaneous multiple round bidding is particularly efficient in awarding several similar concessions with interdependent values. Radio spectrum licencing is the classic example of the benefits. This bidding process was used in the USA by the Federal Communications Commission (FCC) and has since been successfully replicated by Mexico and the Oceania countries. The efficiency of a simultaneous bidding in a multiple round format stems from the reduced need for the bidder to guess about outcomes in later bidding rounds. In sequential bidding, a bidder may pay a lot for a licence in an early round on the mistaken expectation of a low price for a complementary licence in later rounds (see the section on the afternoon effect in sequential bidding). This method reduces the need for bidders to guess outcomes in later rounds, enabling the discovery of market valuation of the network. Bidders can continually reassess their strategy and preferences in light of competitors’ bids.
Table 37.2: Characteristics of different types of bidding procedures

<table>
<thead>
<tr>
<th>Type</th>
<th>Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dutch, or descending-price. Open.</td>
<td>Seller announces very high opening bid. Bid is lowered progressively until demand rises to match supply.</td>
</tr>
<tr>
<td>First-price, sealed bid. Known as discriminatory auction when multiple items are being auctioned.</td>
<td>Bids submitted in written form with no knowledge of bids of others. Winner pays the exact amount he bid.</td>
</tr>
<tr>
<td>Vickrey auction or second-price sealed bid. Known as uniform-price auction when multiple items are being auctioned.</td>
<td>Bids submitted in written form with no knowledge of the bids of others. Winner pays the second-highest amount bid.</td>
</tr>
</tbody>
</table>

**Notes**

1. Transparency refers to the decision-making process itself, be it based on a financial bid or other selection criteria. Rules and procedures are fixed in advance, and apply equally to all participants. The seller must provide information that would help the bidder evaluate the assets’ value, and must fully describe the asset being sold. This is mainly meant to mitigate the political risk of the project.

2. In what follows, we shall take “competitive bidding” to mean “auctions”, although they are technically slightly different. Strictly speaking, bidding is a part of an auction format, and is the manner in which interested parties signal their valuation or preferences for the item that is being auctioned. Bidding is a formal, competitive procurement procedure, by means of which offers to furnish goods, works, or services are solicited, received, and evaluated, and a contract is awarded to the bidder whose offer is the “best”.

3. Most of the arguments will also apply to the transfer of existing assets and services in the infrastructure sectors from public ownership to private.

4. Privately financed infrastructure projects being overwhelmingly financed on a non-recourse basis, the tightness of composition and detail of the contract is likely to be a key determinant of the success of the concession.

5. A good concession contract transparently incorporates mechanisms for incentives and risk allocation for all participants, and achieves the optimum balance between the two.
6. This paper emphasises throughout the undesirability of any attempt to maximise revenues for the conceding authority (the government) from bidding out the right to provide services in sectors where free entry is feasible, or where an asset sought to be sold is not scarce.

7. Even when markets are fully contestable, permission to use rights of way or environmental clearances can be awarded in ways similar to concessions contracts.

8. This is called competition “for the market”.

9. Transmission and distribution contracts in Argentina were awarded for 95 years, but with management contract sub-periods of 10 years, allowing the concessionaire to exit or be taken over by more efficient operators at the end of the sub-periods. A similar open-ended concession was granted to National Grid of the UK, with an exit option after 25 years.

10. A similar form of contract is a lease, for slightly longer periods, which effectively buys the right to the profit flow of the operation, less the lease payment. Most French water supply *aftermage* contracts are leases. Most commercial risks of operations are assumed by the private provider of the service.

11. A concession contract must strike a balance between being credible (thus providing potential investors with the security that they will not be expropriated of their investment in the future) and being flexible (by allowing the concession to be modified if new and unexpected circumstances arise).

12. See Appendix 3a for an example of the sale of electricity generation assets to refine discovery of their value.

13. These issues are likely to be of enormous significance in ongoing public sector reform process in India, including the proposed restructuring of the Department of Telecom, and divesting National Thermal Power Corporation (NTPC) assets.

14. Separation of infrastructure from services is a good example of the way the right to a service may be bid out. It underscores the importance of the choice of the package of service that are auctioned. Usually, in cases where competition may be limited, it is preferable to separate infrastructure from services. Transmission infrastructure in the power sector, or port infrastructure in a limited competition scenario are examples. Intra-port competition now makes even bundling of port infrastructure with services feasible. Airports are generally more competitive, and bundling of infrastructure with air-side services is feasible.

15. For example, competitive electricity generation. However, other competitive markets are regulated, like the US aviation sector. Some would argue that is necessitated by the absence of true contestability of these markets.

16. This is especially true of emerging economies with little track record of regulation. The costs of data gathering and analysis are often high, sometimes of the order of 5 per
cent or more of the revenues of the sector. Economic regulation also has to monitor and evaluate performance and deal with dispute resolution.

17. The sale of electricity distribution zones in Orissa is a good example. Competitive bidding for these zones got a very poor response, and the sole bidder for some of these zones discovered that the financial viability of operations was jeopardised by some subsequent tariff decisions of the Orissa Electricity Regulatory Commission.

18. We use the term risk, less in the sense of usage in the academic community predicated on volatility, but in the sense of project finance. There is an assumption of “loss” in the term.

19. These are management contracts, as in the case of the water system in Conakry, Guinea.

20. This has historically been widespread in the French water sector, known as affermage.

21. The most widespread form of concessions today, e.g. BOT structures, prevalent in all sectors spanning power, roads, ports, water supply, etc.

22. These are the build-lease-transfer models, and are found in several Mexican power projects.

23. Although many of these contracts were negotiated, these mechanisms were designed to have the contractor’s profitability depend largely on his own cost structure (and hence have mimicked private value bids had they awarded through competitive bidding).

24. The road sector is the most graphic example. Traffic flows on the section of road that is being concessioned will depend on the state of the road network that feeds traffic into and evacuates traffic from that section. It also depends on the alternative roads that are available to traffic.

25. The transactions costs for preparing bids can easily amount to 5–10 per cent of the project’s total costs. For high volume, low value licences such as for radio taxis, competitive bidding might be uneconomic.

26. In many cellular markets with a higher degree of cell phone penetration than the US, the contracts were given by non-competitive methods, e.g. Finland. However, these markets had certain intrinsic characteristics that permitted the degree of penetration, including the presence of reputable concessionaires.

27. Some private companies may present innovative ideas to solve a known problem, or for a new type of project. Although competitive bidding schemes which specify performance standards usually have sufficient latitude to come up with new solutions, new ways of defining these standards may be discovered. If these ideas were to be used to formulate a competitive tender, it would tend to discourage private firms from developing these in the first place. The Philippines BOT law allows national or local authorities to accept unsolicited proposals for BOT on a negotiated basis if no direct government guarantee or subsidy is required and the process is subject to a price test from competitors.
28. France has remained a notable holdout, presumably due to its post-War history of state involvement in utilities, and the historical tradition of long-term leases (affermage) for water utilities. However, even this is changing. Following the success of the UK spectrum auction for third generation mobile services, the French government is actively considering a switch from “beauty parades” to auctions in awarding its own spectrum.

29. See note 31.

30. In the Philippines, the first independent power producers (IPPs) signed PPAs with utilities for supplying power at 5 cents per unit. Subsequent PPAs awarded through competitive bids were at 2–3 cents per units. However, it was estimated that the opportunity cost initially of having no power rather than costly power was 50 cents per unit.

31. Competitive bidding for very small water utilities each supplying only a few thousand customers may not justify the transaction costs of the process. One option to get around this problem is to pool the utilities and have them bid for the single larger concession. Another is to limit the number of bidders through a short-listing procedure. Yet another option is have consumers share the costs of bid preparation. The UK’s Private Finance Initiative allowed such sharing of costs of up to 50 per cent, and has been used for the Eurotunnel.

32. By submitting clear bidding rules instead of negotiating, the conceding authority is likely to increase its bargaining power and elicit the best possible bids. However, the more the discretion in awarding contracts, normally arising from a difficulty in scoring and comparing bids, the more likely are prospects of re-negotiation.

33. Competitive bidding may not be suitable in all circumstances. They may be impracticable for high volume, low value licences, where there are more slots than applicants available, e.g. private business radios, such as used by taxis.

34. The consequences of violations of these requisites is clear in the case of the bidding for the electricity distribution zones in Orissa, which is posited in more detail in Box 37.2.

35. This statement should be carefully qualified, since the social value of a public resource, is equal to an efficient firm’s valuation of it only as a first approximation. Externalities would make this diverge, and would need explicit factoring.

36. In the spectrum licence awards, for example, bidders pay a cost determined by the bidding, instead of a licence fee fixed by the government. This amount is determined by the overall business plans of the operator and the expected prices for the services, not the other way round.

37. Each bidder will have access to different areas of a common information set, and a different valuation metric.

38. Most infrastructure concessions to build, manage and operate projects (as opposed to construction contracts) are intrinsically common value, but they can be made to resemble private value bids through mitigation of commercial risks to the extent possible, as discussed in this section.
39. Note that this issue is different from changing the valuation itself, which is dealt with in Section 3.2.1.2.1.

40. An example was the process of privatisation of electricity distribution zones in Orissa, where the Orissa State Electricity Board was initially split into a generation and a transmission and distribution utility, with the intention of rehabilitating the distribution assets before selling those segments off. The utility is still grappling with the accumulated losses from that transition period, and the private distribution utility is facing the consequences of incorrect asset evaluation that it had used in its bid (see Box 37.2).

41. In the recent auction of third generation (3G) mobile telephone licences in the Netherlands, Deutsche Telekom, Nippon Telegraph and Telephone (NTT) DoCoMo and Hutchison, although new entrants to the Dutch cellular market, were allowed to partner with local incumbents. They are all strong established players. The auction managed to raise a mere US$2.5 billion from the sale of five licences with only five groups bidding for these. This was in contrast to the US$35.5 billion raised by a similar 3G auction in the UK in April 2000. Thirteen bidders had competed for five licences. Post bidding, Orange was sold to France Telecom, and part of Hutchison’s interest in its UK licence to KPN and DoCoMo.

42. The need, however, for due caution with this approach is illustrated in Box 37.4.

43. The method has been used with varying degrees of success in concessioning airport landing slots (to be aggregated into routes), railway route aggregations over a commonly owned track, road networks under the design, build, finance, operate (DBFO) schemes, electricity generating station sales in the US, and as given below, sales of public sector steel plants in Mexico. It is also currently being used to auction existing PPAs in Alberta, Canada.

44. It is interesting to compare the 1991 auction of the Mexican steel plants with the auction of the radio spectrum rights in 1994 in the US In both cases, all units were auctioned simultaneously, not sequentially. Both allowed bids for combinations of units. Mexico chose a single highest bid closed-envelope auction (with no sharing of information), the US, an open simultaneous. The reason for these differences was that in the US there were many potential buyers and thousands of spectrum rights to be auctioned, while in Mexico there were less than ten plants and few bidders. Thus, Mexican privatisers were more concerned with collusion, as the buyers knew the plants and their potential quite well. In contrast, US privatisers were more concerned with an efficient transmission of information across bidders.

45. The contract for the Queen Elizabeth II (QEII) Bridge at Dartford, UK, allows the concession length to be determined endogenously, and will end when the concessionaire’s cumulative revenue reaches the level of outstanding debt or 20 years, whichever is sooner.

46. The bidding for both telecom licences in 1995, and FM frequency auctions in 2000 in India belied this, though. The most plausible reason for the huge bids for these licences (apart from inexperience and vastly inflated traffic forecasts) was the absence of penalties
for default and stringent renegotiation conditions. More generally, though, credible bids will only emerge if the auction process (including the services being auctioned) is properly designed. If value maximisation for scarce public resources is an objective of competitive bidding, penalties and information disclosure have to be set in place to prevent non-credible bids, made with the intention of profiting over the expected renegotiations.

47. A well designed auction will mitigate this. The UK auctioned five 3G licences, given the presence of four incumbents, reserving the fifth licence exclusively for a new entrant, thereby ensuring that collusion between the incumbents was limited. A similar auction in the Netherlands did not do this and failed.

48. It is important to be clear about what is being bid, however. The recent Telecom Regulatory Authority of India (TRAI) decision to auction cellular mobile service (CMS) licences through a multiple stage informed simultaneous format is the correct procedure, but is being applied to the wrong service. What should be auctioned is the spectrum, not a specific use of that spectrum. It should be left to the owner of the spectrum rights to decide how best to use them.

49. As in the UK, design, build, finance, operate (DBFO) and private finance initiative (PFI) concessions.

50. The contrast between the 3G spectrum auctions in the UK and the Netherlands, while not a completely appropriate example, serves to illustrate the importance of the choice of bidders. The UK reserved a frequency band exclusively for a new entrant, while the Dutch did not. As a result, the incumbents in the Netherlands auction parcelled out the frequency bands among themselves, at low bids, without the threat of a new entrant.

51. The UK PFI discourages it. Performance bonds are required to be posted for most contracts now.

52. Innovative withdrawal rules were devised for the 1994 spectrum auctions in the USA.

53. An announced reserve price promotes transparency. However, in many high-stake auctions, reserve prices are not disclosed, but minimum opening bids, which are related to reserve prices, are revealed to bidders at the start of the auction. It also may not be a good idea to announce reserve prices if there are only a few bidders.

54. Such sharing of cost is generally allowed under the UK PFI, and up to 50 per cent of cost of bid preparation for the Eurotunnel project was allowed.

55. The ongoing auctions for outstanding PPAs in Alberta, Canada is being conducted on behalf of the Electricity and Utilities Board. The government of the province had provided the broad outlines of electricity sector restructuring in 1993.

56. When an asset (like a power plant), including an intangible one like the spectrum, is being sold, the parameter will typically be the value of the asset.

57. In a version used in some highway franchises in Mexico, the concession holder was given the option of extending the franchise for an additional fixed term at the end of
the original term. The problems associated with fixed term franchises apply to this form as well.

58. Often they amount to 30 per cent of investment cost.

59. Based on still relatively stiff entry fees.

60. Recall that we have been advocating this in the provision of subsidies. Cross subsidies through tariffs are grossly distortive of the relative value of the services. A lump-sum subsidy paid (preferably directly) to the user minimises or eliminates this skew. The underlying economic concept is the distinction, not just between fixed and variable costs, but also fixed and sunk cost (the portion of fixed costs that lack salvage value).

61. The experience of cellular operators who were required to pay a per-subscriber fee to Department of Telecommunications (DoT) is well documented. The consequent reduced incentives to expand subscriber base for the cellular operators, and instead concentrate on increasing revenues per subscriber distorted the optimal pattern of market growth.

62. P&O Ports has expressed reservations on the terms of the contract, especially guaranteed traffic, which is delaying the issue of a letter of intent. The successful bidder has to guarantee a minimum throughput of 350,000 20-foot equivalent units (TEUs) during the first year of operation of the upgraded existing terminal under stage one. This will be raised to 400,000 TEUs during the second year. Besides, the private operator will have to handle 20 per cent of the total direct overseas (not transshipped) container traffic emanating to and from the port during the third year of operating the facility, 25 per cent during the fourth year and 30 per cent from the fifth year onwards. In the event of a short-fall in the traffic, the private developer will have to pay Chennai Port Trust a compensation equivalent to the amount of royalty payable by him. The private developer will have to make an initial payment of Rs 10 crore as upfront amount within a week of being issued the letter of intent (LoI) by the port trust. If the operator fails to make any payments as per the contract to the port trust for three consecutive months, it will be considered as a default. In such a scenario, the operator will have to forfeit his performance security and his contract terminated by the port. Further, the operator will have to invest US$50 million on civil works and new modern equipment within the first two years of signing the agreement, which should be raised to US$100 million by the fifth year. Even worse, the successful bidder will also have to take over the entire labour employed by the port trust at the existing container terminal. The developer will also be responsible for the employees after expiry of the 30-year concession period.

63. In development economics literature, this is an old issue, formulated in the context of share-cropping in agriculture. It has been demonstrated convincingly that fixed rent payment arrangements are superior as incentive compatible sharing between landlord and tenant.

64. This insight is familiar to investment bankers who handle strategic sales as a mode of privatisation and advise governments on such sales. Strategic sales proceed in two stages.
First the seller seeks expressions of interest from possible bidders and then shortlists participants for bidding. The shortlisting is meant to weed out bidders who are “inadequately serious”. It should only retain those bidders who believe that their probability of winning is high enough to justify their bids and if all shortlisted bidders believe this, the expected revenues will rise. Designing a mechanism to actuate this in the case of sectors with limited numbers of players, like roads, is difficult.

65. This is specially true for open bidding, but is equally relevant for sealed bids as it serves to make collusion among a limited number of bidders more difficult.

66. These include high net-worth of bidder, their proposed commercial structure for execution of the project including the proposed scale of financial commitments of sponsors, their sources of financing, or numbers of years of relevant experience in designing, construction and operation of similar projects, and even their experience in competitive tendering for projects.

67. The technical qualifications for the two-berth new terminal at the Jawaharlal Nehru Port Trust (JNPT) were onerous beyond justification, and effectively excluded domestic companies from bidding for this project. The requirements, apart from turnover and paid-up capital, and sufficient marketing experience, included previous experience of the bidder in operating and managing marine container terminals with throughput of 500,000 TEUs for a period of three years with “computer-aided operations”.

68. The government’s use of the valuation of the bidders in each round of the Indian telecom licence auctions as an input in deciding the reserve prices for the next round was probably the major factor responsible for the fall in bids in the second and third rounds. It is also likely that firms formed a cartel and bid less so that the government was forced to lower the reserve prices in each subsequent round. Another factor that points to collusion among bidders is that in four of the five circles that received bids in the second round of auctioning, there were single bidders and the bids were very close to the reserve price set by the government in that circle.

69. Between 1982 and 1988, more than half of the criminal cases filed by the Antitrust Division of the Department of Justice involved bid-rigging or price-fixing in auction markets. Bid-rigging appears to be a pervasive problem, with indictments in highway construction, the distribution of school milk, utility procurement and other auction markets. Typically, a government agency (and hence the taxpayer) was the victim.

70. The issue of potential perverse incentives of construction in road concessions has been a problem in several toll-road programmes, including Mexico and France.

71. The usual argument against a clubbed contract is that the typical construction company is not equipped to handle O&M activities. The construction company, however, can always choose to sub-contract O&M activity to a suitable company.

72. Road service contracts should, in general, also not be bundled with other ancillary real estate and land-development franchises, since this may divert focus from the primary activities. Such a concession is also likely to award real estate developers rather than
road service providers, whose primary intention might be the diversion of resources towards developing resorts and entertainment complexes. The Bangkok Mass Transit System (BTS) urban transport rail project in Bangkok is a graphic example of the diversion of focus from the main construction activity. Although the Malaysian experience in this has been mixed, there are examples there as well of the result of bundling ancillary contracts.

73. Tolling infrastructure (toll plazas) is expensive. Toll projects established in the early 1990s in Tanzania, Kenya and Uganda have all been abandoned, mainly due to the criminalisation of toll collections.

74. Experience worldwide suggests that toll projects are likely to have significant problems. Toll road projects have had to be re-negotiated in many Latin American countries, especially Mexico, as well as others like Hungary, Malaysia, etc.

75. Use of inexpensive and simple counting machines as in the UK, which can only differentiate vehicles reliably by length, is a way around this.

76. Or a combination of both, as we have seen in the section on multi-parameter bids.

77. The government of Tanzania has set up a dedicated road fund. This has led to its own peculiar problems, though.

78. These cesses can be thought of as a tax on the entire road network.

79. It is sometimes argued that annuities offer disincentives to efficient operation of a road project, since it is a guarantee by shifting demand risk away from the concessionaire, that there is no intrinsic reason why any attempt should be made to reduce the commercial risks of a service provider through guarantees or other mechanisms, when the provider can control to any significant extent the revenues for his service (and hence his profitability, through reducing costs). However, in many road segments, traffic flows may largely be determined by factors outside the control of the concessionaire. To prevent the cost of financing these projects making them commercially unviable, some of the risk has to be shifted away from the concessionaire. But these mechanisms need to be incentive-compatible so that the concessionaire is incentivised to reduce cost and maintain the quality of the road. The use of annuities, which allows the conceding authority control over payment streams to the concessionaire to enforce road quality, is one such avenue.

80. The other risks have to be controlled in the standard fashion, with insurance cover and an appropriate financial structuring following detailed project appraisal and evaluation. This includes foreign currency risks given that large amounts may still need to be borrowed from international capital markets and banks. However, the concessionaire needs to bear this risk, since the choice of the borrowing currency portfolio can be optimised to minimise the concessionaire’s forex risk. In India, this choice is eminently possible.

81. Nevertheless, roads that turn out to be white elephants (inviable even in the long run) cannot be avoided. These projects arise due to extraneous circumstances, which economics cannot take care of.
82. In New Zealand’s award of spectrum licences, second-price sealed bidding was used.

83. One of the first applications of competitive bidding in India was for cellular mobile telephone services in the four metros, awarded in November 1994. Licence fees, for the metros, were fixed beforehand, and the companies bid on the basis of rental charges to consumers. Bidding parameters were the same, and two highest bidders were to be granted licences based on the second highest bidder matching the highest bid. Himachal Futuristic Communications Limited (HFCL’s) bid for nine telecom circles was substantially larger than of the second highest bidder.

84. Basically, paying more for an item than its value. Differing information sets and abilities to value a concession could lead to an outcome where the most optimistic bidder rather than the most efficient will win the contract, leading to failures in executing the contract, pressures for renegotiation and excessive costs.

85. It does not make sense to use second price award in open bidding. A bidder’s optimal strategy in bidding for a licence that he values at say Rs 100 crore, may be to bid Rs 1000 crore, provided he thinks that other bidders would not follow the same strategy.

86. One variation on the open-outcry bidding is the open-exit bidding in which the prices rise continuously, but bidders publicly announce that they are dropping out when the price is too high. Once a bidder has dropped out, he may not re-enter. This variation provides more information about the valuations (common or public) of others than when players can drop out secretly (and sometimes even reenter later). The recently concluded bidding for FM licences in major and minor cities in India was a variation of this, and was, a little whimsically perhaps, called a “Dutch auction”. If, say, there were 10 FM licences to be awarded in a city, the bidding authority would call out ascending bid values. As potential bidders dropped out with the increasing bids, the bids stopped at the value where the remaining bidders just equalled the number of licence slots available. All licences were awarded at that bid value.

87. The pitfalls of bidding are nowhere as marked as in the descriptive terminology used. The descending-price bid, commonly known in academic literature as the “Dutch auction”, uses an open format rather than a sealed-bid. Unfortunately, the financial world has chosen to refer by this name to another type, referred to in the academic world as a uniform, second-price bidding. To make matters worse, the financial community refers to a sealed-bid, discriminatory type of bidding as an “English auction” (except in Great Britain where it is known as the American auction!).

88. Auction theory demonstrates that, under assumption of private value, all four basic auction types [(1) open ascending, (2) open descending, (3) sealed first price, (4) sealed second price] yield the same expected price and revenue to the seller when bidders are risk neutral and symmetric. This implies that auction choice is not crucial because each format yields on average the same payoff. But revenue equivalence does not hold under common value assumption. It has been shown that the four auction types can be ranked from highest to lowest as follows: 1; 4; 2 and 3 tied. The rankings illustrate advantages of increased information, although there is disagreement over this.
89. The FM licences for the different metros were awarded sequentially. It is an open question whether the government could have increased sale revenues by offering these simultaneously, by exploiting gaming behaviour between bidders based on the externalities arising from, say, advertising revenues.

90. Secondary markets (for licences) may then improve on the aggregations.

91. If there are restrictions on the degree of concentration of the concessions, the bidding rules must specify how the winner will be determined should the same company announce the highest bids for more than one concession. The Peruvian government split the service area for awarding electricity distribution concessions in Lima into two separate areas, roughly equal in size and consumer base, to facilitate benchmark tariff regulation. The awards were through a simultaneous, sealed-bid procedure. The bidding rules specified that if the same firm made the highest bids for both concessions, the winners would be selected based on the bid combination providing the highest revenue.

92. Mexico, on the other hand, concessioned three rail lines sequentially, the rationale being that concessions were not of equal market value, and that bidding the most attractive would reduce bidder uncertainty.

93. In the Mexican railway concessions, the bidder could not win more than one concession, and therefore needed to value each concession and bid what it was worth.

94. Bidders submitted computerised bids for spectrum licences being offered in any number of markets. These bids were posted for all bidders to see, and rebidding then took place over several rounds. Bidding continued till no new bids were received, or at the discretion of the FCC.

95. An unwitting version of this procedure was inadvertently followed in the bidding for licences for Indian cellular telecom and basic operations services. However, the subsequent rounds of bids needed to be submitted due to confusion about the bids and prior conditions rather than any premeditated strategy. There have also been problems with this format in Australia and New Zealand (see box on design of bidding procedures).
‘It is preferable to design regulatory mechanisms that correspond to a country’s institutional endowments than to copy practices of other countries.’ \(^1\)

‘... a singular emphasis on regulation will be akin to chasing shadows, particularly if it is at the expense of other key aspects of reform such as fostering competitive markets (for which privatisation is essential).’ \(^2\)

1. **INTRODUCTION**

In recognition of the importance of economic regulation in facilitating public–private partnerships in infrastructure, the Hon’ble Prime Minister requested the Planning Commission to prepare a paper on Infrastructure Regulation.

The present paper—aimed at assisting the Planning Commission in finalising its views on the topic—argues that while sound independent regulation is important,\(^3\) it is not a sufficient condition to attract infrastructure investments.\(^4\) Specifically, it delineates a set of proximate issues and concomitant measures that are necessary to harness private sector efficiencies and financing in each of the key infrastructure sectors. In section 2, we draw upon experience and certain key principles to formulate the basis for the sector-specific suggestions that are offered in section 3. Concluding observations are placed in section 4.

2. **SOUND ANCHORS**

Barring exceptions such as telecom services in urban areas and some segments of the transportation sector, infrastructure service provision in India continues to be predominantly through a government agency supported by (usually inadequate) user charges and subventions from general budgetary revenues. This approach is
fraught with several limitations, viz., monopoly, cross-subsidies, mixing of social and commercial objectives, and lack of transparency. The drawbacks of monopolies and cross-subsidies are by now too well known to bear repetition. In addition, intertwining of commercial and social objectives accentuates information asymmetry between governments and their agencies, and thereby leaves ample latitude for agencies to hide inefficiencies and impose their preferences. The bedrock of government ownership, in practice, is a veritable quicksand. For instance, lack of hard budget constraints, characteristic of the public sector, enables government-owned entities to keep their under-performance under wraps for that much longer. In the roads sector, as agencies have relied solely on devolutions from the exchequer, road construction and maintenance activity has aligned more with political interventions and budgetary compulsions, and less with user priorities.

Against this backdrop, there is a strong case for (a) divesting government from the direct provision of infrastructure services; and (b) for separating services that are commercially viable from essential but uneconomical ones (which require subsidy support). Moreover, where competition is feasible and service can be provided on commercial terms, market forces should be relied upon to promote efficiency as well as safeguard consumer interests. The positive experience with private participation and competition in unleashing unprecedented growth in teledensity coupled with the rapid fall in tariffs, makes a compelling case for replication in other sectors. For consumers to procure services such as electricity, gas and water from a supplier of their choice, natural monopoly elements like transmission and distribution networks have to be pried open. Essential but uneconomical services too can be made amenable for private provision and competition using methods such as minimum subsidy bidding (see Box 38.1).

Box 38.1: Minimum subsidy bidding

In a minimum subsidy bidding (MSB) approach, a potential service provider quoting the lowest amount becomes eligible for subsidy payments subject to fulfillment of specified level of performance (service provision) obligations. This method is promising for extending infrastructure services to poor consumers in commercially unviable (sparsely populated) rural areas, and also for facilities such as roads, sanitation and waste management, for which complete cost recovery may not be feasible through direct user charges alone. Already, many countries have successfully deployed this approach in sectors as varied as telecom (Chile, Colombia, Peru and South Africa), electricity (Argentina and Chile), road construction and maintenance (Argentina, Australia, Chile and the UK), and civil aviation (Australia and the US). Implementation of an MSB approach is rarely a
simple and mechanical exercise. It requires, inter alia, careful balancing of different goals such as minimising subsidy outflow, maximising performance, eliciting sufficient interest from private operators and effective monitoring of performance. Accordingly, the procurement agency entrusted with MSB implementation should have a variety of attributes including keen understanding of the sector, diligent planning, rapid and flexible decision-making, transparency and accountability.

Once the government takes the aforementioned difficult (‘catching the bull by the horns’) steps, it could then deploy regulation for segments of natural monopoly. It is useful to recognise that the proximate role of regulation is to ensure, inter alia, efficient price discovery for services. In other words, it is analogous to throwing light in a dark area; hence, it makes eminent sense to rely on competition to light up as much area as possible so that the area that remains to be ‘illuminated’ through regulation can be minimised. Also, to give a fair chance to regulation, the government should divest itself from service provision because, while utilities are under its ownership, it is almost inevitable that it would be tempted to interfere in the regulatory process. Moreover, a private utility is likely to be more responsive to regulatory directives and incentives compared to a government-owned utility.

A shortcoming that is evident in the statutory composition of the members of regulatory commissions in India is the latitude that is allowed in the prescribed qualifications. The legislation almost uniformly can be seen to include an enabling provision for persons with experience in administration. The pattern of appointments to regulatory bodies, with the bulk of chairmen and members being from a pool of persons having ‘special knowledge of ... administration’, raises concern about the efficacy of regulators in checking the government.8 The government should eschew this easy option and instead make an honest attempt to recruit on the basis of professional competence and expertise. In this regard, regulatory agencies should be accorded the flexibility to adopt compensation structures that are competitive enough to attract and retain people with requisite domain knowledge.

Regulators, on their part, should adopt light-handed approaches such as price-caps and multi-year tariff setting, which provide more regulatory certainty and offer better incentives to operators to aggressively pursue efficiency gains. One need not go far to appreciate the importance of such approaches in attracting private investment. While privatising power distribution in Delhi, the state government recognised that private investors may not come forward if the reduction in loss level (or efficiency gains to be achieved) is determined from year to year. Accordingly, it sought to enhance regulatory certainty by accepting the multi-year loss reduction targets arrived at through competitive bidding.
Yet another issue that often comes to the fore while discussing the design of a country’s regulatory framework is the scope of the regulatory agencies, i.e., whether they should be industry-specific, sector-specific or multi-sector. In a federal system, this issue assumes further complexity, in turn requiring examination of merits and limits of having state-specific regulators and the division of responsibilities between central and state regulators. A brief review of literature on this topic suggests an indicative list of advantages and limitations of a multi-sector regulatory approach (see Box 38.2). It is, however, useful to recognise that adoption of a multi-sector regulatory approach _per se_ does not necessarily guarantee benefits attributed to it. For example, in countries beset with governance problems, a multi-sector agency may be equally at risk of political capture. Not entirely surprisingly, regulatory architecture in various countries has evolved against the backdrop of extant institutional arrangements, maturity level of the industry/sector and technological developments. (See the annexure on the ambit of regulatory agencies in selected countries.) It would seem that there is no one ‘right’ or ‘optimal’ approach to the aforementioned ‘design’ queries. Hence, the search for an ‘optimal’ regulatory framework that can be uniformly applied across all sectors may be elusive at best and a red herring at worst. In view of this, an eclectic approach based on legacy and sectoral imperatives has merit.

**Box 38.2: Multi-sector regulatory approach**

**Advantages**

- Likely to be more effective in dealing with convergent sectors (e.g., telecom and broadcasting; one-stop shop approach).
- Could diminish the potential for political capture.
- Allows sharing of expert resources such as lawyers and economists across regulation of different industries.

**Limitations**

- May not be effective in providing requisite (equitable and appropriate) attention to each of the constituent sub-sectors, especially in cases where sub-sectors are at different points on the growth and reform curves.
- Likely to require establishment of sector-specific units (negating the rationale for unification).
- Precedents in one sector may not be (automatically) applicable in other sectors and hence may not offer substantial advantages over the alternative of having sector-specific regulators.
- Could be captured by a dominant multi-industry player or the ministry of a dominant sector.
3. **Sector-specific analysis and suggestions**

**Telecommunications:** The Indian telecom sector provides an unequivocal testimony of the benefits of competition and the consequent reduction in the need for heavy-handed regulation. Since the advent of liberalisation, there has been a steep decline in tariffs of cellular and national and international long distance services, and teledensity increased from 1.9 in March 1998 to more than 8 at present. The cellular subscriber base nearly doubled in 2002–03 to reach 12.7 million, and again in 2003–04, to 26 million. Thanks to the presence of competition in most segments of telecom services, the Telecom Regulatory Authority of India (TRAI) could shed the onerous task of regulating tariffs in such areas and is now focusing its efforts on other issues such as spectrum pricing and universal service. The Authority’s ambit now spans almost the entire communications sector since the definition of ‘telecommunication services’ was expanded in January 2004 to include broadcasting and cable services.

The next major challenge in the telecom sector is enhancing telephone connectivity in rural areas. Although teledensity in both rural and urban areas increased almost five-fold during 1996–2004, 14 per cent of villages are without any telephone service and rural teledensity at 1.7 is way behind urban teledensity of 20. Admittedly, the Universal Service Fund Administrator (USFA) has initiated some commendable steps towards enhancing rural telephony. USFA had bid out subsidy support for meeting the operation and maintenance costs of village public telephones (VPTs) established before 2002 and for the replacement of multiple access radio relay VP Ts, and disbursed Rs 500 crore during 2002–04. In its subsidy support tender for providing VPTs in hitherto uncovered villages, a private operator bagged the contract for 33 per cent of the villages. The USFA has recently put out a draft Notice Inviting Tender to bid out support for the provision of rural household direct exchange lines (DELS) in specified short-distance charging areas.\(^ {11}\)

However, in order to give a further fillip to rural telephony, all the resources/means through which the universal coverage objective is currently being pursued—viz., Universal Service Fund (USF), termination charges, access deficit charge and reimbursement of license fees to Bharat Sanchar Nigam Limited (BSNL)—should be pooled together into the USF.

In addition, as recently proposed by TRAI, ‘niche operators’ should be allowed in rural areas. Furthermore, spectrum could be made available free of charge (or at the cost of its administration) to service providers in rural areas. Subsidies for attaining universal service objectives should not be restricted to any particular type of technology or operator; all technologies and operators should be allowed to compete for support as long as they are capable of fulfilling the specified service requirements.
In fact, all operators should be allowed to compete for the support that is currently being received mainly by BSNL for servicing existing rural DELs. Realigning government support and other resources meant for rural telephony along these lines would help to scale up efforts for expanding rural telephony, and also increase scope for harnessing private sector involvement through Minimum Subsidy Bidding.\textsuperscript{12}

**Electricity:** Recently, the power sector has witnessed a few positive developments. The Electricity Act 2003 promised to usher in a competitive regime through features such as de-licensing of generation and non-discriminatory ‘open access’ in transmission and distribution. Operating losses of state power utilities (of 16 states) have been reduced from Rs 25207 crore in 2001–02 to Rs 17593 crore in 2002–03.\textsuperscript{13} Since January 2004, power projects with a total capacity of around 4000 MW achieved financial closure under the aegis of the Inter-Institutional Group. These developments, however, are nowhere near sufficient indicators to presume that all is well in the sector. In fact, the ground reality appears to suggest quite the opposite. In most states, consumers are suffering from frequent blackouts and voltage fluctuations resulting from acute power shortage and years of underinvestment in transmission and distribution hardware. The aggregate technical and commercial (AT&C) losses in the sector are widely believed to be above 40 per cent; two-thirds of these are said to be commercial, a euphemism for theft. It remains to be seen whether recent performance improvements are sustainable.\textsuperscript{14} Open access provision will take time since it is not compatible with the incentives of state governments while they continue to own distribution utilities. Given the risk of a higher subsidy burden on account of losing ‘remunerative’ customers, state governments are likely to resist consumer choice. Yet another major concern is the trend of promising free power to farmers; it is likely to play havoc with the economics of the respective states and their utilities. From an environmental standpoint too, such a trend is undesirable as it ‘subsidises’ operation of bore wells at greater depths.

As regards regulation, the industry is under the purview of the Central Electricity Regulatory Commission (CERC) and twenty State Electricity Regulatory Commissions (SERCs), which are currently operational; eleven SERCs have issued at least two tariff orders. CERC deals with, *inter alia*, regulation of tariffs of generating companies owned or controlled by the central government and those IPPs which sell electricity in more than one state; inter-state transmission of energy including tariff of transmission utilities; and oversight of the Indian Electricity Grid Code. Functions of SERCs, on the other hand, include determination of tariffs for generation, supply, transmission and wheeling of electricity within the state. To their credit, CERC and some SERCs have succeeded in making the tariff setting process more rational, transparent and inclusive of the views of various stakeholders in the sector.
Regrettably, most of the afore-mentioned problems plaguing the sector are attributable to the lack of incentives for government-owned utilities to pursue efficiency gains and, whether we like it or not, neither CERC nor SERCs can do little in this regard. Privatisation of distribution is necessary for achieving a sustainable turnaround in the sector. In fact, almost every expert group that has studied the sector in the last four years highlighted the imperative of distribution privatisation, beginning with concentrated (urban) zones. This, coupled with multi-year regulation, is the key to rapidly bring down AT&C losses and thereby kick-start a virtuous cycle of positive cashflows feeding into additional investments. Although some states have unbundled generation, transmission and distribution functions into separate entities, only Orissa and Delhi have privatised power distribution. In this context, the central government may consider incentivising states to expedite privatisation of concentrated (urban) zones, say, by offering conditional assistance for mitigating the burden of past unfunded liabilities and meeting the transition financing requirements. As regards rural areas, states should be encouraged to ring-fence the central and state subsidy support meant for these areas and invite private participation through minimum subsidy bidding. (Figure 38.1 provides a mapping of the multi-layered objectives of power sector reform and a set of key processes.)
**Petroleum and natural gas:** The Petroleum and Natural Gas Regulatory Board Bill 2004, in its current form, envisages independent regulation of the refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products and natural gas. The scope and exact nature of regulation of these sub-sectors indeed needs careful examination, particularly in light of the government’s (stated) intent to allow all energy products to be traded at market-determined prices, which, incidentally, seems to be a rational approach considering that these products (or their substitutes) are internationally-traded commodities.

In countries where gas and petroleum sectors are regulated, the realm of regulation typically does not include energy prices. In Australia, the UK and the US, gas transmission and distribution pipelines are regulated by respective federal/state regulatory agency, mainly to ensure fair and non-discriminatory access to competing suppliers. Of these countries, only in the US are transmission pipelines for crude oil and petroleum products regulated. In view of this, in India too, regulation of oil and gas sectors may be limited to natural monopoly elements (e.g. transmission and distribution pipelines). Since the consequent burden of regulation is likely to be less onerous, instead of establishing yet another institution, the central government may consider entrusting the responsibility of regulating inter-state transmission pipelines to CERC and bring intra-state transmission pipelines and city gas networks under the purview of the respective SERCs (which requires equipping them with indispensable industry-specific knowledge and expertise).

As an aside, it is noteworthy that what is (mis) perceived to be a natural monopoly at a point in time, may not remain so. For instance, in the not-too-distant past, fixed line telecom networks were considered a natural monopoly and multiple networks in the same geographical area were almost unthinkable. Today, multiple telecom networks are not unusual and, if demand is adequate, there is no reason not to expect profit-maximising service providers to repeat this even in case of energy pipelines.

In March 2004 the Supreme Court opined that natural gas in any physical form is a central subject and that state governments have no powers to legislate on it. This decision could provide a basis to centralise all decisions related to the sector and to opt for one country-wide regulator. However, if one goes by the experience of Gujarat, it is amply clear that state governments can play a part in facilitating intra-state transmission lines and city-based gas networks. Already, Gujarat Gas Company Limited has established gas distribution networks in Ankleshwar, Bharuch and Surat, and, in 2003, Gujarat Adani Energy Ltd was awarded concessions to erect city gas distribution networks in Ahmedabad and Vadodara. In view of this, the central government should explore ways for constructively engaging state governments in gas sector development rather than use the Supreme Court judgement to undermine state initiatives.
Ports: Indian ports are plagued by widespread inefficiencies in cargo handling, poor connectivity, a mismatch of facilities and type of cargo, and outdated labour practices. In due recognition of the aforementioned deficiencies, the central government as well as states have initiated measures to attract private participation in the sector. Although there has been some improvement in operational performance in recent years, with the average turnaround time falling from 8.1 days in 1990–1991 to 3.7 days in 2001–2002, there is still a long way to go to attain international efficiency levels.

The Tariff Authority for Major Ports (TAMP) was constituted in April 1997 to regulate all tariffs, both vessel-related and cargo-related, and rates for lease of properties in respect of major port trusts and the private operators located therein. Originally, TAMP was established with the intent of imparting confidence to private terminal operators that the major port trusts—who are the entrenched incumbents in most cases—will ‘behave themselves’, and it has fulfilled this role.

As far as container terminals are concerned, with existing and proposed private participation, customers now have a wider choice on the West Coast at JNPT, Mundra and Pipavav, and on the East Coast at Tuticorin, Chennai and Visakhapatnam. The choice will expand once the third container terminal at JNPT, the container transhipment terminal at Kochi Port, and the proposed terminals at Ennore, Kandla and Kulpi start operations. In light of this, there is a prima facie case for excluding container terminals from TAMP’s purview and for reviewing the rationale for the Authority’s continuance.

Going forward, the government should hasten the process of awarding concessions for operating container terminals and other port related services to private operators. Also, to encourage inter-port competition, connectivity to ports with the rest of India’s road and rail transportation network should be enhanced. Regarding movement of containers, it is noteworthy that presently the Container Corporation of India (CONCOR), a subsidiary of Indian Railways, is the ‘sole-provider’ of rail-hauls for moving containers over the rail network. The government should allow multiple operators to transport containers over all segments of the rail network.

Civil aviation: Airport infrastructure in India is woefully inadequate and passenger amenities, for the most part, are an embarrassment. Infrastructure such as parking bays, terminals, runways and air traffic control are insufficient to meet requirements. Put simply, there is a clear and dire need to rapidly improve key facilities (in terms of both quality and capacity) at most of the airports. In order to redress this situation, the government has initiated measures to encourage private participation and upgrade several non-metro airports.
Hitherto, economic regulation of the aviation sector has been, at best, an informal exercise, with the Airports Authority of India combining the functions of operator and regulator of airports as well as air traffic control services. In light of the emerging trend of private participation, the Naresh Chandra Committee has recommended establishment of an independent Aviation Economic Regulatory Authority (AERA) to oversee the natural monopoly and ‘common user/carrier’ segments (of airports and air traffic control). Drawing upon international experience, the Committee favoured a light-handed and multi-year regime and, accordingly, suggested that the AERA should be established as a single member entity. While taking cognisance of the potential for anti-competitive practices in the airline business, the Committee opined that, as in other countries, in India too such behaviour should be checked through competition laws rather than through an intrusive sector-specific regulatory oversight.

The Committee also made several other suggestions aimed at making air transport affordable and enhancing air connectivity across various regions of the country. Some of the notable recommendations include the following:

(a) Abolition of route dispersal guidelines and establishment of an Essential Air Services Fund (headed by the chairman of AERA) to provide support to essential but uneconomical services including commercially unviable airports;

(b) Expeditious privatisation of Indian Airlines, Air India and airports; and

(c) Phased liberalisation of the international air transport segment, beginning with allowing private airlines based in India to fly abroad.24

The central government has just announced its decision to allow private airlines based in India to fly overseas except in the Gulf sector, subject to certain eligibility criteria. The government should open up the Gulf sector too for private operators as soon as possible. After all, the main beneficiaries of the current arrangement appear to be foreign airlines because Indian Airlines and Air India are reportedly under-utilising the entitlements available under the Air Services Agreements in this sector.

**Railways:** In 2001, the Expert Group on Indian Railways suggested establishing an Indian Rail Regulatory Authority (IRRA) to regulate, to begin with, the activities of the proposed Indian Railways Corporation (IRC). The authority was expected to facilitate arm’s length dealings between the ministry and the IRC and ensure that the latter is adequately compensated for the social obligations incurred at the behest of the government through budgetary support. The Authority was also envisaged, *inter alia*, to assist in devising a legislative and regulatory framework for investments and introducing competition, and resolve conflicts.
The Group’s suggestion regarding IRRA is complementary to its central recommendation to corporatise Indian Railways and eventually allow multiple operators to provide various railway services. In the UK too, establishment of the rail regulator was part of a wider restructuring exercise aimed at facilitating entry of multiple operators and private participation. In the EU, the directives which catalysed establishment of rail regulators in most countries were aimed at separating the management of railroad operations and infrastructure from the provision of transport services and facilitating access to all international, national or private railway operators on the infrastructure of different countries.25

Here, it is noteworthy that merely establishing a regulatory authority in India is unlikely to yield much by way of either efficiencies or transparency if Indian Railways continue to be a department of the government. Experience in India suggests that, for the most part, regulation of government-owned utilities is a chimera; for a department that is as ‘politicised’ as the railways, this is likely to be even more so. Hence, until the government decides to, at the least, corporatise Indian Railways and allow multiple players where possible, establishing a regulatory body for the sector may not be of much use.

Roads: Private financing of road projects is difficult given that they are characterised by large sunk costs and long payback periods and, in addition, benefits from road projects are usually not easily amenable for full recovery through direct user charges. In view of this, historically, highways have been funded by the government in most countries. Even now, despite increasing recognition that private sector participation could result in substantial cost savings and improvements in efficiency, completely privately-funded road projects typically form a small percentage of the total highway network of a country barring a few exceptions such as Argentina and Chile where toll roads with private participation respectively account for a third and two-fifths of the main roads.26 Worldwide, governments continue to play a substantial role in facilitating road projects in various ways, viz., budgetary allocation, collection of proxy user charges such as levy on fuel (India), network-wide tolls (Austria, Japan, Korea and Switzerland), concessional financing (France, in the 1960s) and underwriting of debt (Japan). In India too, the significant progress achieved through the National Highways Development Project (NHDP) is largely attributable to the government’s decisions to indirectly collect road user payments through a cess on fuel and to constitute a non-lapsable central road fund.

Although tolls are a form of user charge, we have not come across a country that has a formal ‘independent regulatory oversight’ over fixing of toll rates. Conceptually too there appears to be little reason for doing so since toll rates—either for network-wide use or individual stretches—are usually fixed by a government. If a
government does not fix toll rates with the intent of maximising road user welfare but, say, gives in to the temptation of maximising revenue for the exchequer, there may not be much that a toll regulator would be able to do. In any case, there is little evidence that the government (as a monopoly provider) is out to ‘gouge’ road users through usurious tolls.

Indian and international experience with private participation in the road sector highlights several best practices, viz., ring-fencing of resources meant for the sector into a dedicated fund; competitive procurement of road services; involvement of key road user groups in decision making; and ensuring adequate (priority) allocation of funds for maintenance. The central government could draw upon these lessons to improve the NHDP by, say, enhancing governance of the Central Road Fund and encouraging states to emulate these structures. Here, it is heartening to note that some of these practices have gained acceptance in some states. The Government of Kerala has already constituted a dedicated road fund, and Karnataka and Rajasthan are expected to follow suit. In Maharashtra, the private sector has participated in building and operating several state highway stretches and bridges (on BOT basis) and in toll collection (e.g. at all entry points to Mumbai city). Recently, the Maharashtra State Road Development Corporation Limited awarded a concession to a private agency, encompassing toll collection, O&M and capital works for the Mumbai–Pune stretch of NH 4 and the Mumbai–Pune Expressway (MPE).

As regards NHDP, one of the concerns is that most of the 7500 km of projects either completed or under implementation under the project (total of 14250 km) have been awarded through the EPC (works contracts) method, necessitating a separate mechanism to address operation and maintenance. In contracts that are yet to be awarded, the government should club construction and maintenance as part of a composite contract and link payments (penalties) to specific performance outcomes (failures) over the contract period. This would provide an in-built incentive for the operator to ensure quality of construction and proper maintenance over the entire duration of the contract.

**Water supply and sewerage:** At present, there are no independent agencies for regulating economic aspects pertaining to urban infrastructure services such as water supply, sewerage and solid waste collection and disposal. Establishment of independent regulatory authorities in these areas may assume importance if a (state) government decides to invite private participation. Considering that these services come well within the purview of state governments, it could be argued that vesting the regulation of these services with the already established state electricity regulatory commissions would facilitate harnessing of ‘economies of scope’ through using a common pool of expert resources to oversee multiple sectors.
One forum which examined this issue in depth in the context of Maharashtra—namely, the Sukthankar Committee on Operation, Maintenance and Management of Rural and Urban Water Supply Schemes (2001)—concluded as follows:

Initially, the Committee recommends an independent Maharashtra Water Regulatory Commission (MWRC). However, its integration with the Maharashtra Electricity Regulatory Commission may be considered later on after a detailed review. Such convergence of regulation may enable sharing of cross-sectoral experience and also reduce the cost of regulation.

The Committee’s suggestion was reportedly based on the understanding that the issues pertaining to water sector reform, being complex, would warrant undivided attention of the regulator, especially during the initial phase of sector restructuring. In any case, the power sector in the state is in flux and as such is expected to continue to be the primary area of focus of the Maharashtra Electricity Regulatory Commission. Considering that the situation is more or less the same across the country, other state governments seeking to encourage private participation in water and sewerage may also opt for establishing a separate agency for water sector regulation to begin with, and subsequently explore the option of merging it with another agency.

4. Conclusion

A regulatory framework is necessary but, per se, it cannot ‘crowd in’ capital flows into infrastructure. In order to be effective, regulation has to be complemented with an industry structure that aligns operators’ incentives towards pursuit of value for money. For this, central and state governments should divest themselves from ownership of utilities and encourage entry of multiple private players where feasible. As regards services that are essential but uneconomical, to benefit from private sector efficiencies, a reliable stream of subsidy support is essential and such support should be awarded in a transparent and competitive manner.

Notes


3. Effective regulation is indeed essential for private participation in infrastructure. Private investors derive comfort from a transparent and consistent regulatory framework before they actually commit investments that are huge, largely sunk and have long pay-back periods. Moreover, governments worldwide routinely rely on (selective) economic regulation to safeguard interests of consumers.
4. One only needs to look at the power sector to appreciate this point. Since the advent of the Electricity Regulatory Commissions Act in 1998, as many as 21 states have constituted Electricity Regulatory Commissions (ERCs), but very little has come by way of additional private capital into the sector.

5. The track record of State Electricity Boards in camouflaging line losses and other shortcomings under unmetered agricultural consumption year after year is a case in point.

6. As a matter of sound economics, subsidies on non-merit goods should be withdrawn over a specified (ex-ante announced) time frame, to mitigate the risk of such support being perceived as a perennial entitlement and also to release the exchequer’s resources for other needy constituencies.

7. While commenting on a study on the ERCs in India, an eminent panel (comprising of Madhav Godbole, E.A.S. Sarma and S.L. Rao) has observed: ‘...many state governments have been brazen in defying the orders and directives of the ERCs, year after year. Even the basic requirement of submission of full data in support of the tariff increase proposals is not being met by the utilities. This does not augur well for the ERCs...’.


9. For example, in the UK, Office of Communications (OFCOM) inherited duties of five existing regulators, viz., the Broadcasting Standards Commission, the Independent Television Commission, Oftel, the Radio Authority and the Radiocommunications Agency.

10. For example, if all sub-sectors have multiple operators, a unified regulatory agency focusing on anti-trust issues could be sufficient. Conversely, a competition commission may not be as effective as a dedicated regulator in overseeing a sub-sector with special needs, viz., entry of additional operators and substantial scaling up of investments (the latter could act as an entry ‘barrier’).

11. Only the rural household DELs provided on fixed lines (landline) and wireless in local loop technology (fixed WLL) will qualify for subsidy support from the USO Fund.

12. In Chile, Fondo de Desarrollo de las Telecomunicaciones (telecommunications fund), granted US$10.2 million subsidy during 1995–97 to serve 4504 locations, as against the maximum available subsidy of US$24.2 million. During 1998–99, to serve 1412 locations, US$9.8 million subsidy was granted, as against the maximum available subsidy of US$14.4 million.

14. These improvements are in part attributable to the incentive component of the Accelerated Power Development and Reform Programme (APDRP).


19. Electricity supply to rural areas receives special dispensation in varied countries, e.g. Bangladesh, Chile and the US.

20. The Bill has reportedly been referred to a Group of Ministers for review.

21. Major port trusts have awarded concessions for container terminals to global port majors such as P&O (JNPT and Chennai), PSA (Tuticorin), Dubai Port International (Kochi, where it emerged as the highest bidder, and Visakhapatnam, where it has a minority shareholding), and Maersk (JNPT).

22. Recently, the Ministry of Railways has permitted Pipavav Rail Corporation Limited to transport containers carrying export–import cargoes by rail on some routes from Pipavav port.

23. Cochin is already being serviced by a green field airport with private participation and Bangalore and Hyderabad are following suit. Steps to restructure and modernise Mumbai and Delhi airports through private sector involvement are progressing.

24. India is using barely 40 per cent of its bilateral rights and, if the Gulf sectors are excluded, the utilisation of available entitlements in the remaining sectors works out to 21–22 per cent.


26. [http://www.highwayfinindia.org/psp_intl_overview.htm](http://www.highwayfinindia.org/psp_intl_overview.htm)
### ANNEXURE

Table 38.1: Scope of regulatory agencies in selected countries

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<tr>
<th>Sector / sub-sector</th>
<th>Argentina</th>
<th>Italy</th>
<th>Jamaica</th>
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<td>Cable and/or TV</td>
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<td>Rail</td>
<td>OUR</td>
<td>CAA*</td>
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<td>ACCC</td>
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<td>CPUC</td>
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<td>Ports</td>
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<td>TAMP*</td>
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<td>Civil aviation</td>
<td>OUR</td>
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<td></td>
<td>ACCC</td>
<td>FAA*</td>
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<tr>
<td>Passenger transport</td>
<td>OUR</td>
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<td>CPUC</td>
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<tr>
<td>Water</td>
<td>ETOSS*</td>
<td>OFWAT*</td>
<td></td>
<td></td>
<td></td>
<td>ESC</td>
<td>CPUC</td>
<td>NYSPSC</td>
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</tr>
</tbody>
</table>

* Single-industry regulatory agency
? Sectors awaiting resolution regarding regulatory mechanism

**Sources:**
1. INTRODUCTION

Infrastructure services, defined broadly to include roads, ports, airports, communication networks, water supply, irrigation systems, and electric power, have unique characteristics that invariably generate special interest among governments of all kinds, be they monarchical, authoritarian, republican or others. While it is true that infrastructure in the nineteenth century was largely owned and managed by private entities in many countries, including the US and the UK, with the increasing scale of infrastructure provisioning to an expanding consumer set over the years, governments, as guardians of public interest, were compelled to intervene, if not as owners, then certainly in a regulatory role. Indeed, over the twentieth century, infrastructure development and service delivery reverted in varying degrees across different countries to the state preserve. In fact, by the second half of the twentieth century, infrastructure came largely within the state domain in emerging market economies. Since the 1990s, however, endeavours to invite private interest in the infrastructure sector have been renewed. However, given the strategic importance of infrastructure services, their role as public goods and their natural monopoly characteristics and associated externalities, and the often large and lumpy nature of the investments involved, the state can never fully relinquish its role as the key player in this space.

Be it power utilities or the Interstate Highway system of the United States, mass-transit systems or the water utilities of modern-day Europe, airports or the high-speed rail system in Japan, the story of infrastructure development in these countries is closely linked to their political histories and the changing roles of governments (federal, state and local) in their economic development. India is no exception.
Therefore, in seeking to shed light on the post-Independence evolution of India’s infrastructure sector, which is the primary objective of this paper, we must place our analysis in the wider context of the evolution of the country’s political economy. This paper is accordingly divided into five sections. The first is descriptive in nature and attempts, notwithstanding certain obligatory definitional challenges and data constraints, to capture the broad trends in infrastructure development over the past five-and-a-half decades. It seeks also to explore the relationship between infrastructure development and GDP growth in the Indian context.

The second is more schematic—it seeks to present a political economy framework to understand the different phases of policy making in post-Independent India. Sections IV and V are interpretative (as opposed to rigorously analytical). They rely on the political economy framework laid out, to shed light on the distinct phases of post-Independence infrastructure policy, implementation and service delivery. The sections try to explain why and how infrastructure development took place; why such an acute shortage of just about any kind of infrastructure service prevails today (with the notable exception of telecommunications services); and why we may have reasons, notwithstanding our current predicament, to be optimistic about our ability to meet the significant challenge of building the infrastructure that this country so desperately needs.

2. INFRASTRUCTURE SECTOR SINCE INDEPENDENCE

The definition of ‘infrastructure’ is nebulous and a temporally moving target, changing with technological innovation. Thus, what is regarded as infrastructure today (such as optical fibre networks) could not have been envisioned as such fifty years ago. Official definitions of what comprises infrastructure also change over time. Specifically in the Indian context, up until the Fourth Five-Year Plan, irrigation was considered part of infrastructure and all data pertaining to investments therein were recorded as part of infrastructure. But, since then, irrigation has been included in the agriculture sector, making inter-temporal comparisons more challenging. Moreover, there is no uniform definition of infrastructure across different record-keeping agencies of the government. Thus what is infrastructure for the Ministry of Finance (MoF) is not so for the Reserve Bank of India (RBI). And, in general, what is considered to be part of infrastructure in the Indian context is not regarded as such elsewhere in the world. The Indian definition of the term, like the pantheon of Hindu gods, is somewhat more expansive than what the term signifies in the literature elsewhere. In this paper, unless otherwise mentioned, we include within the purview of infrastructure, only power, irrigation, roads, rail, airports, ports and telecom. Getting consistent time series data for even this definition of
infrastructure is challenging. We have, therefore, made use of two different time series to give us a bird’s eye view of the broad trends in the sector.

![Figure 39.1: Infrastructure spending, 1951–2005 (per cent GDP)](image)

**Source:** Morgan Stanley (2005), Joshi and Little (1994) and IDFC estimates

The first is the Joshi and Little (1994) series, which includes electricity, water (including irrigation), railways, communication and other transport sectors as part of infrastructure. Unfortunately, this series is available in readily compiled form only from 1961 to 1989. The second is the Morgan Stanley (2005) series, which extends all the way to FY 2005 and includes gross capital formation in energy, airports, seaports, roads and telecom as a proxy for infrastructure spending—it does not include data on water/irrigation and railways and, therefore, understates the actual spending on infrastructure in any given year. However, as can be seen in Figure 39.1, the two series suggest a very similar pattern for infrastructure spending after 1960. We have supplemented these two series with our own estimates for the decade of 1950–60 to get a more complete sense of the trends over the entire period for which India has pursued its five-year plans.

On the face of it, India has seen several cycles of infrastructure build-out over the past five-and-a-half decades (Figure 39.1) as measured by the share of infrastructure spending in GDP, with each phase being interrupted (and partly, albeit temporarily, reversed) by exogenous shocks of different kinds. Thus, after a smart run-up in the infrastructure spending to GDP ratio for the first seven years of the 1950s, we saw a severe reduction in the same for three years following the foreign exchange crisis of 1957–58.
The second cycle of infrastructure spending growth spanned roughly the first half of the 1960s and was cut short upon the death of Nehru in 1964. The ensuing decline in infrastructure spend as a share of GDP was prolonged by subsequent events including the 1965 war with Pakistan, the drought of 1967–68, and the Bangladesh war of 1971 when infrastructure spend hit a post-independence low of 3.3 per cent of GDP.

Over the 1970s, we saw two more growth cycles in infrastructure spending. The first was cut short by the oil shock of 1973–74 and the political crisis associated with the Emergency of 1975–76. The second was interrupted by the oil shock of 1979–80.

The 1980s were likewise punctuated with a fourth and fifth cycle of growth in infrastructure spending. The fourth cycle peaked at an infrastructure to GDP ratio of 5.3 per cent in 1984–85, the year of a failed monsoon and the death of Indira Gandhi. The fifth cycle saw an extraordinarily sharp ramp-up in ratio of infrastructure spending to GDP ratio which rose to a new post-Independence peak of 5.7 per cent in 1991, the year of Rajiv Gandhi’s assassination and the IMF crisis.

Since then, the experience of the past decade-and-a-half has been tangibly different from previous decades. There has been no growth cycle or sustained recovery in infrastructure spending from the post-IMF crisis trough. On the contrary, we have witnessed an unprecedented and sustained decline in infrastructure spending, punctuated only by two very short-lived growth spurts: one in 1994–95, corresponding to a significant one-time flow of telecommunications-related FDI, and a second in 2001–02 corresponding to government support for the four-laning of the national highway network. In fact, by 2003–04, infrastructure spending as a share of GDP dipped to its previous post-Independence low of 3.3 per cent.

It is beyond the scope of this paper to undertake a comprehensive empirical analysis of the links between infrastructure spending and GDP growth. Indeed, much of the sophisticated research using cross-section and time series data for other countries has failed to establish the direction of causality in the relationship between infrastructure spending and growth. No such attempt, that we are aware of, has been made to analyze the Indian experience at a macro level. While deferring a more rigorous analysis of this question, we can, based on the available data, make a few observations and posit some plausible hypotheses about the Indian experience.

First, there is a broad positive correlation between GDP growth and infrastructure spending (as measured by the annual share of infrastructure spending in GDP) in India in the post-Independence period up to 1994. As to the causality of this relationship, what is evident is that each time growth has faltered on account of drought, foreign exchange crisis or political upheaval, infrastructure spending, as a share of GDP, has invariably suffered as a consequence.
Second, the underpinnings of reverse causality are likely to be more complex. But prima facie it would appear that growth in infrastructure spending does contribute to the GDP growth performance of the country, at least up to the decade of 1990. Figure 39.2 plots the 10-year moving averages (in view of the long gestation and pay back periods for infrastructure projects) of growth in real infrastructure spending versus the moving average of real GDP growth (smoothed out to take account of the distorting impact of crisis-driven outlier figures). What it suggests is that as growth in infrastructure spending slowed down quite sharply over the decade of 1960 and the early 1970s, the real GDP growth rates showed a more modest albeit perceptible trend decline over the same period. Following the mid-1970s, as the annual growth rates in real infrastructure spending accelerated again right up to 1990–91, so was there a less marked but steady rise in real GDP growth rates over the same period.

![Figure 39.2: GDP growth and growth in infrastructure spending, 1951–2005 (10-year moving average)](image)

**Source:** IDFC estimates

Third, the above relationship between infrastructure spending and GDP growth clearly breaks down post-1990. In fact, what is remarkable about the past fifteen years is that even as growth rates in real infrastructure spending have sharply declined, real GDP growth rates have tended to accelerate. There are two possible explanations to this puzzle:

a. That the build-up in the infrastructure stock up to 1990–91 was sufficient to support the momentum of GDP growth through the decade; and
b. That the last fifteen years are fundamentally different from previous years in that the positive impact on GDP growth of structural reforms pursued, starting in 1991, is much more significant than the presumably negative impact from the sharp deceleration in real infrastructure spending.

We would hypothesize that the 1990s did see a fundamental shift in the drivers of growth in the Indian economy. Until then, growth in the Indian economy (adjusted for terms of trade or weather-related shocks) was led primarily by public sector investment2 (albeit with declining efficiency as is well documented in the literature), but the 1990s saw an important shift to private consumption and private investment led growth. Table 39.1 calculates for each of the four distinct phases of India’s post-Independence political economy (these are defined and explained in detail in the next section) the average investment to GDP ratio, the average share of Gross Domestic Fixed Capital Formation in GDP, the average share of the public sector in GDFCF, and the share of infrastructure spending in GDP. What the data suggests is that trend GDP growth rates rose over each successive period spanning 1951 to 2004; and the rise in this average growth rate over the period up to 1991 was indeed accompanied by (a) a rise in the overall investment to GDP ratio, (b) a rising share of the public sector in that ratio; and also (c) a rising share of infrastructure spending in GDP. In the period from 1991 to 2004, however, the rise in the average GDP growth rate is accompanied by (a) a rise in the overall investment to GDP ratio, but (b) a significant fall in the share of the public sector, as well as (c) a fall in the average infrastructure spending to GDP ratio. While this does seem to support our hypothesis on the changing drivers of growth and the role of infrastructure spending, we cannot come to any definitive conclusion. Suffice it to say that the question merits further in-depth research.

Table 39.1: Economic growth and infrastructure spending in post-Independent India (1951–2004)

<table>
<thead>
<tr>
<th>Period*</th>
<th>Growth of GDP</th>
<th>Average spending on infrastructure (per cent GDP)</th>
<th>GDFCF (per cent GDP)</th>
<th>PSGFCF (per cent GDFCF)</th>
<th>Pub. sect. GDP (per cent GDP)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950–67</td>
<td>3.6</td>
<td>4.4</td>
<td>17.4</td>
<td>n.a.</td>
<td>10.6</td>
</tr>
<tr>
<td>1967–84</td>
<td>4.2</td>
<td>4.1</td>
<td>20.9</td>
<td>45.4</td>
<td>17.1</td>
</tr>
<tr>
<td>1984–91</td>
<td>5.9</td>
<td>5.2</td>
<td>22.6</td>
<td>43.5</td>
<td>23</td>
</tr>
<tr>
<td>Post 1991–2004</td>
<td>6.0(^1)</td>
<td>4.5</td>
<td>25.5</td>
<td>30.8</td>
<td>23.6</td>
</tr>
</tbody>
</table>

*See next section for logic of time span chosen for each period


3. PHASES OF POST-INDEPENDENCE POLITICAL ECONOMY IN INDIA

As outlined in the previous section, India has seen several cycles of infrastructure build-up, each interrupted by a crisis. It is, however, useful to step back and reflect on broader trends. Doing so suggests that the story of infrastructure development in post-Independence India is essentially the story of economic planning under four distinct political eras. We define these as the eras of Nehru (1950–67), Indira Gandhi (1967–84), Rajiv Gandhi (1984–91), and the era of decentralized politics (1991–2004).

The time spans corresponding to the first three eras, as we have defined them, overlap very largely with the periods over which each of the three politicians was in power, but are not exactly coterminous with their tenure. Each era represents a distinct political tone, and hence, a different emphasis in the corresponding five-year plans and, more generally, a different approach to economic policy. Over the Nehru, Indira and Rajiv eras, the Congress Party was the dominant force in the realm of national politics, even though its primacy at the state level was progressively eroding. The post-1991 era is characterized by a marked increase in decentralization of political power at all levels of government. Hence, it has been described as the era of decentralized politics.

Table 39.2 attempts to capture the essential differences in the political posture, policy focus and approach to macroeconomic management over the four political economy eras post-Independence.

Table 39.2: Eras of political economy in post-Independent India (1951–2004)

<table>
<thead>
<tr>
<th>Era</th>
<th>Political orientation</th>
<th>Policy focus</th>
<th>Macroeconomic management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nehru (1950–67)</td>
<td>Fabian socialist</td>
<td>Industrialization, pro-public sector and central government bias</td>
<td>Fiscal conservatism</td>
</tr>
<tr>
<td>Indira Gandhi (1967–84)</td>
<td>Rhetorical socialist with anti-urban bias trending to populist</td>
<td>Food security, anti-private sector, import substitution</td>
<td>Fiscal conservatism</td>
</tr>
<tr>
<td>Rajiv Gandhi (1984–91)</td>
<td>Populist</td>
<td>Industrial de-licensing and deregulation, technological modernization</td>
<td>Fiscal profligacy and debt monetization</td>
</tr>
<tr>
<td>Decentralized politics (Post-1991)</td>
<td>Neo-populist (coalition based)</td>
<td>Structural economic reforms, globalization</td>
<td>Fiscal consolidation</td>
</tr>
</tbody>
</table>
We have effectively witnessed three successive waves of infrastructure build-out in the country since Independence, each corresponding to the Nehru, Indira and Rajiv eras respectively. The growth in infrastructure spending in each era was temporarily interrupted/partly reversed by exogenous events, but the infrastructure spending to GDP ratio climbed successively higher peaks from one era to the next. The era of decentralized politics marks a significant reversal of this pattern, for it is in this period that we have seen an almost secular decline in spending on infrastructure relative to GDP.

The first wave of infrastructure build-out corresponding to the Nehru era covers the period of the first three five-year plans, the formulation of each of which was presided over by Nehru. The second wave corresponds to the period of the next three plans, formulated under the leadership of Indira Gandhi. And the third wave of build-out covers the period of the Seventh Five-Year Plan which was guided by Rajiv Gandhi. The Eighth, Ninth and Tenth Plans were formulated in the era of decentralized politics.

**Nehru era**

As is well established, the guiding political philosophy of Nehru was Fabian socialism, which envisaged a very significant role for the state in economic policy. While there was universal consensus that coalesced during the Independence movement around the premise that “poverty and stagnation in India were the consequence of colonial rule”, there were different views about how active the State ought to be in the process of economic development (Marathe 1986). Most notably, Gandhi did not share Nehru’s vision for the role of the State, nor did Sardar Patel and others such as Purushottam Das Tandon from within the Congress Party itself (Wadia and Merchant 1952). There was healthy debate on these issues for many years even before Independence, but Nehru had been working on forging consensus around the concept of centralized planning.  It is interesting that even before Nehru got the Planning Commission established in March 1950, the pre-Independence Industrial Policy Statement of 1945 had noted the objective of exercising central government control over certain industries, including key infrastructure sectors such as power. The debate notwithstanding, the economic policy, articulated immediately after Independence (in the Industrial Policy Statement of 1948, for example), hardly represented a radically new policy direction—it was more of an evolutionary step in a policy of central government participation in economic activity.

It was in this context that the First Five-Year Plan was formulated and implemented. It has been said that “there is nothing in the Indian economy that does not find a reflection in the [First] Plan and there is nothing in the Plan that is also not found in the Indian reality” (Patel 2002). The plan was essentially a programme of public expenditures that reflected the priorities of the time: (a) food production, a concern
born from “the memory of the Bengal Famine, the dislocation of the Punjab peasantry and the early shortages of food” in the immediate aftermath of the Partition; and (b) rehabilitation of strategic assets such as railways and ports that also suffered on account of the Partition.

By the time the Second Plan was being formulated in 1955–56, Nehru had cemented his position as the undisputed head of the Congress Party. And his vision of planned economic development and Fabian socialism’ had taken concrete hold on the whole policymaking apparatus through the acceptance by Parliament in 1954 of the “socialist pattern of society” as the key objective of social and economic policy, and the passage also in Parliament of the Industrial Policy Resolution and the Industries Act in 1956. By then the Planning Commission’s prestige was considerably enhanced through the appointment of senior ministers as members and elevation of the Deputy Chairman’s position to the rank of Cabinet Minister (Frankel 1978)—in effect, the Commission had become an extension of the prime minister’s authority in the area of economic policy.

The accent in the Second Plan was very much on industrial development on an ambitious scale, especially basic and heavy industries. As the private sector was not deemed to be in a position to cope with the envisioned scale of infrastructural build-out, a strong pro-public sector policy bias emerged. Moreover, compared to previous years, there was a definite shift in favour of central (as distinct from state or local) government control and regulation over industry. The notion of reserving the so called “commanding heights” of the economy for the central government thus took hold and so did the regime of industrial licensing begin to take shape (Kochaneck 1985).

In any event, the Second Plan was nearly aborted when the foreign exchange crisis engulfed the country in 1957 and forced a severe cutback in the public expenditure programme envisioned under the plan. This ushered in the cumbersome machinery of foreign exchange controls that survived for several decades after. It should be noted that foreign exchange controls were not the result of ideology—they were born out of necessity as a pragmatic response of the bureaucracy to a crisis, which itself was induced in part by a liberal import regime intended to spur the domestic economy.

By the Third Plan (1961–66), there was a growing realization that though the goals of planning were laudable, there was disconnect between “targets and performance, requirements and resources” and between the goal of rapid industrialization on the one hand and the gradual pace of agrarian reforms (especially land reforms) on the other. Although there was an awareness of the need to speed up implementation in general and focus especially on the development of ancillary
infrastructure in power and transport during this period, the Sino-Indian war and other adverse developments came in the way of the successful pursuit of these objectives.

As to macro-economic management through the Nehru era, the Ministry of Finance was dominated by formidable figures. Deshmukh gave priority to economists and economic advice. He believed that the dominance of economists in the Finance Ministry led to better coordination of economic policy. He nurtured experts and established a powerful economic analysis division within the Ministry of Finance and an economic research wing at the RBI. A dedicated team, which built up this division, led to the annual publication of the *Economic Survey* a few days before the Budget (Patel 2002). T. T. Krishnamachari, who took over the MoF just around the first foreign exchange crisis, built the economic analysis capabilities of the Ministry further. Despite his mercurial temper, he was open to advice and brought vigour, debate and discussion into the working of the ministry (Patel 2002). Under both Deshmukh as well as TTK, the MoF developed as a powerful and independent custodian of macroeconomic policy whose tone was anything but profligate.9

**Indira Gandhi era**

After Nehru’s demise in 1964, (and Shastri’s untimely death), a power struggle within the Congress Party ensued (Brecher 1969). The business community tried to take advantage of this to reassert its influence through the old guard of the party that had aligned itself against an embattled Indira Gandhi. Although the business community did continue to support the Congress Party during the 1967 election, leanings towards certain opposition parties were apparent. These parties were more sympathetic to their agenda and included the Swatantra Party and the Jan Sangh, the latter representing the urban middle class and the trading community (Kochanek 1970).

The precarious economic situation did nothing to help. During the Third Plan (1961–66), per capita income did not increase at all while signs of stagnation multiplied prominently. The food crisis continued to worsen in 1965–66 and the spectre of food security loomed large once again in the wake of the refusal of the US Congress to renew Public Law 480, a vital scheme that allowed India to import surplus wheat from the US against payment in rupees.10 No progress was made in solving the problem of unemployment (Minhas 1971, Raj 1976). On the contrary, the backlog of unemployment was estimated at 12 million at the end of the Third Plan and was then projected to increase to 15 million people by 1971. Accumulating problems culminated in a drastic devaluation of the rupee under an IMF rescue plan in June 1966.11
Indira Gandhi’s response to these economic challenges and the growing opposition to her leadership both from within the Congress Party and from other parties, largely supported by big business, was to appeal directly to the voting public. She did this by wrapping herself in the ideological cocoon of socialist rhetoric and adopting a harshly anti-big business and anti-urban stance. This populist cocktail ultimately underpinned her triumphant “garibi hatao” campaign immediately after the 1971 Bangladesh War and set the political tone for the rest of her tenure.

The direction of economic policy initiatives in the early years of the Indira era is easily explained against this political backdrop. The Monopolies and Restrictive Trade Practices Act (MRTP) was passed in 1969, ostensibly to safeguard the interests of consumers from potential abuse of monopoly power in the industrial sector. But, in practice, it was used to curb the growth of certain big-business interests or more cynically, as Marathe (1986) argues, it was used as a device by which “the money power of the large business houses could be kept on a short leash so that it could be utilized to the benefit of the ruling party”. Similarly, all banks were nationalized in the same year with the advertised intention of taking banking to the poor, but with the immediate objective of curtailing the power of private banks.

What is interesting about the Indira era is the emergence of a growing contradiction between imperatives of industrial growth on the one hand and the “environment of socialist postures” on the other. Even though the Fourth Plan document acknowledges the need for reviewing and “improving the administrative machinery of existing systems and controls” in industrial policy, no such review actually took place. This was despite the growing empirical evidence on the distortions caused by the increasingly cumbersome machinery of regulatory control such as those provided by Bhagwati and Desai (1970) and Bhagwati and Srinivasan (1974). In practice, it suited the government to continue with the centralized regulatory and licensing machinery, for this system led to a considerable accretion of its discretionary power and, hence, of its ability to confer or deny favours. The political system, over time, became more adept at using these levers of power to further its own objectives, and the business community, in fact, adjusted itself to this reality and evolved its own ways of dealing with the system. Thus the “license Raj”, the apparatus of which had been created under Nehru, took on a life of its own.

Meanwhile, the health of the economy, through the first half of the 1970s remaining fragile, became all the more vulnerable with the oil shock of 1973. As a result, the political tone set in the early years of this era persisted through the formulation of the Fifth Plan. Therefore, not only was the framework of the Industries Act of 1956 preserved, but in response to continuing pressures to embrace a populist agenda, it was, in fact, considerably extended beyond its original scope to add a vast list of
sectors reserved as the exclusive domain of small-scale industries in the mid-1970s and an array of protectionist tariff and non-tariff barriers.

The Sixth Five-Year Plan (1978–83) was launched under conditions that remained difficult, thanks to the second oil shock of 1979 and the ensuing domestic inflationary pressures. Although politically the position of the Indira Gandhi government at the time of the Sixth Plan was more secure on account of a convincing victory over the Janata Party, there was no compelling change in the direction of economic policy.

Despite difficult economic circumstances, the Indira era did deliver successful policy initiatives for rural India. On the one hand, the food crisis she inherited forced Indira Gandhi to make food security an overwhelming priority; on the other hand, her political survival hinged on her appealing directly to the rural vote bank. A lot of resources were thus poured into rural India over the 1970s and early 1980s. Kotwal and Ramaswami (1999) have argued that what made the Green Revolution a big success in the 1970s was that the introduction of the new technology package (seeds and fertilizers) was supplemented very effectively by massive public investment in rural roads, groundwater irrigation, and a system of procurement prices that greatly reduced uncertainty for farmers, motivating them to grow more food. The Indira era marked a major and most successful change from the Nehru era in the area of irrigation. Whereas the focus in earlier years was on massive and multipurpose irrigation projects having very long gestation, the focus during the Indira Gandhi years shifted to groundwater irrigation through pumps powered by massive rural electrification schemes.

While this strategy was clearly successful in helping India attain self-sufficiency in food, from a macro-management point of view, it set the tone for much greater politicization of fiscal policy. This was the era of much bigger government and public (including defence) spending and “loan melas”. The quality of public spending also began to deteriorate. The massive programme of rural support created the now ubiquitous and fiscally expensive practice of delivering free power and subsidized fertilizer to farmers and food subsidies to consumers. These are today the three largest components of the government’s very substantial subsidies bill.

Notwithstanding the tendency towards big (politically induced) spending, the government remained resolutely hawkish on inflation, not only because of the discipline of senior officials such as L. K. Jha and I. G. Patel, but because it made equally good political sense to keep inflation under control—price increase was one thing that the rural poor, Mrs Gandhi’s main political constituency, were very sensitive to.
The Rajiv Gandhi era (1984–91), the third distinct political-economy phase of post-Independence India, marked a decisive change in the direction from the previous seventeen-odd years, despite being the most short-lived of the four eras we discuss in this paper. Buoyed by a landslide victory in December 1984, following his mother’s assassination, Rajiv Gandhi was finally able to ease some of the stifling regulatory controls that had become entrenched.

Rajiv Gandhi emphasized industrial delicensing and deregulation. Deshmukh (2004) recalled in his memoir that the functioning and performance of the PSUs was causing acute anxiety, and the prime minister was not at all happy. The first wave of dismantling of the “licence Raj” came within twelve to eighteen months of his taking office through the announcement of the new Industrial Policy. The GOI also constituted many government committees during this era to conduct a long overdue review of the system of price controls and of the licensing regime. These committees recommended a “shift from physical to financial-levers’ controls”—in effect, deregulation of the industrial sector. The government implemented many of these recommendations resulting in industrial growth of more than 8 per cent on average for the period 1985–90. The capital market was also buoyant in this period as loosening of direct controls, particularly in the field of industrial licensing, signalled higher profitability.

Second, Rajiv Gandhi was keen that India catch up technologically with the rest of the world. His political orientation was pro-modernization, and he left a very clear imprint on the Seventh Five-Year Plan, the only one whose formulation he chaired, by committing serious resources to the development of the telecommunications sector.

However, Rajiv Gandhi did not have the political muscle to tackle the legacy of direct and indirect subsidies he inherited from his mother’s regime, nor the fortitude to make the necessarily difficult decisions. To be fair, the scale of the underlying fiscal problems he had inherited from his mother (thanks in part to the power of compounding and its impact on the government’s debt servicing obligations) was such that he could not have reasonably addressed the issues in the short time that he was at the helm (Figure 39.3). The political posture of this era thus remained populist, with a pro-modernization bias.

The casualty in this process was macroeconomic management and fiscal discipline—the era of big spending gave way to a period of even bigger (and less productive) spending. Though GDP growth rate trended upward during his tenure and
spending on infrastructure increased on account of his commitment to the telecommunications sector, government final consumption also rose sharply during this period contributing to a ballooning fiscal deficit that was eventually financed through money creation, fanning domestic inflation, widening the current account deficit, and sowing the seeds of the 1991 economic crisis (Jalan 1991, World Bank 1991).

The era of decentralized politics

The crisis of 1991 is recorded as a watershed in the evolution of Indian political economy. The ensuing decade-and-a-half, spanning the Eighth, Ninth and Tenth Plans, has seen meaningful progress on structural economic reforms, despite several changes of government and the demise of single-party domination of national politics.

Several explanations for this evolution have been offered. Analysing the types of reforms that have been pursued as opposed to those that have not been attempted, Varshney (1999) for one argues that elite politics is what is at work. It is politically easier to liberalize the trade regime, simplify investment rules, devalue the currency and lift restrictions on capital markets. These are all decisions made by the central government that affect elite politics (that is, politics discussed in the English press). It is a political challenge to revise labour laws, reduce subsidies and privatize state-run enterprises as these reflect concerns of mass politics and generally require action at the state level. Gurucharan Das (2000), however, suggests that the information
technology revolution and the deep penetration of electronic media has connected a much wider swathe of the electorate to the rest of the world, raising their expectations and aspirations, thereby creating space for the pursuit of structural reforms.

![Figure 39.4: Electoral position of Indian National Congress in Lok Sabha (1951–2004)](source: Table 39.7)

Whatever the underlying explanation for the broader trends post-1991 (and we return to this question in Section 5), the reality is that the crisis forced some basic structural reforms upon decision makers. Trade liberalization and deregulation (the latter having already been initiated during the time of Rajiv Gandhi) helped create the conditions for the IT boom, and allowed India to take unprecedented advantage of the process of globalization. This contributed to significant productivity gains and facilitated a substantial reduction in real interest rates.

![Figure 39.5: Electoral position of Indian National Congress in state legislatures (1951–2004)](source: Table 39.8)
Meanwhile, political power has become much more decentralized than in any period in post-Independence history (Figures 39.4 and 39.5), leading inevitably to greater reliance on coalition governments and accentuating the tendency towards populist decision making. It is remarkable how, despite the growing complexity of the political process, the growth performance of the economy has, in fact, improved and macro stability has been retained in this era of decentralized politics.

4. **The three waves of infrastructure build-out**

As we discussed in Section 2, the infrastructure build-out in independent India took place in three distinct waves, each corresponding to a different political-economy era. Each wave of the infrastructure build-out has a different focus, shaped in large part by the changing political priorities of governments in each era.

**The first wave and the Nehru era**

As we saw in Section 3, attention during most of the Nehru era (1951–67), covering the period of the first three plans, was focused on (a) increasing food production, (b) developing basic and heavy industries and (c) repairing the damage from the Partition. The first required irrigation to be developed, the second needed electric power and facilitating infrastructure such as roads, and the third required certain strategic assets to be rehabilitated. This, then, defined the government’s priorities in the infrastructure space.

Hence, massive resources were allocated for the development of multipurpose irrigation schemes. The construction of large river-valley projects like Bhakra-Nangal, Hirakud, Chambal, Tungabhadra, Nagarjunasagar and the Damodar Valley project, which provided both irrigation and power, was commissioned. During the First Plan, as much as 23 per cent of plan expenditures or about 0.8 per cent of GDP was poured into large surface water irrigation schemes (Figure 39.6). Over the second and third plans, the share of expenditure on power rose sharply.

There was also some investment in railways and maritime transport, the primary objective being to rehabilitate assets which had been ignored for a long time due to the Second World War and the separation of Pakistan from India. Thus, Kandla Port was developed to compensate for the loss of Karachi port. A 20-year plan was drawn up by the chief engineers of the state and the central government to develop the road network. Capacity enhancement outlined in the Nagpur Plan (1943–61), could not be carried out due to shortage of materials, scarcity of trained men and above all, financial stringency (see Annexure: Development of Indian road network).

However, roads which provided vital links to agricultural centres were given priority. New bridges and missing links on national highways were slated to be built during this era. In the Nehru era, an average of 0.3 per cent of GDP per annum was spent on road development.
Despite the elaborate machinery of state planning, a strategic approach to building national infrastructure was missing at the time of the Second Plan. In fact, Mahalanobis’ involvement notwithstanding, and despite the work done at the Indian Statistical Institute (ISI), the analytical foundations of the Second Plan were weak. There was, it seems, more consensus than dissent over the objectives and general orientation of the plan, which devoted central attention to developing heavy and basic industries. Such differences of opinion did exist in the community of eminent economists comprising the likes of Gadgil, Vakil, Brahmananda and Sen, but were not fully discussed, not because of any ideological zeal on the part of the Planning Commission, but merely because of Nehru’s overwhelming stature (Patel 2002). In this context, infrastructure was developed almost on a piecemeal basis as an activity ancillary to the development of large industrial projects, many of which were constructed in remote greenfield sites.

On the whole then, the first wave of infrastructure development in the country is essentially about the build-out of large multipurpose and irrigation schemes. For the rest, the attention to general infrastructure development during the Nehru era was surprisingly modest given the machinery of state planning that had been put into place.

The second wave and the Indira Gandhi era

As our previous analysis suggests, this era saw the intense politicization of all economic policy decisions. Since it was critically important for Mrs Gandhi to win
the rural vote, infrastructure during this era was village-oriented and projects with long gestation were substituted with shorter gestation initiatives.

The droughts of 1965–66 and 1966–77 highlighted the need for adequate irrigation facilities to ensure food security, an urgent concern in the early years of Mrs Gandhi’s tenure. The possibilities offered by the new seed varieties, both for increasing yields of cereal crops and for intensifying cultivation, were contingent on availability of water at the right time. The large multipurpose irrigation schemes launched during Nehru’s time were complex, long-gestation projects. Some of them took 20–25 years to be built with numerous time overruns exacerbated by poor implementation capacity. Neither the economy nor Mrs Gandhi could afford the time commitment this canal-based approach to irrigation infrastructure entailed. The only immediate solution was to have groundwater-based irrigation using tube wells. Thus, the emphasis in the irrigation sector shifted to minor irrigation on a massive scale when Mrs Gandhi took over (Figure 39.7).

![Graph showing build-up of minor irrigation](image)

**Figure 39.7: Build-up of minor irrigation in the Indira Gandhi era**

*Source: Planning Commission (2001)*

Tube well-based irrigation required pump sets to be powered and, hence, the delivery of electric power to the farming sector was critical to this strategy. The origins of rural electrification and the associated power sector infrastructure, therefore, lie in the political and perceived economic importance of food security in the early years of the Indira Gandhi era.

To provide financial support to this effort, the Rural Electrification Corporation (REC), with a plan outlay of Rs 150 crore, was established in the public sector.
The REC provided loans to the state electricity boards for rural electrification. Additional funds for rural electrification came from other financing institutions, such as the Agricultural Refinance Corporation, land development banks and commercial banks. It was estimated that 1.25 million pump sets and tube wells were required to be energized between 1966–69. Similarly, the setting up of the National Thermal Power Corporation (NTPC) in 1975 can also be understood in this context—its initial mandate was to accelerate power generation by mobilizing the vast coal reserves available in the country to meet the electricity demand for irrigation.

Village electrification, in this context, did not mean electrification of rural households—grid extensions were provided to farms, not to village habitations. The genesis of the financial problems that plague the power sector to this day are to be found in the political compulsions of this era. Electricity to the agriculture sector was not metered in the 1970s and, not surprisingly therefore, the financial burden on states started piling up. The poor governance of state electricity boards in general and the highly distortionary tariff structures, intended to provide cross-subsidies from industrial and commercial users to agriculture, are hardly surprising given the pace at which village electrification took place during the Indira Gandhi era and the rate at which the share of agriculture in power consumption grew (Figures 39.8, 39.9, 39.10).

![Figure 39.8: Pace of rural electrification (1947–2004)](source: MOP (2005))
The other infrastructure that consumed substantial resources in the Indira Gandhi era was roads, especially rural roads. During the 1980s, it was realized that the bulk of the increased traffic was being borne by the national highways. Though these constituted the main trunk routes, they accounted for a very small share of the overall road network in the country. In 1971 the length of overall road network was 915,000 km, of which national highways accounted for only 24,000 km.
About 8,000 km of new national highways were thus added during the following decade as part of a scheme to rationalize the road transport infrastructure of the country (Table 39.3).

| Table 39.3: Progress of road network (thousand km) |
|---------------------------------|-------|-------|-------|-------|-------|-------|
| 1. National highways           | 22     | 24     | 24     | 32     | 34     | 58     |
| 2. State highways              | 45     | 62     | 70     | 95     | 127    | 132    |
| 3. Other roads (including district roads, village roads, etc.) | 333 | 429 | 821 | 1358 | 2166 | 3010 |
| Total                          | 400    | 515    | 915    | 1485   | 2327   | 3200   |
| Surface roads                  | 156    | 234    | 398    | 684    | 1090   | 1600   |

*Source: Basic Road Statistics, Road Development Plan Vision: 2021*

The rural road sector first attracted attention in the context of rationalization of the transport sector. But political imperatives once again took over and rural roads rapidly became a conduit for channelling funds into rural India to build vote banks among the poor who could not benefit from village electrification.18

The bulk of funds to rural roads were allocated through special poverty alleviation schemes of successive budgets. The Minimum Needs Programme at the beginning of the Fifth Five-Year Plan in 1974 proposed to link all villages with a population of 1500 and 50 per cent of villages with a population of between 1000 and 1500 by all-weather roads. As acknowledged in the Ninth Five-Year Plan, implementation of these schemes was poor and wasteful. Often, earthen tracks and gravel roads did not conform to technical norms of compaction, drainage and geometrics, so the roads that were built were hardly all-weather roads. In reality, the quality of the physical network of rural roads that was built (Figure 39.11), was hardly commensurate with the resources that were allocated to the effort during the 1970s and the 1980s.

Other sectors of infrastructure remained largely stagnant in the Indira Gandhi era with a bare minimum effort devoted to enhancing port capacity in the 1970s for handling bulk cargo, including iron ore and petroleum, oil and lubricants. In fact, shortages of capacity were experienced in handling fertilizer and general cargo from time to time at most of the major ports, and there was hardly any headroom in port capacity. No addition was made to the fixed infrastructure of the railways. Some improvements to runway, terminal and communications facilities were carried out at the four international airports of Bombay, Calcutta, Delhi and Madras, essentially to make them suitable for operation of heavier and larger capacity aircraft.
like Boeing 747 jets. After that, only in the 1980s were investments made (a) to provide additional capacity at the international airports to relieve the heavy congestion at peak hours, (b) to provide additional workshop and maintenance facilities, and (c) to provide additional safety-oriented equipment. The telecommunications sector was ignored on the grounds that telephones were a luxury good. Little attention was paid to the development of our cities during this period, and in fact some of the seeds of their degradation were sown in the Indira Gandhi era with the introduction of the Urban Land Ceiling and Rent Control Acts.¹⁹

Unlike in the Nehru era, infrastructure development per se did not form part of the strategic thinking on economic policy during the Indira Gandhi era which, as we have argued, was in any case very heavily politicized. There is no empirical research of note that focuses generally on infrastructure development during this period, although there was a lot of preparatory work that was done to pave the way for the shift from canal-based irrigation to tube well–based irrigation (NCAER 1973). Research on infrastructure-related issues appears to have been limited to concerns about managing the country’s energy requirements and reducing dependence on imported energy (not surprising, given the impact of the oil shocks). A lot of critical research was devoted to agriculture-related issues during this time —research on the Green Revolution, for example, was helpful in understanding the distributional consequences of the same (Griffin 1974). Similarly, a lot of attention was devoted to the design of subsidies to agriculture. Otherwise, the
preoccuaption of the academic and intellectual community was more with the increasingly dysfunctional and all-pervasive regulatory apparatus.

The third wave and the Rajiv Gandhi era
There are two noteworthy features with respect to the third wave of infrastructure build-out. First, given Rajiv Gandhi’s preoccupation with modernization and technology, significant investment was made in the country’s telecommunications infrastructure. Telecommunications technology and services assumed high national priority in the Seventh Economic Development Plan (1985–90), during which expenditure on this sector grew very substantially (Figure 39.12). A key initiative of this period, and in hindsight a most prescient one, was Rajiv Gandhi’s drive for “technology missions” intended to help India catch up with the rest of the world.²⁰ The Centre for Development of Telematics was established in 1987 by Sam Pitroda to revolutionize the telecommunications sector in India. Under his leadership, significant initiative was taken to improve the efficiency of the telecommunications sector. Although all investments in this era remained in the public sector, the growing use of digital technology in telecommunications facilities, its interface with computers and the advent of satellites reduced the costs of long haul telecommunication. These developments enabled the country to move into a new era of communications and set the stage for substantial improvements in productivity as well as the take-off of the Indian IT industry during the 1990s. Moreover, the debate on the restructuring of the telecommunications sector was seeded at this critical time and paved the way for radical reforms of the sector a few years later (Box 39.1).

Figure 39.12: Planned expenditure on telecommunication, 1951–2002 (Rs crore)

Source: Planning Commission (2001)
Box 39.1: Development of telecom sector in India

National investment in the telecom sector in the first six five-year plans since 1950 hovered between 1.4 and 2.7 per cent of the planned expenditure. Only after 1985 did investment in this sector jump to 3.6 per cent of planned expenditure in the Seventh Plan (1985–90) and 5.8 per cent in the Eighth Plan (1992–97). The telecom services were seen by policy makers up until the early 1980s as luxury services not essential to economic growth (McDowell 1997).

Though reforms had been under way for five years by 1990, and terms like privatization and liberalization were used in public debates during the 1980s, the meaning of these terms was different from those used by telecom sector analysts in the West. In India, “privatization” did not refer to selling government enterprises then, but rather meant the licensing of private manufacturers to produce telecommunications equipment. Similarly, “liberalization”, a term used to describe telecom policies of the mid-1980s, involved merely expanding the number of manufacturing licences available and easing the rules for importing electronic equipment. Neither term was used with reference to telecom service provision in the 1980s.

With the opening up of the economy in 1991, requirements for telecommunications services changed suddenly and plans were redrafted accordingly in 1994 through the National Telecommunications Policy (NTP). The aim of the new NTP announced was to achieve an average density of at least 2.5 lines per 100 people by the year 2000.

The telecom sector was recognized as a crucial component of infrastructure in the mid-1990s reflecting the needs of a rapidly globalizing economy. Until 1994, telecommunication services were a government monopoly. NTP 1994, followed by liberalization in NTP 1999, has provided the Indian IT and related sectors a world-class facility at reasonable rates and telephone on demand anywhere in the country. Among developing nations, India has fared well in attracting FDI to this sector. The spike in infrastructure spending in 2000–01 is due to FDI of Rs 15,498 crore (0.82 per cent of GDP) in the telecom sector (Figure 39.1).

Second, the build-out of physical infrastructure for groundwater irrigation and electricity supply that was needed to power the irrigation pumps continued during this wave, even as the financial situation of SEBs continued to deteriorate and chronic shortages of power appeared for commercial and urban use. The political imperative that underpinned the momentum of initiatives (mostly inefficient and distortionary) in these sectors during his mother’s time was still very much intact during Rajiv’s tenure as well. As a result (for fiscal constraints were more severe), the development of critical transportation and urban infrastructure continued to be neglected.

As far as the role of the research community is concerned, it began to turn its attention to shortages in infrastructure capacity. Until then, the widely held view
was that the country’s physical infrastructure capacity was enough to cope with a sustained GDP growth rate of 5 per cent. The shortage of infrastructure services did not begin to be understood until the 1980s (Mody, Ahluwalia 1983). It was also during this time that research attention was devoted to the growing problems of urban India (Mohan 1985).

The Rajiv Gandhi era also ushered in intellectual debate about the direction administrative and organizational reforms needed to take in order to improve the efficiency of infrastructure service delivery in the country. Some of this work was led by multilateral and lending agencies (S&P 2005, Rudolph 1987), but some was conducted by government bodies such as the Railway Reforms Committee (1984). Unfortunately, these issues remained in the realm of debate, but the research work done during this time eventually speeded up the reform initiatives of the post-1991 crisis era.

5. INFRASTRUCTURE IN THE ERA OF DECENTRALIZED POLITICS

The post-1991 period has witnessed fiscal consolidation in an increasingly complex decision making environment caused by the atomization of political power. Investment in infrastructure has been a major casualty in this political economy dynamics (Figures 39.13 and 39.14).

![Figure 39.13: Infrastructure spending and votes to INC](Source: Table 39.7 and Morgan Stanley (2005))

The key objective of economic policy in the wake of the crisis and negotiations with the IMF was to reduce the central government fiscal deficit from 8.4 per cent of GDP in 1990–91 to 6.5 per cent in 1991–92, and further to 5 per cent in 1992–93. The process of fiscal consolidation continued in 1993–94 with the fiscal deficit
targeted at 4.7 per cent of GDP (GOI 1993). The only way such reductions could be achieved was by putting on hold almost all spending on infrastructure projects even though shortages in the infrastructure sector were acute.

On the face of it, the sharp decline in infrastructure spending witnessed since 1991 should have spelled disaster for economic growth. However, telecom-related reforms in particular, and reform initiatives in general, had a deep impact on productivity across the board. Further, the impact of a general decline in overall spending on infrastructure was mitigated by better targeting of that spending.

![Figure 39.14: Trends in government expenditure and public sector fixed capital formation](image)

**Source:** RBI Handbook on Indian Economy

**Table 39.4: Evidence of shortages**

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak power shortage (1991)</td>
<td>23 per cent</td>
</tr>
<tr>
<td>Turn-around time at major ports (1997-98)</td>
<td>8 days</td>
</tr>
<tr>
<td>Time taken for a truck to travel from Delhi to Kolkata</td>
<td>5 days</td>
</tr>
<tr>
<td>Waiting list for a telephone connection (1991)</td>
<td>1.7 million</td>
</tr>
</tbody>
</table>

Without the telecom sector initiatives of the Rajiv Gandhi years, the government post the 1991 crisis would have reacted even much more slowly to the need for radical reform in the sector than they did. By placing it on the agenda, it became possible to use structural reform to induce private investment into the sector, and thereby circumvent the severe constraint on government resources. And
the rest, as they say, is history (Figure 39.15)! The success of the IT industry is indicative of the impact of telecom sector reforms on productivity. The explosive growth in IT service exports provided critical foreign exchange earnings for the economy without using up too much capital, foreign or domestic, for doing so (Kelkar 1994).

![Figure 39.15: Telecom growth—the changing scenario](image)

Source: TRAI (2005c) and TRAI (2006c)

In the era of decentralized politics, while the financing constraint became the most severe in decades, shortages in the infrastructure sector intensified and, therefore, the sector began to attract unprecedented attention. Moreover, given the atomized nature of political power during this era, the space for debate expanded and consensus building in policy making became a complex exercise creating greater demand for relevant empirical research.

The India Infrastructure Report (NCAER 1995), under the chairmanship of Rakesh Mohan, emerged as a seminal piece of work in the area, with many of its recommendations finding their way into the several budgets spanning the Eighth Plan. The Ninth Plan identified the management of the infrastructure deficit as a key objective which, given the binding nature of fiscal constraints, was to be achieved through organizational, management, structural, or in some cases, legislative reforms designed to improve operational efficiency, cost recovery and financial viability in key infrastructure sectors, and attract private capital into them (GOI 1993, Jalan 1993). Many of these objectives were underpinned by a high-powered Task Force on Infrastructure (Box 39.2).
A Task Force on Infrastructure comprising both government and industry representatives was constituted under the chairmanship of Shri Jaswant Singh, Deputy Chairman, Planning Commission, with the aim of attracting investment to specific projects of national and regional importance, and ensure their timely completion. Initially, the task force dealt with the following projects focusing on innovative methods for financing them.

- Six-lane expressway of 7000 km length, having North-South and East-West corridors
- Four-laning of national highways
- Five world-class international airports

The terms of reference of the Task Force included:

- determining the routes for the expressways and national highways, and establishing technical parameters thereof
- identifying and recommending locations for the airports
- establishing benchmarks and criteria for the airports
- recommending financing options for expressways, highways and airports
- recommending criteria for competitive bidding and selection of (EPC) contractors
- recommending measures as necessary for timely completion of the identified projects, including governmental clearances
- overseeing and monitoring timely implementation of the projects.

The Task Force also formulated the Integrated National Transport Policy to strengthen the transport infrastructure in the country.

Source: The Ninth Five-Year Plan

More specifically, the Ninth Plan kicked off the debate on privatization of distribution in the power sector and paved the way for the passage of the Electricity Act of 2003 (which although not yet successful in driving open access, has at least served to attract more private participation in captive generation capacity).

The case of transportation infrastructure is a good example of more effective targeting of public spending and initiative in the post-1991 period. The Ninth Plan clearly identified the unbalanced modal mix in the transport sector—that is, a disproportionate reliance on congested national highways vis-a-vis rail, with the former carrying over 60 per cent of all freight traffic and 80 per cent of passenger traffic. This awareness did have some impact on the operational efficiency of the Indian Railways, which has since shown signs of improvement. More importantly, it led to targeted spending on the national highway network and the build-out of the Golden Quadrilateral and the related North–South and
East–West road corridors under the Tenth Five-Year Plan. Likewise, the port sector, which saw an 11-fold increase in traffic from 19 million tonnes to 227 million tonnes from 1950–51 to 1996–97 and an average turnaround time reaching eight days in 1997–98, was opened up to private investment. This helped add some 4 million TEU of container handling capacity, helping reduce congestion in our major ports. Similarly, the work of the Committee on Civil Aviation facilitated the entry of low-cost private carriers and led to enormous private sector investment into the civil aviation infrastructure, including airlines, and now also airports.

In sum, the post-1991 period has been one in which, forced by binding fiscal constraints on the one hand and the pressures of “neo-populist” coalition politics on the other, we have seen a sharp reduction in government spending on infrastructure. In a tough fiscal environment, the easier thing for weak governments to do is to favour existing vote banks over future voters by cutting capital expenditures in favour of spending on subsidies and other current consumption. Notwithstanding the fact that infrastructure spending dipped back to post-Independence lows during this period, we have seen a marked improvement in the targeting of that spending, and much greater application to the pursuit of structural reforms to improve the sector’s efficiency and induce private investment into the space. We have, at last, also seen the emergence of a strategic focus to infrastructure policy, as well as an unprecedented rise in the profile and influence of empirical policy oriented research in the sector. The ensuing productivity improvements and the incipient participation of the private sector in infrastructure have bought the Indian economy valuable time. But there is still a long way to go, and the following years will be a crucial test of whether or not we are able to meet the challenge of giving the country the infrastructure it so desperately needs.

What next? The era of middle-class politics?

In our view, understanding the rapidly evolving political economy dynamics at work in India today gives us hope for the future. While it is true that the diffused nature of political power makes decision making more difficult and even more prone to populist deal making than in previous decades, we believe that there is a more powerful underlying dynamic at work which, over time, is likely to make reforms, especially in the infrastructure sector, deeper and more sustainable.

Think of the process of public policy formulation in India as a complex “lobbying model”, wherein a variety of interest groups compete for influence. Over previous decades (as we saw in the case of the Indira Gandhi era), the direction of initiatives, in the infrastructure sector in particular and of economic policy generally, was set
primarily by the imperatives of electoral politics. To be sure, there were powerful
lobbies, such as the corporate lobby and the public sector workers’ lobby, that did
exercise influence from outside the electoral process, but the tone of policy was
overwhelmingly set by the logic of vote banks.24 Over the last decade or so, there
has emerged an increasingly powerful new lobby which is the middle class and the
electronic media.

Table 39.5 gives some indication of the growth of the Indian middle class and of
the penetration of the electronic media. A decade of more than 6 per cent real GDP
has likely swollen the ranks of the middle class to anywhere from 150 to 200 million
people, and it is estimated that 25 million people are being added to this group
every year. It is our judgment (based on the positioning of television advertising
and the commercial underpinnings of the medium) that the electronic media is a
very strong mirror of, and advocate for, the issues that are of particular concern to
this middle class.

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<tbody>
<tr>
<td>Telephones# (mn)</td>
<td>5.07</td>
<td>9.8</td>
<td>28.39</td>
<td>~104</td>
</tr>
<tr>
<td>TV sets (mn)</td>
<td>21</td>
<td>46</td>
<td>71</td>
<td>~200</td>
</tr>
<tr>
<td>Cars and jeeps registered ('000)</td>
<td>2,709</td>
<td>3,489</td>
<td>6,423</td>
<td>7,793*</td>
</tr>
<tr>
<td>Refrigerators produced ('000)</td>
<td>1,282</td>
<td>1,850</td>
<td>2,011</td>
<td>4,360</td>
</tr>
</tbody>
</table>

* (includes fixed + wireless from 2000 onwards)
*of the year 2003

Source: India Infrastructure Database, Indian Planning Experience, Planning Commission (2001) and CMIE Basic Statistics (August 1994)

The impact of the now very substantial purchasing power of this segment of the
population is readily seen in the rapid and accelerating pace of consumer goods
penetration. This group of people are also much more willing and able to pay for
essential infrastructure services than they were a decade ago. In view of this, our
hypothesis with respect to the emerging political economy of reform, especially in
the infrastructure sector, is that a reform initiative becomes sustainable and
irreversible the moment the middle class gets a taste of the benefits from that
initiative. That is the moment that the “dam of resistance” from other political
constituencies (corporate or public sector incumbents, trade unions or even rural
vote banks) gives way to the inescapable influence of a burgeoning middle class,
made stronger by the representation of their interests by the electronic media.
An illustration helps make the point. Telecom sector reforms remained sluggish and vulnerable to pushback until 1998–99 when competition from a new generation of private providers of mobile telecom services triggered a decline in tariffs. From that point onwards, we saw an exponential subscriber growth (Figure 39.16) as a result of which telecom sector reforms gained political legitimacy and became irreversible.

We can trace a similar trajectory for civil aviation sector reforms. Once the entry of low cost airlines forced air fares lower, unprecedented growth in domestic air travel was unleashed, creating a new constituency for reforms in this sector. It is because of the power of this constituency (and the media that played up the story) that the strike by airport workers against the privatization of the Delhi and Mumbai airports failed to take hold, whereas it might have succeeded in setting back such an initiative a decade ago.

By exactly the same logic, power sector reforms are still vulnerable. Take the case of the privatization of Delhi electricity distribution. In the minds of the consuming public, privatization has only been associated with higher tariffs with no improvement in reliability of power supply (which is subject to shortages because of limited generating capacity). The moment, however, the consuming public gains confidence about the availability of power, this reform initiative too would become politically unassailable.
In conclusion, our perspective on the future is optimistic. As long as the middle class gains momentum, it is a matter of time before public policy becomes more responsive to their concerns. According to the World Bank (2007), by 2030 a global middle class of 1.2 billion would emerge in the developing world, up from 400 million in 2000 (Figure 39.17). A significant portion of this middle class will be in India. We can, therefore, expect that in the coming years, political logic will drive decision makers to deliver improved infrastructure services. Much greater reliance on private sector participation in the space along with a reversal in the trend of declining government spending on infrastructure can also be envisaged. It is not surprising that the government today is extremely focused on launching ambitious PPP programmes in roads, ports, airports, and even the railways. Innovative schemes have now been launched in hitherto completely neglected segments such as urban water supply and sanitation. In this environment, the role for empirical research is more fertile than it has ever been. Our suggestion is that such research should not only focus on “what needs to be done” but also on the political economy of “how it can be done”—the deeper our insight is on harnessing the middle-class dynamics to push reforms ahead, the sooner will we be able to deliver the infrastructure that our country so desperately needs.

Rajiv Lall and Anupam Rastogi

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**Figure 39.17: Growth of the global middle class**

*Source: World Bank (2007)*
REFERENCES


**ANNEXURE**

**Development of Indian road network**

In 1950–51, only 39 per cent of the total road length in India was surfaced. This rose to 43.5 per cent in 1970–71, and 46.8 per cent in 1990–91. At the beginning of the Eighth Plan (1992), there was no significant increase in the proportion of surfaced roads, leaving over 50 per cent of the road length in the country unsurfaced (Table 39.3).

Village connectivity was given priority right from the First Five-Year Plan. The Road Development Committee, consisting of chief engineers of the PWDs, formulates long-term plans for construction of the road network in the country. The three plans, since 1941, were the Nagpur Plan (1941–61), the Bombay Plan (1961–81) and the Lucknow Plan (1981–2001). The National Highway network
could not achieve its target, and rural and district roads exceeded their target by nearly 40 per cent (Table 39.6). Norms for rural roads were reviewed and diluted and targeted to be completed by 1990. The village connectivity programme was implemented under the Basic Minimum Services programme in 1996, in which the Minimum Needs Programme was also merged. The Ninth Five-Year Plan acknowledged that because the village connectivity programme was undertaken as part of several employment creation and poverty alleviation programmes, the dirt tracks and gravel roads did not conform to technical norms of compaction, drainage and geometrics. They were not all-weather roads and in most cases could not be treated as functional means of connectivity.

Table 39.6: Targets and achievements under 20-year road plans (in km)

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<tr>
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<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Achievement</td>
<td>Target</td>
</tr>
<tr>
<td>National highways</td>
<td>33,395</td>
<td>22,636</td>
<td>55,500</td>
</tr>
<tr>
<td>State highways</td>
<td>86,825</td>
<td>62,052</td>
<td>112,650</td>
</tr>
<tr>
<td>Major district roads</td>
<td>80,145</td>
<td>113,483</td>
<td>241,400</td>
</tr>
<tr>
<td>Rural roads (inc. ODR)</td>
<td>332,335</td>
<td>500,802</td>
<td>651,780</td>
</tr>
<tr>
<td>Total</td>
<td>532,700</td>
<td>698,973</td>
<td>1,057,330</td>
</tr>
</tbody>
</table>

(*Includes 1,000,000 km of earth tracks, built under the employment generation programme)

Maintenance of roads did not receive adequate attention in the past, primarily because of diversion of resources and lack of funds. It became necessary to provide sufficient funds for maintenance to avoid continuing deterioration of roads built with scarce plan resources. The 12th Finance Commission was compelled to allocate funds tied to the maintenance of state roads for 2005–10 instead of general centre–state transfer of funds.

Table 39.7: Electoral results of Indian National Congress (INC) in Lok Sabha (1951–2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of votes for INC</th>
<th>% of votes polled</th>
<th>Total seats</th>
<th>Seats contested</th>
<th>Seats won by INC</th>
<th>% seats won</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>47665951</td>
<td>44.99</td>
<td>489</td>
<td>479</td>
<td>364</td>
<td>74.4</td>
</tr>
<tr>
<td>1957</td>
<td>57579589</td>
<td>47.48</td>
<td>494</td>
<td>490</td>
<td>371</td>
<td>75.1</td>
</tr>
<tr>
<td>1962</td>
<td>51509084</td>
<td>44.72</td>
<td>494</td>
<td>488</td>
<td>361</td>
<td>73.1</td>
</tr>
<tr>
<td>1967</td>
<td>59490701</td>
<td>40.78</td>
<td>520</td>
<td>516</td>
<td>283</td>
<td>54.4</td>
</tr>
</tbody>
</table>
### Table 39.7: Electoral results of Indian National Congress (INC) in Lok Sabha (1951–2004) (contd...)

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of votes for INC</th>
<th>% of votes polled</th>
<th>Total seats</th>
<th>Seats contested</th>
<th>Seats won by INC</th>
<th>% seats won</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971</td>
<td>64033274</td>
<td>43.68</td>
<td>518</td>
<td>441</td>
<td>352</td>
<td>68</td>
</tr>
<tr>
<td>1977</td>
<td>65211589</td>
<td>34.52</td>
<td>542</td>
<td>492</td>
<td>154</td>
<td>28.4</td>
</tr>
<tr>
<td>1980</td>
<td>84455313</td>
<td>42.69</td>
<td>529</td>
<td>494</td>
<td>353</td>
<td>66.7</td>
</tr>
<tr>
<td>1984</td>
<td>115478267</td>
<td>49.1</td>
<td>514</td>
<td>491</td>
<td>404</td>
<td>78.6</td>
</tr>
<tr>
<td>1989</td>
<td>118894702</td>
<td>39.53</td>
<td>529</td>
<td>510</td>
<td>197</td>
<td>37.2</td>
</tr>
<tr>
<td>1991</td>
<td>99799403</td>
<td>36.26</td>
<td>521</td>
<td>487</td>
<td>232</td>
<td>44.5</td>
</tr>
<tr>
<td>1996</td>
<td>96455493</td>
<td>28.8</td>
<td>543</td>
<td>529</td>
<td>140</td>
<td>25.8</td>
</tr>
<tr>
<td>1998</td>
<td>95111131</td>
<td>25.82</td>
<td>543</td>
<td>477</td>
<td>141</td>
<td>26</td>
</tr>
<tr>
<td>1999</td>
<td>103120330</td>
<td>28.3</td>
<td>543</td>
<td>453</td>
<td>114</td>
<td>21</td>
</tr>
<tr>
<td>2004</td>
<td>103408949</td>
<td>26.53</td>
<td>543</td>
<td>417</td>
<td>145</td>
<td>26.7</td>
</tr>
</tbody>
</table>

**Source:** Key Highlights of General Elections to the Lok Sabha, The Election Commission of India (various years)

**Notes:** Indian National Congress as recognised by the Election Commission

### Table 39.8: Electoral results of Indian National Congress in state legislatures (1951–2004)

<table>
<thead>
<tr>
<th>Year</th>
<th>% votes polled in state legislatures</th>
<th>% seats won in state legislatures</th>
<th>% states with INC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1951</td>
<td>43</td>
<td>77</td>
<td>100</td>
</tr>
<tr>
<td>1957</td>
<td>44</td>
<td>76</td>
<td>92</td>
</tr>
<tr>
<td>1962</td>
<td>43</td>
<td>61</td>
<td>92</td>
</tr>
<tr>
<td>1967</td>
<td>40</td>
<td>49</td>
<td>58</td>
</tr>
<tr>
<td>1971</td>
<td>33</td>
<td>33</td>
<td>20</td>
</tr>
<tr>
<td>1977</td>
<td>36</td>
<td>43</td>
<td>38</td>
</tr>
<tr>
<td>1980</td>
<td>33</td>
<td>49</td>
<td>43</td>
</tr>
<tr>
<td>1984</td>
<td>30</td>
<td>33</td>
<td>35</td>
</tr>
<tr>
<td>1989</td>
<td>38</td>
<td>46</td>
<td>50</td>
</tr>
<tr>
<td>1991</td>
<td>28</td>
<td>26</td>
<td>24</td>
</tr>
<tr>
<td>1996</td>
<td>25</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>1998</td>
<td>39</td>
<td>49</td>
<td>40</td>
</tr>
<tr>
<td>1999</td>
<td>36</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>2004</td>
<td>25</td>
<td>27</td>
<td>21</td>
</tr>
</tbody>
</table>

**Source:** Key Highlights of General Elections to the Legislative Assemblies, The Election Commission (various years)

**Notes:** 1. For comparison purposes all the legislative election results in the intervening years have been clubbed with the later year. 2. Only that data for INC is taken which is provided in the reports of the Election Commission. 3. If INC has not fielded its candidates, the result is counted as zero in that event.
NOTES

1. Water here means irrigation.

2. Bagchi (1975) writing on industrial growth in India suggests that the growth of capacities through public investments, especially in basic and intermediate goods sectors, indeed spurred economic growth during what we call the Nehru era.

3. This average would be 6.3, if 1991–92 GDP growth (0.9 per cent) is ignored.

4. Until the breakthrough participation of private players in the telecommunications space in the 1990s, the bulk of infrastructure spending in India came from government, and that too primarily from the central government.

5. The need for national planning was acknowledged, for example, by the National Planning Committee, comprising leaders of all political hues and also representatives of business and chaired by Nehru in as early as 1938–39.

6. Having expended, it seems, some political capital in getting to that point (Breacher, 1959).

7. The Fabian Society is a British Socialist movement best known for its initial groundbreaking work beginning in the late 19th century and up to the World War I leading to the formation of the Labour Party in England. Nehru had a long association with the Labour Party MPs. He even stayed with Stafford Cripps when he visited England in 1937 (Frank 2001).

8. I. G. Patel argues in his memoirs that the crisis of 1956–57 was caused by import liberalization that preceded the industrialization push of the Second Plan—the point being that despite being committed to the development of domestic industry, the Nehru-era policymakers were not, at least in the early years, committed to import substitution.

9. The MoF acquired a reputation for being wary of the private sector and was criticized for high tax regimes and for squeezing the corporate sector (Frankel 1978).

10. The law expired on 30 June 1966. Instead, the Johnson Administration proposed a Food for Peace programme which, over five years, envisaged that all US shipments of food would be financed by long-term credits, repayable only in dollars (Frankel 1978).

11. “… A combination of circumstances, aggravated by war and drought, has temporarily slowed down, and almost halted economic growth.” (Indira Gandhi’s broadcast to the nation on All India Radio, 12 June 1966, after receiving on June 6 IMF approval for devaluing the rupee by 57.5 per cent).

12. Deshmukh (2004) records that the bitter memories of how grain-surplus countries had treated India when it urgently needed food supplies propelled Indira Gandhi to take imaginative and bold steps in the area of food security.
13. The practice of periodically writing off debts of farmers.

14. I. G. Patel was appointed Governor of the Reserve Bank by Morarji Desai’s short-lived Janata Government.

15. Minor irrigation schemes include all groundwater development projects as well as surface water projects. Most deep tube-well schemes are community-based and tube-wells are usually constructed and owned by individuals. In either case, groundwater provides the farmer with just the type of “instant” and controlled irrigation which the new high-yielding varieties of seed demand. Minor irrigation schemes further enable farmers to grow more than one crop on an assured basis.

16. Interestingly, the definition of village electrification was changed in 2005 (MOP 2005). Now at least 10 per cent households in an unelectrified village have to be electrified for a village to be declared electrified and any public place or institution, like schools, panchayat offices, health centres, dispensaries and community centres, should be able to avail themselves of power supply on demand. Apart from this, a distribution transformer should be made available in the inhabited locality within the revenue boundary of the village, including at least one hamlet/Dalit basti as applicable. Quite clearly, central to village electrification now is the availability of power to villagers. The earlier definition of village electrification has been criticized by many. But, then, circumstances have changed drastically in the last forty years.

17. The losses in transmission and distribution were estimated to be 12 to 26 per cent, and plants used to operate at an average of less than 50 per cent load factor, with 40 to 60 per cent of the energy produced going to drive irrigation pumps (Financial Times Survey: India, 24 May 1982).

18. According to Alavi et al. (1989), one of the causes of the erosion of support for the Congress after 1967 was its inability to retain the support of the “bullock capitalists”. “Bullock capitalists” are described as “independent self-employed agricultural producers” who can be both productive and prosperous compared to “tractor capitalists” who own more than 15 acres and operate with wage labour. Another motive for the attention to road transport at this time was to weaken the political constituency behind the railways. The railwaymen’s unions had successfully challenged the political leadership in May 1974 by holding a nationwide strike disrupting steel and coal production and inflicting political damage to the Indira Gandhi government (Srinivasan and Narayana 1977, Chakravarty 1977).

19. Arguably, measures calculated to contain the political opposition to Mrs Gandhi, such as the Jan Sangh, for example.


21. The World Development Report (World Bank 1994) was also quite influential and
brought to the attention of policymakers the range of initiatives being pursued globally to induce greater private sector participation in infrastructure development.

22. The populist policies of previous decades meant that user charges on many publicly provided utilities, such as irrigation, electricity and water, were well below their costs of provision. A new body of research, spawned in the wake of the 1991 crisis, indicates that the unrecovered costs were as high as 5 per cent of GDP for the central government alone (World Bank 1991, Gulati et al. 1990, Morris 1996, 2003).

23. Having learnt the lesson from the failure of early IPPs that it is hard to get private financing for power generation in the absence of creditworthy off-takers.

24. This resulted in what Marathe (1986) has called “the dynamics of a capitalist growth distorted by socialist postures”.

25. More than half of the passengers using Deccan Airways, for example, are first-time air travellers.

26. The middle class is defined as population earning US$4000 to US$17000 per capita on purchasing power-parity basis.

27. The Prime Minister’s Committee on Infrastructure is a manifestation of the government’s seriousness, and the Jawahar Lal Nehru National Urban Renewal Mission is an example of innovation.

28. This paper was written by the authors in April 2007 for the National Council of Applied Economic Research (NCAER), New Delhi, for its Golden Jubilee publication in 2007.
1. **Introduction**

China’s sustained high economic growth and increasing competitiveness has been underpinned by a massive development of infrastructure. The outcome has been spectacular in terms of scale and pace: between 1990 and 2005, power generation capacity nearly quadrupled and the road network almost doubled (Table 40.1). Port capacity increased six-fold. The length of civil aviation routes has doubled. During this period, the gap between China and India in terms of infrastructure capacity has widened significantly, with the exception of railways. China’s infrastructure capacity is now approximately five times larger than India’s, especially in power and ports, and much greater in expressways (Table 40.1).

How has this been achieved? How is China financing its infrastructure investment? What lessons can we learn? This paper attempts to answer some of these questions. Section 2 places the achievements of China’s infrastructure sector in macro-economic context and discusses key features of the sector’s development. Section 3 focuses on how China’s infrastructure development has been financed and on the returns to investment in the sector. Section 4 examines some aspects of the institutional and regulatory architecture of the Chinese infrastructure sector. Section 5 tries to assess how inclusive access to infrastructure is in China. Section 6 deals with the environmental impact. Section 7 concludes with some lessons from China’s experience with infrastructure development. Throughout the paper, wherever possible, we have attempted to compare and contrast the Chinese experience to that of India’s. We have also tried to draw specific insights and lessons from a more detailed examination of two specific infrastructure sub-sectors, namely power and roads.
Table 40.1: Development of infrastructure capacity—China and India

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Power installed capacity (GW)</td>
<td>China</td>
<td>100</td>
<td>135</td>
<td>217</td>
<td>319</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>43</td>
<td>64</td>
<td>81</td>
<td>98</td>
</tr>
<tr>
<td>Road network ('000 km)</td>
<td>China</td>
<td>943</td>
<td>1,028</td>
<td>1,157</td>
<td>1,403</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>1,852</td>
<td>2,327</td>
<td>2,538</td>
<td>3,200</td>
</tr>
<tr>
<td>o.w. expressways</td>
<td>China</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Coastal ports—volume of freight handled (mn tons)</td>
<td>China</td>
<td>310</td>
<td>480</td>
<td>800</td>
<td>1,260</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>129</td>
<td>163</td>
<td>223</td>
<td>334</td>
</tr>
<tr>
<td>Civil aviation routes (mn km)</td>
<td>China</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>103</td>
<td>118</td>
<td>115</td>
<td>193</td>
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<tr>
<td>Railways ('000 km)</td>
<td>China</td>
<td>55</td>
<td>58</td>
<td>60</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>62</td>
<td>62</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>National electrified railway ('000 km)</td>
<td>China</td>
<td>4</td>
<td>7</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>6</td>
<td>9</td>
<td>12</td>
<td>14</td>
</tr>
</tbody>
</table>

Source: China Statistical Yearbook (various issues), China Highway and Waterway Transport Statistics Yearbook 2006
*The series is discontinuous: The data on rural roads is included only starting 2005

2. **Defining features of Chinese infrastructure development**

**Infrastructure-led growth**

Over the past two decades, China’s growth has been investment-led, and supported by rising domestic savings. Historically, the cyclical nature of post-reform Chinese GDP growth has been attributed to boom–bust investment cycles. Over time, the management of these cycles seems to have improved. Although signs of overheating have emerged in recent months, the current boom has been especially long, having taken hold in the aftermath of the Asian Crisis of 1997.
### Table 40.2: China—macroeconomic indicators

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP (%)</td>
<td>9.6</td>
<td>8.8</td>
<td>7.8</td>
<td>7.1</td>
<td>8.0</td>
<td>8.3</td>
<td>9.1</td>
<td>10.0</td>
<td>10.1</td>
<td>9.9</td>
</tr>
<tr>
<td>(GDP%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross dom. savings</td>
<td>39.0</td>
<td>38.2</td>
<td>40.0</td>
<td>38.0</td>
<td>41.0</td>
<td>43.0</td>
<td>47.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross domestic fixed capital formation</td>
<td>33.8</td>
<td>32.9</td>
<td>33.8</td>
<td>35.9</td>
<td>36.5</td>
<td>37.8</td>
<td>35.0</td>
<td>38.0</td>
<td>39.0</td>
<td>41.0</td>
</tr>
<tr>
<td>Govt revenue</td>
<td>11.2</td>
<td>12.1</td>
<td>13.0</td>
<td>14.3</td>
<td>15.3</td>
<td>17.0</td>
<td>15.9</td>
<td>16.2</td>
<td>16.6</td>
<td>17.5</td>
</tr>
<tr>
<td>Govt expenditure</td>
<td>12.8</td>
<td>13.9</td>
<td>16.1</td>
<td>18.3</td>
<td>18.9</td>
<td>20.1</td>
<td>18.9</td>
<td>18.6</td>
<td>18.1</td>
<td>18.8</td>
</tr>
<tr>
<td>o.w. cap. exp.</td>
<td>1.3</td>
<td>1.3</td>
<td>1.6</td>
<td>2.4</td>
<td>3.4</td>
<td>3.6</td>
<td>4.0</td>
<td>4.0</td>
<td>3.6</td>
<td>3.8</td>
</tr>
<tr>
<td>Overall budget bal.</td>
<td>-1.6</td>
<td>-1.8</td>
<td>-3.1</td>
<td>-4.0</td>
<td>-3.6</td>
<td>-3.1</td>
<td>-3.0</td>
<td>-2.4</td>
<td>-1.5</td>
<td>-1.3</td>
</tr>
<tr>
<td>Primary balance</td>
<td>-2.8</td>
<td>-2.3</td>
<td>-2.4</td>
<td>-1.8</td>
<td>-1.8</td>
<td>-1.0</td>
<td>-0.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FDI, net (US$ bn)</td>
<td>41.7</td>
<td>45.2</td>
<td>45.4</td>
<td>37.0</td>
<td>37.0</td>
<td>37.0</td>
<td>47.0</td>
<td>47.0</td>
<td>53.0</td>
<td>68.0</td>
</tr>
<tr>
<td>Investment in infrastructure*</td>
<td>6.3</td>
<td>5.2</td>
<td>6.3</td>
<td>6.2</td>
<td>6.8</td>
<td>6.3</td>
<td>7.6</td>
<td>9.0</td>
<td>12.0</td>
<td>12.6</td>
</tr>
<tr>
<td>Memo items:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal investment in infrastructure (bn RMB)</td>
<td>450</td>
<td>408</td>
<td>533</td>
<td>556</td>
<td>672</td>
<td>688</td>
<td>912</td>
<td>1220</td>
<td>1910</td>
<td>2318</td>
</tr>
<tr>
<td>Nominal GDP (bn RMB)</td>
<td>7118</td>
<td>7897</td>
<td>8440</td>
<td>8968</td>
<td>9921</td>
<td>10966</td>
<td>12033</td>
<td>13582</td>
<td>15988</td>
<td>18232</td>
</tr>
</tbody>
</table>


**Note:** Gross Domestic Fixed Capital Formation in 1996 to 1998 is from the China Statistical Yearbook, and thereafter from the IMF. The estimates between these two sources vary (by 1–2% of GDP) so the jump in 1999 may not be as high. Government accounts are on IMF basis. Overall budget balance includes central and local governments.

*Infrastructure is defined as spending on power and gas, transport, water, irrigation and telecommunication. This is aligned to the Indian Planning Commission’s definition of infrastructure (Source: China Statistical Yearbook, various issues).

Infrastructure investment in 2004 and 2005 are urban investments only (see Note 3 for clarification).

Since 1997, economic growth in China has accelerated to over 10 per cent per annum from around 7.5 per cent in 1998–99, driven by continuously rising domestic savings and gross domestic capital formation. In just five years, between 2000 and 2005, the savings rate, driven by burgeoning retained earnings of the enterprise sector, increased nearly nine percentage points of GDP, rising to an astounding 47 per cent, while investment rose to 41 per cent of GDP. But it is not just investment that has been driving the current boom, it seems that investment in infrastructure has played an especially important role.
In sharp contrast to other East Asian countries where investment in infrastructure fell sharply in the aftermath of the Asian Crisis, the Chinese Government relied heavily upon infrastructure investment as a counter-cyclical policy. Under the fiscal stimulus program that was implemented in 1997–98 (as a result of which the consolidated deficit doubled from 1.8 per cent of GDP in 1997 to a peak of 4 per cent in 1999), the central government provided transfers to local governments and introduced the issuance of state debt (treasury bonds) essentially to fund infrastructure. The bond issuance has continued since then, much of it going to irrigation, waterworks, transport and urban infrastructure (Liu 2004), and although budgetary allocations for infrastructure development have come off their post-crisis peaks, total spending on infrastructure has continued to climb.

Infrastructure-focused fixed capital formation more than doubled from 5.7 per cent of GDP in 1998 to over 13 per cent in 2005, and the share of infrastructure in total investment spending ballooned from well under 20 per cent in 1998 to almost one-third of gross capital formation in 2005 (Table 40.2). Over this period, investment in power increased by over one and a half times as a share of GDP between 1998 and 2005, investment in transport almost doubled as a share of GDP (Table 40.3), and the length of the country’s road network expanded by over 2.5 times, with a big push on expressways and rural roads. By 2006, infrastructure spending as a share of GDP had crossed 14 per cent, making China’s investment in infrastructure certainly the highest in the world.

Table 40.3: Infrastructure investment in 1998, 2005 and 2006 in GDP

<table>
<thead>
<tr>
<th></th>
<th>1998</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power and gas</td>
<td>2.3</td>
<td>3.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Transport</td>
<td>2.4</td>
<td>4.6</td>
<td>5.2</td>
</tr>
<tr>
<td>Drinking water</td>
<td>0.2</td>
<td>0.3</td>
<td>0.3</td>
</tr>
<tr>
<td>Irrigation</td>
<td>0.4</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>Telecom</td>
<td>0.4</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Other rural infrastructure*</td>
<td>-</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Total spending</strong></td>
<td>5.7</td>
<td>12.6</td>
<td>14.4*</td>
</tr>
<tr>
<td><strong>India</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total spending</strong></td>
<td>4.1</td>
<td>4.7</td>
<td>5.6</td>
</tr>
</tbody>
</table>

*Data on rural infrastructure spending are not available for previous years, and the numbers for 2006 are estimates based on IMF budgetary data.
Although it has not been possible to establish an empirically rigorous link between infrastructure spending and GDP growth, it does appear that heavy investment in infrastructure has contributed in no small measure to the Chinese economy’s superior growth performance over the past decade.

**Fiscal discipline**

A second remarkable feature of China’s experience with infrastructure development is that despite heavy investment in the sector the government has managed to maintain fiscal discipline.

Over the past decade of this boom, China has seen continued progress in the “corporatization” of its state-owned enterprises (SOEs) and the state budget at all levels of government has become progressively less tangled with the operations of the country’s vast industrial/manufacturing and state banking complex. As a corollary to this initiative, the Chinese have focused relentlessly on improving their tax effort. Thus, even as government expenditures have grown with a lot of previously off-budget expenses coming on to the budget, there has been no trend deterioration in the performance of government savings (Table 40.4). In fact, tax revenues more than cover current expenditures and partially finance capital expenditures. If non-tax revenues are also included, more than two-thirds of capital expenditure is covered by budgetary revenues, leaving only one-third to be financed by government borrowing.

**Table 40.4: Consolidated fiscal balance—China and India (in per cent of GDP)**

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current expenditure</td>
<td>14.4</td>
<td>14.4</td>
</tr>
<tr>
<td>Total revenue</td>
<td>16.1</td>
<td>16.6</td>
</tr>
<tr>
<td>o.w. tax revenue</td>
<td>14.7</td>
<td>15.1</td>
</tr>
<tr>
<td>Non-tax revenue</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Capital expenditure</td>
<td>4.0</td>
<td>3.6</td>
</tr>
<tr>
<td>o.w. infrastructure</td>
<td>1.1</td>
<td>1.2</td>
</tr>
<tr>
<td>Govt saving (+)/dissaving (-)</td>
<td>1.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Consolidated deficit</td>
<td>-2.4</td>
<td>-1.5</td>
</tr>
</tbody>
</table>

**Sources:** China: ‘IMF–China Staff Report: 2006 Article IV Consultation’, 11 July 2006


**Note:** Govt saving/dissaving is taken as total revenue less current expenditure as the extent of capital receipts is not available.
Maintaining this fiscal discipline has meant that China has delivered very substantial growth in infrastructure spending with little dependence on the state budget. Between 1997 and 1999, the government used increased budgetary allocations to infrastructure spending as the lynchpin of its post-Asian Crisis counter-cyclical fiscal policy. Since then, the government has maintained capital expenditures from the consolidated budget in the range of 3 to 4 per cent of GDP and it has retained its focus on infrastructure spending by allocating an increasing share of these expenditures to the sector.5

Overall though, the bulk of the growth in infrastructure spending has come from corporatized state-owned entities and/or sub-national government agencies that have funded themselves through off-budgetary means. Further, there is no evidence of any growth in a ‘quasi-fiscal deficit’ through hidden subsidies or losses in the system. In fact, indications are that the financial performance of SOEs in general has been improving as has the health of the banking system, where the practice of ‘policy lending’, quite common in the late 1980s and early 1990s, seems to have given way to more disciplined lending and recovery.

By implication, then, it must be the case that China has relied significantly more than what one might expect on user fees and capital levies to recover the cost of building and maintain core infrastructure (more on this in Section 3).

Urban focus

A third feature of the China infrastructure development experience is its strong urban bias, which is reflective of the nature of Chinese growth more generally. Rapid urbanization has been an important contributor to the accelerating growth of the economy. As Table 40.5 indicates, there has been, over time, a marked shift in investment towards urban infrastructure. Compared to 77 per cent in 1997, the

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total investment in fixed assets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Urban</td>
<td>n.a.</td>
<td>77.0</td>
<td>84.6</td>
<td>89.0</td>
</tr>
<tr>
<td>– Rural</td>
<td>n.a.</td>
<td>23.0</td>
<td>15.4</td>
<td>11.0</td>
</tr>
<tr>
<td>Funding sources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– State budgetary appropriations</td>
<td>8.3</td>
<td>2.8</td>
<td>4.4</td>
<td>3.9</td>
</tr>
<tr>
<td>– Domestic loans</td>
<td>17.3</td>
<td>18.9</td>
<td>17.3</td>
<td>16.5</td>
</tr>
<tr>
<td>– Foreign investment</td>
<td>6.6</td>
<td>10.6</td>
<td>4.2</td>
<td>3.6</td>
</tr>
<tr>
<td>– Self-raised funds and other investment</td>
<td>67.8</td>
<td>67.7</td>
<td>74.1</td>
<td>76.0</td>
</tr>
</tbody>
</table>

Source: CFA (2006) p. 278
share of investment in urban fixed assets increased sharply to 89 per cent in 2006. Detailed data on the urban–rural split for infrastructure spending are not readily available but, for 2006, we estimate that fixed investment spending on urban infrastructure was more than 13 times that for rural infrastructure development (Table 40.6).

This marked bias is not surprising given China’s development trajectory. The pattern of infrastructure development has been integrally linked with the country’s export-led strategy. Priority was thus given to building infrastructure in the coastal areas, related first to the SEZs and associated port capacity and road transport links. The improvement in infrastructure in coastal urban areas in the 1980s was an important factor in making these areas highly competitive in attracting manufacturing FDI, setting the precedents for the subsequent waves of infrastructure investment (ADB–JBIC–WB 2005). The policy was encapsulated in the slogan: ‘Let some areas get rich first’.

From 1993 onwards, focus shifted to accelerating the pace of urbanization to absorb surplus rural labour (Chen 2005). As the share of the urban population rocketed from about 27 per cent of the total to about 45 per cent a decade and a half later, significant attention was devoted to the rapid build-out of infrastructure in the major eastern and southern cities. Urban road networks, mass rapid transport systems, water supply and waste management systems were developed even as inter-city connectivity was improved through investment in airports, highways and railways. Investment in power generation capacity also grew rapidly, but barely really kept pace with the escalating demands of industrial activity. Following endemic blackouts on account of acute shortages in 2002, the scale of investment in power-generating capacity was seriously accelerated, with installed capacity doubling by 2007 in an effort to keep the engine of urban-centric industries humming.

Over recent years, the government has become highly sensitized to the need for developing infrastructure in the poorer western and central regions that have hitherto been neglected. From the Eleventh Five-Year Plan, emphasis has moved distinctly towards the development of rural infrastructure under the slogan of a ‘harmonious society’.

**High local-level participation in infrastructure development**

A common misperception about China is that investment, especially infrastructure investment, if not planned, remains highly centralized and financed largely from the central budget and/or loans that are easily available from state-owned banks. In fact, financing from the state budget has been declining steadily and now accounts for less than 4 per cent of the total financing requirement for fixed capital formation (Figure 40.1), and the central government’s share of this financing is even smaller.
While it is true that the Chinese tax system was recentralized following the Budget Law of 1994, and that the central government collects more than half of tax revenues today (up sharply from 20 per cent in the early 1980s), its share of budgetary expenditures has declined steadily from over 50 per cent in the early 1980s, down to under 30 per cent in 2005 (Naughton, 2006), supported by a system for inter-governmental transfers that has become more systematized.

In fact, budgetary expenditures have become progressively less meaningful as a source of financing for investment—they contributed less than 4 per cent to the funding requirements for fixed investment in 2005 (Figure 40.1)—as sub-national governments have gained more and more autonomy in the development decision-making process.

Deng Xiao Peng’s ‘Southern Tour’ of 1992 gave strong impetus to the forces of decentralization and unleashed competition between sub-national governments to attract FDI. Indeed, one of the important parameters on which local party leadership was judged by the national leadership was the volume of FDI they had managed to attract. Given the importance to foreign investors of infrastructure, local authorities enthusiastically embraced the development of physical infrastructure.

Lacking in a strong local fiscal base, and prohibited from borrowing, provincial and local governments have turned aggressively to alternative ways of raising resources to finance infrastructure development. As a result, the overwhelming proportion of resources for investment comes from the ‘self-raised and other funds’ of local governments and of the enterprises they own/control. Such funds, comprising largely of a combination of enterprise-retained earnings and extrabudgetary revenues of different kinds (see Section 3 for more on this), accounted for more than 55 per cent of the funding requirement for fixed investment in 1981. Their contribution had risen to more than 75 per cent of total investment financing by 2006 (Figure 40.1).

**Limited private sector and foreign participation**

The fourth noteworthy characteristic of China’s infrastructure is the very little extent of private or foreign participation in the sector. Although China has experimented with many models for private participation in infrastructure, none has been fully developed and implemented (Bellier and Zhou 2003). Aside from a short-lived period in the mid-1990s, when foreign investors were invited to invest in power generation projects, FDI inflows into infrastructure have been very modest. In 2006, FDI accounted for less than 2 per cent of the capital funds invested in infrastructure (Table 40.6).

In the infrastructure space, state-owned companies of different hues dominate the landscape. In some key sectors such as telecommunications, the central government
has opted to create a small number of large companies that operate as oligopolies and are in the nature of ‘national champions’ with cross-regional or nationwide footprints. In other cases, such as power generation and expressways, a few national champions compete with smaller companies owned by provincial or lower level governments. By and large, private participation in infrastructure development in China has been restricted to investment in the stock of the few (but growing) number of state-owned companies that are listed.

One of the reasons for limited private sector participation in the development of infrastructure is that the National Development and Reform Commission (NDRC) has retained centralized control of planning while decentralizing responsibility for building infrastructure to local government. The high level of political risk and lack of certainty on tariff regulation has discouraged private infrastructure investment (Finlayson 2007). More recently, the government has taken initiatives to attract strategic investors into the space by making tariff regimes more transparent and market based. This has attracted players into ports, airports and expressways.

3. Financing of Infrastructure

A bird’s-eye view

China has had phenomenal success in finding the domestic resources to fund its aggressive build out of infrastructure. Figure 40.2 provides a schematic overview of the financing chain for Chinese infrastructure.
Conceptually, from the point of view of a consumer of infrastructure services, there are only four ways in which these services can be paid for: a) taxes; b) extra-budgetary levies; c) user charges; or d) subsidy. To the extent that a)-c) instruments do not generate enough revenue to cover the cost of building (including a ‘market’ return on equity to the investor) and maintaining the infrastructure asset, the consumers of the service must enjoy some level of implicit financial subsidy (which may be eminently justifiable on economic/policy grounds, given the public good nature of infrastructure).

**Figure 40.2: China infrastructure financing chain**

*Source: China Statistical Yearbook; World Bank 2005; Table 3*

(a) Extra-budgetary funds of sub-national governments ~ 1% of GDP (World Bank 2005)
(b) Rural infrastructure investment ~ 1% of GDP (IMF)
(c) Extent of bond financing is an estimate.

Broadly, in the case of China, it would appear that the consumer of infrastructure services does not benefit from very large implicit or explicit financial subsidies. The central and local governments recover the bulk of their capital expenditure pertaining to infrastructure development through a combination of general and specific taxes, and off-budgetary levies. User fees are also higher in China than one might expect: by and large, they seem sufficient to cover at least the cost of servicing the debt deployed for funding the construction of assets as well as the cost of operating and maintaining the same.

This is not to say that consumers bear (directly through user fees, or indirectly through taxes) a market determined cost for infrastructure delivery. They do enjoy
an implicit subsidy, the cost of which is borne in part by the suppliers of infrastructure services through a sub-market return on their equity (RoE), and in part by the banks whose profitability has been depressed because of a certain persistent degree of financial repression. The implicit subsidy varies from sub-sector to sub-sector. For example, the implicit subsidy is very low to non-existent in the telecommunications and port sectors, where the suppliers of the services are probably earning close to market rates of return on their equity. On the other hand, in the case of the power and roads sectors, the implicit subsidy is likely still quite large (for roads see Figure 40.8).

In essence, the capital structure of the infrastructure sector has three component parts: a) a grant component that does not expect any return; b) an equity component; and c) a debt component. In the case of China, the grant component (in the form of allocations from the consolidated government budget) contributes an estimated 16 per cent of the funding needs of the sector. The equity piece (provided by a range of players, including local governments and their agencies, corporatized/listed SOEs, foreign and other investors), contributes a very large 54 per cent of the sector’s capital structure. And debt, provided mainly by domestic banks (including China Development Bank), accounts for the remaining 30 per cent of the sector’s capital structure. In financial terms, the sector is significantly under-leveraged, which implies that the return to the equity providers is likely on average to be depressed relative to the expectation of purely market players.

The average return masks a range of ROEs that accrue to different types of providers of equity. Local government and their agencies may not earn meaningful financial returns on their equity investment in local roads, for example. But they are at least recovering their capital expenditure as well as the associated operations and maintenance expenses through a variety of extra-budgetary levies and non-tax revenue streams such as land sales—else, the unfinanced gap would show up somewhere as borrowing. While the effective leverage in the Chinese infrastructure sector could well be higher than indicated in Figure 40.2 because of ‘hidden’ leverage of the local government agencies or the cascading leverage of SOEs investing equity in the sector, the central government does not encourage this practice and is taking steps to monitor and control this phenomenon. Data on this are hard to come by, but our hypothesis is that there is not significantly more leverage embedded in the infrastructure finance chain in China than hypothesized in Figure 40.2.

Similarly, the centrally-owned grid companies in China’s power sector do not seem to generate a market rate of return because of their obligations to pay high charges to power generators on the one hand, and the government’s reluctance to let them hike user charges to end consumers on a pass-through basis.
On the other hand, user charges for operating expressways are high enough to attract a number of purely private foreign investors to invest in highway concessions for a market rate of return. Similarly, user charges for electricity generation are high enough to allow the handful of dominant state-owned enterprises to earn a reasonable RoE.

From a public policy perspective, the above mechanism for infrastructure finance works because it has managed to distribute the burden of providing the public good that is infrastructure judiciously between a) government which is effectively the provider of grant financing through budgetary allocations; b) infrastructure service suppliers, both government and non-government, who are owners of the equity with different return expectations; and c) the banks and other financiers who are providers of the debt.

The government is not overburdened by huge budgetary obligations towards the infrastructure sector that might make its fiscal situation unsustainable. As we have noted before, China has managed to keep its fiscal deficits well under control. Local governments as providers of equity may not earn meaningful financial returns on their investment, but they do generate significant economic rates of return. The cross-subsidy thus provided by central and local government allows consumers not to be overburdened by user charges that are so onerous that they are unable/unwilling to pay, yet are sufficient to ensure a) that debt service obligations to banks are met; and b) that an array of corporatized/listed SoEs enjoy a reasonable (albeit not quite market) return; and c) that a small number of truly private investors get a market return.

As it turns out, the success of the system hinges critically on the fact that the bulk of the suppliers of infrastructure services in China, and therefore the providers of equity to the sector, are owned/controlled by central or sub-national governments—they can therefore remain satisfied with an RoE that is high enough to keep them financially sustainable, but modest by the standards of the private sector. Likewise, state-owned banks can continue to provide large volumes of debt in a financially sustainable manner as long as their loans are serviced, even if their profits remain depressed partly on account of interest rate regulation.

Sources of infrastructure finance

FDI

Infrastructure projects have been funded primarily from domestic sources, with limited foreign investment (Table 40.6). Foreign investment\textsuperscript{11} was just 2 per cent of infrastructure financing in 2006. At its peak in the mid-1990s, it accounted for 10 per cent of infrastructure financing.
## Table 40.6: Sources of funds for fixed investment in infrastructure, 2006

<table>
<thead>
<tr>
<th></th>
<th>Total funds (US$ bn)</th>
<th>State budget (%)</th>
<th>Domestic loans (%)</th>
<th>Foreign investments (%)</th>
<th>Self-raised funds (%)</th>
<th>Others (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total investments in urban infrastructure</strong></td>
<td>360.7</td>
<td>9.7</td>
<td>30.7</td>
<td>1.8</td>
<td>50.0</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>97.5</td>
<td>4.2</td>
<td>45.3</td>
<td>1.2</td>
<td>42.9</td>
<td>6.4</td>
<td>99.8</td>
</tr>
<tr>
<td><strong>Water</strong></td>
<td>8.5</td>
<td>9.5</td>
<td>19.9</td>
<td>4.0</td>
<td>59.0</td>
<td>7.6</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Transport of which</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Railways</strong></td>
<td>139.4</td>
<td>12.8</td>
<td>30.8</td>
<td>2.7</td>
<td>44.9</td>
<td>8.8</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Roads</strong></td>
<td>24.9</td>
<td>30.3</td>
<td>17.1</td>
<td>1.3</td>
<td>36.6</td>
<td>15.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>MUTS</strong></td>
<td>77.7</td>
<td>10.8</td>
<td>35.5</td>
<td>1.1</td>
<td>45.3</td>
<td>7.3</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Water transport</strong></td>
<td>10.2</td>
<td>3.6</td>
<td>45.2</td>
<td>1.5</td>
<td>45.0</td>
<td>4.6</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Air transport</strong></td>
<td>13.3</td>
<td>1.6</td>
<td>26.5</td>
<td>7.4</td>
<td>55.4</td>
<td>9.0</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Pipelines</strong></td>
<td>6.4</td>
<td>11.8</td>
<td>29.7</td>
<td>17.9</td>
<td>26.2</td>
<td>14.5</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Other transport services</strong></td>
<td>0.9</td>
<td>10.2</td>
<td>34.6</td>
<td>1.2</td>
<td>53.9</td>
<td>0.5</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Telecom</strong></td>
<td>5.7</td>
<td>7.1</td>
<td>12.8</td>
<td>5.8</td>
<td>69.9</td>
<td>4.3</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Irrigation</strong></td>
<td>21.2</td>
<td>1.5</td>
<td>3.7</td>
<td>1.1</td>
<td>91.1</td>
<td>2.6</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total investments in rural infrastructure</strong></td>
<td>26.9</td>
<td>100.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Total investment in infrastructure</strong></td>
<td>387.6</td>
<td>16.0</td>
<td>28.5</td>
<td>2.1</td>
<td>46.5</td>
<td>6.9</td>
<td>100.0</td>
</tr>
</tbody>
</table>

As % of GDP

<table>
<thead>
<tr>
<th></th>
<th>14.4</th>
<th>2.3</th>
<th>4.1</th>
<th>0.3</th>
<th>6.7</th>
<th>1.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>of which urban</td>
<td>13.4</td>
<td>1.3</td>
<td>4.1</td>
<td>0.3</td>
<td>6.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Rural</td>
<td>1.0</td>
<td>1.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

*Source: China Statistical Yearbook 2007 (Table 6.15)*

Data for rural infrastructure spending and its composition are estimates based on IMF data.

*Budgetary appropriations*

As noted earlier, and contrary to popular belief, the state budget (which includes budgetary appropriations and transfers from the central government budget) finances only about 10 per cent of the infrastructure investments.

*Debt financing*

Domestic debt financing in the form either of loans from banks and non-bank financial institutions (NBFIs), or bonds account for less than one-third of infrastructure funding. Although all banks lend to infrastructure, the single most...
important institution for lending to infrastructure is the China Development Bank (CDB). In 2006, the CDB accounted for about 8 per cent of domestic loans to infrastructure (see Box 40.1).

Box 40.1: China Development Bank (CDB) and infrastructure projects

The CDB, which is the largest of the three policy banks, enjoys a close relationship with the Chinese government as well as certain privileges. Its mandate is to provide medium- and long-term funding for projects. It provides finance to the less-developed regions and for other government priorities. Approximately 45 per cent of the outstanding loans are for projects in the western and central regions, reflecting the government’s policy of promoting the development of these inland regions. The CDB’s lending plans are determined by the People’s Bank of China (PBOC) and the National Development and Reform Commission (NDRC), but implementation is increasingly left to the bank’s discretion. Close to a quarter of the bank’s lending goes to public infrastructure projects, especially in the power and land transport sectors.

The CDB’s balance sheet has grown from US$63 billion in 1998 to US$290 billion by the end of 2006. Its assets and loans have expanded at an annual rate of 20 per cent or so in the last decade. In 2006, the growth of loans slowed to 15 per cent as the CDB diversified into financial advisory, asset management and asset securitization. The CDB is a wholesale institution, relying largely on the issuance of ‘infrastructure bonds’ to state-owned banks as its source of funding.

Some of the projects undertaken by the bank may not be commercially viable but have the potential for partial cost recovery as a result of credit enhancement features. Overall, the bank is profitable with a return on equity of about 17 per cent and return of assets of 1.2 per cent. The CDB has the lowest non-performing loans ratio among all Chinese banks, possibly explained, at least partly, by its preferred-creditor status with local governments. Loan guarantees are usually loose and typically come from related parties, while local governments often provide unenforceable letters of comfort, usually indicating the importance of the projects to local economic development. However, local governments’ leverage over the CDB’s borrowers has proved to be as effective as any formal guarantee in many instances, as local authorities have an incentive to compel repayment of the CDB loans to access further funding to other projects in the region.

Source: CDB, Standard & Poor’s

Self-raised funds

By far the most important source of infrastructure finance is what is called ‘self-raised funds’. These funds contribute more than half of total investment financing in infrastructure, with the ability of different sectors to generate these funds varying from 26 per cent of their financing in air transport to over 90 per cent in telecom (Table 40.6). What are these self-raised funds? These essentially comprise three types of revenue streams: a) retained earnings of enterprises; b) extra-budgetary funds of local authorities; c) other non-tax revenue that is principally drawn from the leasing of land and/or asset sales.
Retained earnings of SOEs, comprising depreciation and profits, have been growing very rapidly over the past decade and now comprise more than half of gross domestic savings, or over 20 per cent of GDP. This reflects the improving performance of SOEs over time. The free cash flow generated by SOEs has, therefore, become a significant source of funding for infrastructure investment. Local governments are able to tap into the cash flow of SOEs under their control to invest in, or sometimes even cross-subsidize, infrastructure development in their respective areas.

Extra-budgetary funds comprise a range of formal, and ‘informal’ or non-regulated, levies imposed by local governments, the proceeds of which are used for investment (Box 40.2). Unlike other countries, all levels of government in China collect user charges, surcharges on utilities and informal taxes. Most are designated for specific purposes, such as the ‘airport user charge’ levied at all airports which is earmarked for airport upgrading. These levies and charges are managed by designated government agencies for the purpose of making earmarked investments—they are not reflected in enterprise revenues or in government budgets. Conceptually they amount, therefore, to an equity contribution of local governments to infrastructure development.

Box 40.2: Extra-budgetary funds

Within the state sector, own funds can be broadly divided into enterprise retained funds (depreciation and profits); contributions from related government enterprises and agencies; earmarked funds; and other extra-budgetary revenues of sub-national government units. Starting in the late 1980s, extra-budgetary earmarked funds proliferated. These have been in the form of local surcharges over and above nationally earmarked budgetary levies such as the power development levy, a charge on each kilowatt hour of electricity generated, the railroad construction levy (per ton/km charge), and the road construction tax on the purchase of motor vehicles. There are a range of additional surcharges and fees that some localities levy, including airport construction fees, port construction surcharges, and long-distance telephone surcharges.

These funds are generally managed by government agencies rather than enterprises. Typically, the provincial line bureaus through state-owned enterprises under their control are responsible for collecting the fees, and the State Development and Reform Commission (SDRC, erstwhile provincial planning commission) and finance bureaus closely supervise their use. Government agencies such as the SDRC under the supervision of the NDRC appropriate and allocate them to priority projects in the province.

Given the lack of autonomy on taxation at the local level, some local governments have been overzealous in the application of ad hoc or unauthorized levies in an effort to shore up their fiscal base. This has contributed in some regions to discontentment amongst peasants and has invited strong reaction from the central government. There are four types of extra budgetary levies that are fully authorized: fees collected by public institutions and administrative agencies; the township unified levy/village retained fund; contributions to social insurance funds; and fees collected by local finance bureaus (Naughton 2006).

Revenues from land leasing are an important source of funds for municipal, city and township governments in particular. All land in China belongs to the State. Land leasing involves the upfront sale of long-term occupancy and development rights, of around 40 to 70 years. The practice was introduced on an experimental basis in 1987 in Shenzhen and other coastal cities, as part of the de facto decentralization of China’s fiscal system. Up to that time, public authorities allocated land administratively and land use was free. In 1988, China’s constitution, which previously had prohibited all types of land transfer, was amended to permit land leasing, while retaining public ownership of land. The land-leasing reforms were intended, in part, to stimulate locally-led economic development, by allowing cities to attract foreign investment by providing stable land occupancy rights to investors. In 1990, the State Council formally affirmed land leasing as public policy. By 1992, Shanghai and Beijing had adopted land leasing as a local practice, and it began to spread westward to the rest of the country.14 Originally, municipalities transferred land rights to developers primarily by private negotiation but in 2002 were instructed to conduct all land leasing through public bidding at auctions. The municipalities were slow to accept the new limitations but it is becoming the primary form of conveyance in economically advanced cities (Peterson 2006). Proceeds from land leasing have become a significant source of financing urban infrastructure development in particular.15

The role of publicly owned land in urban infrastructure finance extends well beyond direct proceeds from land-leasing sales. Borrowing from state-owned commercial and development banks has financed much of the remaining urban infrastructure investment. This borrowing takes the form of balance-sheet debt typically secured by municipally owned land. Debt service often is paid by selling off the leasing rights of parcels of land whose value gets enhanced in future by the debt-financed infrastructure projects (Box 40.3).

Box 40.3: Financing of outer ring highway in Changsha

The interaction between land leasing, debt and infrastructure investment is illustrated by the construction of the outer ring circumferential highway in Changsha, capital of Hunan Province in central China. To finance the project, the municipality transferred to a public–private agency, the Ring Road Investment Corporation, leasing rights for strips of land 200 metres wide on both sides of the highway that was to be built, totalling 33 square kilometres of land in all, of which 12 square kilometres was finished land possessing infrastructure access and development approvals. In its original state, without access to roads or infrastructure, the remaining land had very little market value. However, the plan was to sell off land parcels once the highway was built. The total cost of the second stage of the highway project was estimated at yuan 6 billion (at the time some US$730 million). Approximately half of this amount was financed directly from sale of leasing rights to the land already having infrastructure service. The other half was financed
through borrowing. The Ring Road Investment Corporation was able to borrow against the future anticipated value of the improved land to obtain financing from the China Development Bank and commercial banks, pledging to sell off land parcels in the future, after the highway was completed, to meet debt service.

Source: Peterson (2006)

Given the importance of land-leasing to the fiscal capacity of cities and to urban infrastructure development, municipalities try to acquire as much land as cheaply as possible, then lease it at market rates, or use it as collateral for infrastructure loans, or provide it at below-market rates to strategic (mostly foreign) investors for industrial development. Municipalities acquire land in various ways. They can move municipal state-owned enterprises (SOEs) from central locations to the urban outskirts. They can acquire land from rural communes and convert it to urban use. Reportedly, a municipality’s price for leasing land for urban use vastly exceeds the acquisition price it pays to farmers, often by a factor as large as 50 to 60 times or more. A municipality can also acquire land in centrally located areas of rundown housing or small-scale businesses, upgrade the infrastructure, and sell land-leasing rights for redevelopment.

A closer look at the financing of the power sector

Reforms and the power sector financing chain

The expansion of power generation capacity in China has been truly remarkable—on average 15 GW of capacity has been installed every year since the mid-1980s, and as much as 30 GW on average every year since 1995. Between 2002 and 2007, China doubled installed generation capacity. It added over 100 GW of capacity in 2006 alone, and then added almost another 100 GW in 2007, to reach a total installed capacity of 713 GW.

Crucial reforms starting in the early/mid-1980s, paved the way for this impressive performance (see Box 40.4 for more detail on the phases of power sector reforms). The first was the decision to decentralize power generation and coal mining by taking it out of the centralized planning process and allowing new players to enter the fray with access to sources of capital outside the government budget. Second, special tariffs were introduced for new plants such that they could earn a guaranteed return on a cost-plus basis and coal prices were progressively deregulated. Third, the government very deliberately, albeit selectively, facilitated the access of emerging state-owned power generating companies to bond markets and to equity markets.

In the early phase of reforms, provincial and national SOEs, actively nurtured by the Ministry of Power as well as local governments eager to develop local industry, began investing their retained earnings into power generation on a commercial
basis. By the mid-1990s, reforms also induced several private (including foreign) investors to enter the market for power generation as commercially run IPPs. With the proliferation of players, the share of power generated by the central government (and its state-owned companies) has come down sharply over the years. The central government now accounts for about 40 to 45 per cent of power generated, split into five separate companies, each with a national footprint and access to equity markets through a listing on the stock exchanges. Thirty large provincial-level generating companies, also with access to equity markets, account for 10 per cent of generating capacity; and a handful of IPPs for another 8 per cent market share. The remaining 40 per cent of generating capacity is spread out widely over a large number of smaller provincial and sub-provincial companies (Figure 40.3).

The coal mining industry, the fuel source for more than three-quarters of the installed generation capacity of the country, has seen a similar evolution. In response to an acute shortage of coal, the previously state-controlled sector was thrown open to privately and collectively owned mines that were free to sell at market rates. Although there are a few central government—owned players of size that remain, the industry has become very fragmented with the entry of a large number of sub-national, and even community level enterprises, mining coal on a commercial basis. The top three state-owned coal companies, while of world scale, account for less than 15 per cent of domestic production (Rosen and Houser 2007).

**Figure 40.3: China—power sector market structure**

*Source: IEA, companies’ websites (2005 data), SERC 2007*
Box 40.4: Power sector reforms in China—financing and unbundling

China successfully diversified its funding sources for power investment away from state budgetary dependence in the mid-1980s, by partially decentralizing investment authority in the generation sub-sector. These early reforms in the power sector aimed to raise capital for capacity expansion to overcome the electricity shortages, by allowing local governments, state-owned industrial enterprises and private (including foreign) investors in power generation. To make it attractive, tariffs for new power plants were raised to cover costs plus a 12 to 15 per cent rate of return. In addition, a fee was added to end-user prices nationwide to raise capital for the newly established electricity construction fund, part of which enabled provincial governments or their financial companies to expand generation capacity. A wide range of special fees and charges were further collected by the state and local governments to finance various projects such as the Three Gorges hydro project construction. Meanwhile, the central government also began to raise its own investment capital from financial markets. Huaneng International was founded by the central government in 1985 to raise funds from international equity markets. The former Ministry of Electric Power Industry (MEPI) and its successor, the State Power Company, issued bonds in 1997 and 1998. The first Electricity Law was promulgated in 1995 to formally protect the interests of new investors. Thus emerged a number of power generators at local levels, characterized as the ‘periphery’, which supplemented the central government-controlled power companies or the ‘core’ (Zhang and Heller 2004).

The next stage of reforms was aimed at reducing the role of government in business. As part of these economy-wide reforms, the MEPI (along with a dozen other ministries) was dismantled in 1998. Its commercial functions were transferred to the State Power Corporation (SPC), which was created in 1997, and its administrative functions assigned to other government agencies. The SPC, like a holding company with generation and transmission assets, operated through its subsidiaries which were given more autonomy by the SPC. The system, however, began to experience conflicting interests and political complications in capacity development and power dispatch. In 1999, when a power surplus emerged after the Asian financial crisis, the SPC began experimenting with wholesale market competition on a very limited basis in six provinces. The experiment was unsuccessful as tensions between the ‘core’ and the ‘periphery’ developed due to parochial interests prevailing in power dispatch.

The third and current stage of reforms aims to create a competitive market. It also seems to have reasserted the central government’s control. The vertically integrated SPC was unbundled in 2002 and a separate regulatory authority was set up in 2003. The central government separated generation assets from transmission and distribution. Five national generator groups were set up, namely, Huaneng International Power, Datang Power, Huadian Power, Guodian Power and China Power Investment. Two grid companies were set up, the State Grid Company and the Southern Grid Company. The State Grid company has six regional grid subsidiaries. Under each regional grid company (and owned and controlled by the respective regional grid companies) there are a number of provincial electricity companies which own and operate their local transmission and distribution networks. The law guarantees open access to the transmission system but virtually no-one takes advantage of this provision. The provincial grid company remains the single buyer to
purchase electricity from the generators within the province and from other provincial grid companies. A national grid is being constructed and an incipient power market exists. Transmission activities have not been separated from distribution activities in the provinces, though accounting separation is to be introduced gradually (SERC, 2007). The provincial electricity companies remain responsible for supplying electricity to the end consumers through their branch local companies. They have monopolies over distribution and electricity sales within those areas (based on the 1996 Electricity Law). There are no provisions for third-party access on distribution networks, and distributors have no obligations to provide system service to others. The current stage of reforms aims to break up the industry and regional monopoly and to set up a competitive electricity market at the national level, but allowing consumers a choice of supplier will take time.

Figure 40.4 provides a schematic of the financing chain for the power sector. The Chinese government’s success in attracting a wide range of new players into the space has meant that enterprise-retained earnings have become the single-most important source of funding for fixed investment in the power sector overall. ‘Self-raised funds’ accounted for more than 40 to 50 per cent of the fixed investment funding requirements of the sector in 2006—these essentially comprise the retained earnings of the various enterprises (state-owned, private and foreign) that now operate in the sector. In addition to retained earnings, another 8 per cent of fixed investment funding requirements now come in directly as equity from foreign investors (as joint venture partners), or indirectly as equity from private (mostly foreign) investors in the stock markets. Domestic banks provide as much as 45 per cent of the funding needs in the form of debt.

![Figure 40.4: China—power sector financing chain (2006)](image)

**Source:** *China Statistical Yearbook*, Table 6 and Figure 7

(a) Effective user charges assume a 7.5% transmission & distribution loss; (b) Division of retained earnings into coal mining, power generating companies and grid companies is based on Figure 7; (c) Assume bond financing is now negligible.
Finally, although dependence on budgetary appropriations has diminished over time, they still contribute about 4 per cent of the fixed investment funding needs of the sector. In fact, since the early stages of the reform process, the government had introduced a number of special levies and surcharges on end-users to finance a national electricity fund as well as to support critical national initiatives such as the Three Gorges Hydroelectricity Project and the development of nuclear generating capacity.\(^{18}\)

Overall, diversification of funding sources has been key to the Chinese success in ramping up power generating capacity at the pace they have.

**Market structure and burden sharing**

Average end-user electricity tariffs in China are not high by international standards (Figure 40.5). At 5.9 cents per kWh,\(^{19}\) the weighted average end-user tariff in China is in fact just about the same level as in India. At the same time, as we have noted earlier, budgetary allocations to the power sector are modest—the budget contributes less than 5 per cent of the funding requirements for fixed investment in this sector, and there is no budgetary support for operating expenses of service providers. So the big question is: are end-user charges high enough to cover the full cost of investing in, and maintaining, the assets in this sector, or is it the case that consumers of power enjoy some degree of off-budget ‘hidden subsidy’?

![Figure 40.5: Electricity prices for households (US$ per kWh, 2005)](source: EIA and CEIC from NDRC Price Monitoring Center *2004 data.)

**Source:** Rosen and Houser (2007)
There is evidence to suggest that the full burden of development and maintenance is not absorbed by electricity consumers. All tariffs are determined by the NDRC, with input from local price bureaus and sub-national planning authorities. The NDRC tries to balance various competing interests in the tariff setting process, but as Figure 40.6 demonstrates, end-user tariffs have not kept pace with the recent escalation in the cost of coal. This implies that end-users of electricity in China do enjoy some level of hidden subsidy.

**Figure 40.6: Coal and electricity price growth**

(index of nationwide averages, January 2002=100)

Source: CEIC from China Statistical Yearbook, export coal price is used as a proxy for the spot market price.

It is not easy to pinpoint how rents are allocated across the electricity value chain. However, the evidence is that by and large Chinese coal mining companies and power plants are today self-financing and earning a reasonable return. Given that coal prices (except in rare circumstances such as the period of shortage in 2004 and 2007)\(^{20}\) are largely deregulated, and the price to grid suppliers is fixed on a cost-plus basis, coal mining companies as well as the power generating companies are able to achieve returns on equity that are reasonable (Table 40.7).\(^ {21}\)

The shock-absorbing seems to be provided by the as yet unbundled transmission and distribution (T&D) segment of the value chain. Unlike the coal mining and power generation segments of the chain, where the number and type of participants have been allowed to proliferate over the years, the government has reasserted centralized control over the T&D sector by creating two giant national utilities. The State Grid Corporation and the China Southern Power Grid are pretty much the only buyers of electricity from power generation companies and are the only distributors of electricity companies across the entire country.
Table 40.7: ROE for China’s publicly traded coal and power companies
(per cent)

<table>
<thead>
<tr>
<th>Company</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coal Mining</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China Shenhua Energy</td>
<td>54.3</td>
<td>61.5</td>
<td>30.5</td>
<td>29.5</td>
</tr>
<tr>
<td>China Coal</td>
<td>171.3</td>
<td>80.7</td>
<td>25.4*</td>
<td></td>
</tr>
<tr>
<td>Yanzhou Coal Mining</td>
<td>12</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Power Generation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPI</td>
<td>12.2</td>
<td>9.7</td>
<td>8.8</td>
<td>5.3</td>
</tr>
<tr>
<td>CRP</td>
<td>13.4</td>
<td>18.4</td>
<td>18.2</td>
<td>21.7</td>
</tr>
<tr>
<td>Datang</td>
<td>14.6</td>
<td>13.7</td>
<td>15.2</td>
<td>15.8</td>
</tr>
<tr>
<td>Huadian</td>
<td>11.0</td>
<td>10.8</td>
<td>9.5</td>
<td>9.1</td>
</tr>
<tr>
<td>Huaneng</td>
<td>15.7</td>
<td>13.4</td>
<td>15.2</td>
<td>14.3</td>
</tr>
<tr>
<td>Yangtze Power</td>
<td>15.3</td>
<td>15.2</td>
<td>13.7</td>
<td>17.4</td>
</tr>
<tr>
<td>SDIC Huanjing Power Co.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>31.0</td>
<td>18.2</td>
</tr>
</tbody>
</table>

*Estimates

Since 1998, the central government has been increasing investment in the grid and distribution systems in order to overcome the bottlenecks created from the breakneck pace of expansion in generating capacity. The central government has also been funding the renewal of the rural electrification grid.

There is some evidence that grid company revenues are not commensurate with what published rate tables with respect to end-user tariffs suggest. This is on account of rebates to, or non-payment from, end-users (Rosen and Houser 2007). Moreover, given the cost plus pricing structures for generators and end-user tariffs fixed by NDRC, the effective tariff received by the grid companies is residual. The financial situation of grid companies is, therefore, not clear. According to one source, in 2002, generating companies received around 66 per cent and the grid companies 34 per cent of total revenues from end-users. This did not leave enough revenue to allow grid companies to fund system expansion from retained earnings (SERC 2007).

What is clear is that at 4 per cent of revenues, the profitability of the T&D segment is the lowest of all segments of the electricity value chain (Figure 40.7). It is likely that the ROEs to this segment of the chain are also, therefore, depressed and lower than what a commercially motivated investor might expect.

Note: *Estimates

Source: Morgan Stanley; CLSA
In summary then, the structure of the Chinese power sector has evolved in a manner that has a distinct pro-generation and mining bias. These two segments of the value chain now seem to operate largely on commercial terms, receiving a market (or close to market price) as in the case of coal, or a cost-plus price as in the case of generators. However, end-users are still not bearing the full burden of costs involved in developing and maintaining the electricity value chain. Consumers of electricity still benefit from an implicit subsidy. The burden of providing this subsidy is not carried in full by the state budget. Budgetary contributions to the sector are intended only for fixed investment in the sector. So, in effect, government support is limited to providing a capital subsidy. The burden of these costs that are not passed through to the end consumer are absorbed largely by a central government owned T&D system. These costs are not severe enough to cause operating losses in the grid companies. They do, however, appear to depress the earnings of these companies and force them to accept less than commercial returns on the equity invested in them.

In terms of the vocabulary of the schematic in Figure 40.4, the story is as follows: user charges do not provide full cost recovery. The burden of the resulting subsidy must be shared between the grant provider, which is the government; the equity providers; and the debt providers. Debt is fully serviced, so that the banks are not really providing any subsidy. The equity financing portion is split into three components, corresponding to the three segments of the electricity value chain. Equity from the coal mining and generating sectors is largely in the form of retained earnings and third party investments—this equity is getting an adequate return and
so is not bearing any subsidy burden. The grant component from the government budget, financed from taxes, does defray some of the subsidy cost. Its contribution is limited to a relatively modest capital subsidy. The residual cost of the implicit subsidy to end consumers is borne then by the equity of the grid companies, not in the form of losses, but in the form of depressed returns.

A closer look at financing of roads

Expansion of road network

In terms of sheer pace of growth, the expansion of the Chinese road network has not been quite as torrid as that of its power generating capacity. China doubled the size of its road network (above village level) from 940,000 km in 1985 to almost 1,900,000 km in 2004 (Table 40.8). Of this, the share of ‘standard’ roads grew from 64 per cent to 82 per cent. There is no data available on China’s village road network before 2005. But by 2006, China had over 1.5 million km of village roads, making for a total road network of about 3.4 million km. Of this network, about 133,000 km or less than 4 per cent was classified as national roads; 7 per cent as provincial; and 89 per cent as county, township or village roads. Of the total network in 2006, 44 per cent was paved; the rest was unpaved (Tables 40.21 to 40.23).

In recent years, China has launched ambitious plans to build a national highway network. Since 1995, 40,000 km of expressways, and 35,000 km of what are called Class I highways have been built as part of the National Trunk Highway System (NTHS) and the National Expressway Network (NEN).

Table 40.8: Development of road infrastructure in China (in '000 km)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Express-ways</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
<th>Below Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>942.5</td>
<td>0.4</td>
<td>21.3</td>
<td>128.5</td>
<td>456.3</td>
<td>336</td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>1028.3</td>
<td>0.5</td>
<td>2.6</td>
<td>43.4</td>
<td>169.8</td>
<td>524.8</td>
<td>287.2</td>
</tr>
<tr>
<td>1995</td>
<td>1156.9</td>
<td>2.1</td>
<td>9.6</td>
<td>84.9</td>
<td>207.3</td>
<td>606.8</td>
<td>246.2</td>
</tr>
<tr>
<td>2000</td>
<td>1402.8</td>
<td>16.3</td>
<td>20.1</td>
<td>152.7</td>
<td>276.7</td>
<td>750.3</td>
<td>186.7</td>
</tr>
<tr>
<td>2004</td>
<td>1870.5</td>
<td>34.3</td>
<td>33.5</td>
<td>231.7</td>
<td>335.3</td>
<td>880.9</td>
<td>354.8</td>
</tr>
<tr>
<td>2005</td>
<td>3345.2</td>
<td>41.0</td>
<td>41.7</td>
<td>248.1</td>
<td>347.2</td>
<td>1461.9</td>
<td>1205.3</td>
</tr>
<tr>
<td>2006</td>
<td>3457.0</td>
<td>45.3</td>
<td>45.3</td>
<td>262.7</td>
<td>354.7</td>
<td>1574.8</td>
<td>1174.1</td>
</tr>
</tbody>
</table>

Source: Li (2005), *China Highway and Waterway Transport Statistics Yearbook 2006*

Institutional and financing arrangements

Interestingly, even for the development of national roads, including the roads under the NTHS and the NEN, the role of Ministry of Communications (MoC), which is the central government ministry in charge of road development, is restricted by and
large to planning and management. Construction and maintenance is the responsibility of sub-national governments. The MoC sets the alignment and the technical specifications of classified roads and administers the NTHS and NEN Fund, which is financed by the car purchase tax, a 10 per cent levy applied by the central government on the purchase of all new vehicles countrywide.

Budgetary contributions from the central government towards road building are not much larger than the proceeds collected from the vehicle purchase tax. These contributions are delivered to sub-national governments as a capital subsidy for the construction of national roads, especially those under the NTHS and NEN plans.

It is our understanding that only expressways and Class I and II roads are tolled. In other words, not much more than 10 to 12 per cent of the overall road network of the country is tolled. As of now, there does not seem to be any formulaic approach to tolling that is applied uniformly across the country. Tolls are fixed at the provincial level, specifically by the provincial pricing bureaus, but following consultations with the MoC.

The MoC sets guidelines for tolling. There does not seem at this time to be any provision for automatic inflation-linked adjustment of tolls. There are broadly two types of schemes for tolling. Under the first scheme, tolls are set just to cover the cost of debt servicing—once the debt is paid off, the tolls cease to apply. This scheme applies to expressways and/or other classified roads that are built by provincial state-owned construction companies.

The second scheme provides for tolls that allow commercial operation of the underlying road assets. This applies to road concessions (typically for 25 to 30 years) awarded on a BOT basis to private (including some foreign) investors. Toll rates that apply in such cases are high enough to cover debt servicing costs, but also to allow the operator to recover a reasonable return on their overall investment, including the capital cost of development.

There is no uniform national approach to how BOT projects are awarded, although the system is moving towards more transparent bidding. Provincial Communications Departments (PCDs), the sub-national equivalent of the MoC, typically accept financial and construction risks for new road projects through state-owned construction companies. When traffic levels begin to mature, generally over a three- to five-year period, the operating rights of these expressways are sold by the PCDs to private operators or the assets are securitized in the capital markets, in order to provide funding for new construction (Myers 2007). A small group of Hong Kong developers have bought road concessions of existing expressways and highways. Some of the concessions were awarded in the 1990s in Guangdong Province and the later ones are in Anhuai Province which is developing now (see Box 40.5).
Direct bank financing is available for road development, but is restricted to projects where there is a formal tolling arrangement. Such stretches of road are in fact much coveted assets for the banks. Typically, domestic banks follow the PBoC’s unwritten rule that loans may constitute no more than 65 per cent of construction costs and 35 per cent must be in the form of upfront capital. Generally, an expressway or Class I or II road with a formal tolling arrangement would be funded as follows: 10 to 20 per cent of the project costs from the central government in the form of a grant; 15 to 25 per cent of project costs through an equity contribution from a provincial level state-owned construction company; the remaining 65 per cent in the form of bank debt, secured against project cash flows.

Additional bank financing is available to the sector through provincial construction/development companies that may be able to borrow against their own corporate balance sheet and supplementary collateral such as the future value of land being developed in a particular project (see Box 40.3).

With limited support from the central government, and the limited footprint of commercial tolling, local governments have had to rely heavily on extra-budgetary means to finance road development. First, provinces have turned to pooling arrangements, whereby they levy tolls on a network of classified provincial roads in order to cross-subsidize other provincial-level road development. In effect, these tolls are in the nature of off-budget capital levies that finance dedicated road development funds at the provincial level.

Second, local governments, right down to the village level, are authorized to charge road maintenance fees (that are distinct from tolls) in order to cover the operations and maintenance of the road network under their care. Such fees are collected by dedicated agencies allowed to deploy the funds only for O&M—they do not form part of the local government budget.

**Box 40.5: Road King Infrastructure Limited**

Road King Infrastructure Limited is one of the leading highway investors and developers in China. Its core business is in the investment, development, operation and management of toll roads and property projects. It has a toll road portfolio of HK$6 billion, comprising 19 toll road and bridge projects spanning approximately 1,000 km in eight provinces of China. The company has expressways, and Class I and Class II highways, in its road portfolio. The toll road business contributes stable cash flow and profit to the group. The average daily traffic and toll revenue shows a healthy increase in toll revenues since 2002. To enhance the performance and management of the toll road business, the group disposed/shuffled portfolio of its roads projects.
Third, local governments have made effective use of their land assets to generate revenues for road development. Not only have sale of land-use rights in the form of long-term leases been used to generate revenues for development purposes, they have also been used as collateral for raising debt at the level of the local project company (Box 40.3 describes the example of the Changsha ring road development).

**The road financing chain**

Using the schematic in Figure 40.8 summarizing the financing chain for the Chinese road sector, some important observations emerge. Unlike the case of power, user charges cover a much smaller share of the full cost of developing and maintaining the country’s road network. As we noted earlier, tolls are applied on only 10 to 15 per cent of the road network, and most are not designed to cover the cost of capital, but only that of debt servicing. Although local governments are allowed to recover maintenance costs through extra-budgetary fees, there is still a very substantial implicit subsidy that the Chinese consumer of roads enjoys relative to a consumer of electricity. This is indeed as it should be (and is similar to the experience elsewhere in the world)—roads, by their nature, have more of a public goods character than electricity.

How is this subsidy financed? As in the case of the power sector, in roads too, bank debt is being fully serviced. Banks are, by and large, not funding the implicit subsidy to end users of roads. Likewise, the small number of private and foreign equity providers in the road sector do seem to enjoy a commercial return and therefore are not carrying the burden of the implicit subsidy either.

Some of the cost of the subsidy is borne by the state budget. Compared to the power sector, in the case of roads, budgetary contributions account for double the share of the sector’s funding requirements. But this grant component of overall sector financing is still only 10 per cent of funding requirements and is delivered only in the form of a capital subsidy.
The bulk of the burden of the implicit subsidy to end users of Chinese roads falls on providers of self-raised funds. Unlike in the power sector, where these funds comprise largely retained earnings of commercially oriented generating and mining companies, in the case of roads retained earnings are a very modest component of self-raised funds. Self-raised funds in the road sector consist primarily of the extra-budgetary revenues of local governments financed either through levies of different kinds, or through the sale of land use rights. There is no evidence of any large-scale ‘hidden’ borrowing by local governments. It follows that local governments are not running any meaningful operating losses on account of their road development activities—the levies they charge are sufficient for them to fund their capital outlay and to recover the cost of operating and maintaining the road network under their care. Conceptually, extra-budgetary funds can, therefore, be looked upon as the equity contribution of local governments. And the implicit subsidy to the end users of roads is, by deduction, being funded in large part in the form of sub-market financial return to this equity. This makes perfect sense—low financial returns notwithstanding, local governments presumably generate high economic rates of return on their investment in roads.

**Figure 40.8: China—highway sector financing chain**

*Source: China Highway and Waterway Transport Statistics Yearbook 2006, and interview with MoC.*

**Some comparisons with India**

In order to contrast China’s experience in infrastructure financing with that of India, we have, in Figure 40.9, attempted to construct the equivalent schematic for India as we did for China in Figure 40.2. Several noteworthy points emerge.
First, effective user charges for infrastructure services (i.e. user charges adjusted for rebates and non-collection) are much lower in India than they are in China. Hence, the subsidy to users of infrastructure services in India is significantly higher than in China. The most pertinent example is that of the power sector. The weighted average effective electricity tariff in China is an estimated 5.9 cents/kWh versus 4.0 cents/kWh in India. Assuming the costs per unit of electricity supplied are comparable in both countries, the subsidy that the Indian consumer of electricity enjoys is at least 1.5 times greater than in China (Table 40.9). In actual fact the differential in the subsidy is likely to be even larger because our hypothesis is that the Chinese electricity chain is more efficient than its Indian counterpart.

Figure 40.9: India infrastructure financing chain, 2006–07

Source: Planning Commission, 2006; Lall and Mohanty, 2007

Second, at 43 per cent, the share of budgetary contributions, and hence of the grant component in the infrastructure finance chain is more than 2.5 times higher in India than in China. This is a corollary to the fact that the subsidy enjoyed by the Indian end-user of infrastructure services is much higher than that given to her Chinese counterpart. By and large, Chinese providers of infrastructure services do not run any meaningful operating losses—O&M expenses are recovered through non-budgetary levies and surcharges applied at different levels of government. Budgetary allocations to the sector are then delivered essentially as a capital subsidy towards fixed investment in the sector. In the Indian case, again taking power as an example, infrastructure service providers are running large operating losses. So, only a part of budgetary allocations are used for capacity
expansion, the rest is used up to fund operating losses of state-owned service providers.

### Table 40.9: Effective electricity tariff in China and India—2004

<table>
<thead>
<tr>
<th>Category</th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Average tariff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>5.7</td>
<td>6.2</td>
</tr>
<tr>
<td>Commercial</td>
<td>9.0</td>
<td>11.7</td>
</tr>
<tr>
<td>Agriculture/irrigation</td>
<td>5.0</td>
<td>1.5</td>
</tr>
<tr>
<td>Industrial</td>
<td>5.9</td>
<td>9.0</td>
</tr>
<tr>
<td>Others</td>
<td>0.0</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td><strong>Effective tariff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic</td>
<td>0.6</td>
<td>25</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.4</td>
<td>8</td>
</tr>
<tr>
<td>Agriculture/irrigation</td>
<td>0.2</td>
<td>24</td>
</tr>
<tr>
<td>Industrial</td>
<td>4.2</td>
<td>35</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5.9</td>
<td>4.0</td>
</tr>
</tbody>
</table>

*Note:* Assures ATC losses of 7.5% for China and 40% for India

*Source:* Tables 40.24 and 40.25

Third, India is significantly more dependent on foreign debt financing for its infrastructure sector than China. On the other hand, China has managed to attract FDI to fund a greater share of their infrastructure financing requirements than India: 2 per cent versus virtually zero. The Chinese have also had greater success in tapping equity markets for infrastructure financing—third party equity funding as a share of total sector financing requirements was 6 per cent in China compared with an estimated 1 per cent in India. In India, as in China, little of the burden of the subsidy to end-users is borne by providers of debt or of third party equity capital.

Fourth, there is no equivalent in India of the funding source that is local governments’ extra-budgetary revenues deployed as equity in infrastructure projects in China. This makes the equity portion of the financing structure much larger (relative to the grant and debt portion) in China than in India—54 per cent of the sector’s funding was in the form of equity in China, versus 21 per cent in India. Despite this, the *average* return to equity providers in India does not seem much higher than in the case of China. However, unlike in China, there is a very large variation in equity returns across type of investor in India—private investors tend to enjoy a significantly higher rate of return than their state-owned counterparts (Table 40.10).
Table 40.10: Returns to power generation, transmission and distribution—China versus India

<table>
<thead>
<tr>
<th></th>
<th>China</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generation ROEs</td>
<td>14.5%–17%</td>
<td>19% (NTPC)–25% (Merchant)</td>
</tr>
<tr>
<td>Transmission ROEs</td>
<td>Paid on residual revenues after paying generators</td>
<td>12.5</td>
</tr>
<tr>
<td>Distribution</td>
<td>No theft, effective cost recovery, but single-digit ROE?</td>
<td>40% losses, very poor cost recovery, negative ROE</td>
</tr>
</tbody>
</table>

Source: IDFC; Company reports

Fifth, China seems to have made very effective use of state-owned land to unlock investible extra-budgetary resources for infrastructure. In India, neither public sector corporations nor municipal governments have been able to systematically monetize landholdings for infrastructure development.

Finally, the burden of the subsidy provided for end-users in China is widely distributed across a significant universe of SOEs and local government agencies in the form of sub-market returns to their equity contributions. In India, on the other hand, the burden of the subsidy is concentrated on the consolidated government budget and on the equity contribution of a small class of state-owned infrastructure service providers, such as the state-owned distribution companies and provincial generating companies that are running significant operating losses.

In essence, in China the subsidy implicit in the infrastructure financing chain is intended more to incentivize the creation of new capacity than to protect the end-user. In India, the subsidy is intended primarily to please end-users of infrastructure services, on the one hand, cover up for the inefficiencies and operating losses of state-owned service providers, on the other, and safeguard the superior returns to the equity of private investors in the space.

4. Institutional Arrangements

China has been able to raise the level and quality of its infrastructure services. Besides extending infrastructure facilities more widely, it has executed large, complex infrastructure projects of world quality in record time. In this section, we examine key aspects of China’s institutional arrangements that have made possible the provision of infrastructure services on such a scale.

Different nature of public sector enterprises

Infrastructure service provision is currently dominated by government departments and state-owned enterprises (both at the central and sub-national levels) in China.
as well as in India. But why is it that the Chinese government agencies and public enterprises are more successful? Their profitability and returns are reasonable, their implementation ability seems better and they are more dynamic. There are many instances where they seem to be ‘pushing the envelope’ to achieve their goals. In fact, at times the central government has had to ‘rein’ them in as their exuberance has almost led to ‘chaos’. For instance, decentralization led to hectic infrastructure building by local governments and their enterprises to the extent that sometimes overcapacity may have been created. In India, while there are some well performing public sector undertakings (PSUs) in the infrastructure space, they are vastly outnumbered by weak, run-down public utilities with the overall performance of these enterprises and agencies far behind those in the private sector and behind their counterparts in China.

A key difference is that in India PSUs and the bureaucracy operate in a framework that does not encourage risk-taking. So they are generally risk-averse. Indeed, the attitude seems to be that doing nothing is better than doing something wrong. The apparatus of the Chief Vigilance Commission (CVC), the Comptroller and Auditor General (CAG), and parliamentary oversight, together with the absence of an appropriate incentive system, has restricted entrepreneurial initiatives in PSUs and bureaucracy more generally.

Second, governments in a representative democracy such as India are subject to huge populist pressures. Thus, there is a tendency for PSUs (such as railways, water utilities) to get overstaffed and become vehicles for political patronage rather than effective suppliers of services to the general public.

In contrast, Chinese state-owned enterprises are actively encouraged to deliver results (that need not always be measured in financial terms) and take risks. The nature of political intervention is also different. The Party drives the economic agenda and uses the bureaucracy to deliver results. So, even though China has powerful energy firms, the government influences developments through informal channels by appointing the senior-most executive leadership of these firms. The Ministry of Personnel, which has the power of appointment and dismissal, is fully aligned with the interests and politics of the Communist Party (Rosen and Houser 2007). The heads of the enterprises, who are mostly industry professionals, also view their posts as stepping stones to powerful government positions. While the Party can shape industry in this manner, making industry leadership a political position (the chairmen of some of the largest energy companies hold a vice-minister rank), the system provides industry with a seat at the table in shaping policy (Rosen and Houser 2007).

Thus, the character of public sector organizations in China and India is quite different. In China, the incentives between the government and bureaucracy, and by extension, the management of state-owned enterprises seem aligned—the politicization of the government machinery turns out to be a good thing and effective.
for delivering results. In India, the relationship between government and bureaucracy seems more contentious. The politicization of the bureaucracy is in fact a corrosive phenomenon that undermines professionalism and performance.

**The need for independent regulation: Myth or reality**

Except for the power sector for which a State Electricity Regulatory Commission (SERC) was set up, the central government has not established a separate regulatory authority for any other infrastructure sub-sector in China (see Figure 40.10).

**China**

- Central Party Committee sets policy direction, long- and medium-term planning. National People’s Congress approves plans and mega-projects. The State Council formulates policy with the help of DRCs.
- National Development and Reform Commission formulates and implements plan/policy, coordinates across sectors and levels of government guidance and approves projects.
- Power, Coastal ports, Airports, Roads, Railways, Telecom.
- Tariff Regulation: Cost recovery principle of each generator, consumer tariff set by NDRC. Market determined. Provincial price bureau and approval by NDRC. Cost recovery principle for expressways set by provincial bureaus as per NDRC rules. Decided by MoR, Approved by NDRC and MoF.

**India**

- Line ministries formulate and implement plan/policy, No central coordinating agency across sectors and levels of government directly. Indirectly done by the Planning Commission.
- Power, Ports, Airports, Roads, Railways, Telecom.
- Tariff Regulation: Consumer tariff set by SERC. Tariff auth. of major ports & State Maritime Board for minor ports. Min. of Civil Aviation. Min. of Surf. Tran & Min. of Rural Dev.
- Tariff Regulation: Consumer tariff set by SERC. Tariff auth. of major ports & State Maritime Board for minor ports. Min. of Civil Aviation. Min. of Surf. Tran & Min. of Rural Dev.
- MII, TRAI.

**Figure 40.10: Regulatory and institutional arrangements in infrastructure sector**
In the case of highways, ports and airports, important development and allocative functions are carried out by the NDRC. Operational control of civil aviation remains with the Civil Aviation Authority of China (CAAC) and regulation of telecoms is with the Ministry of Information Industry (MII).

Even in the case of electricity, where there is a newly created regulatory body, it is not clear that it has been effective in any material way. The SERC’s functions are to promote and supervise market competition and issue licences to operators in the power industry. The commission is also responsible for development and implementation of electricity reforms (OECD 2005). However, it is not a very powerful body. The NDRC plans and approves energy projects and is responsible for tariff regulation (electricity tariffs as well as gasoline, diesel and natural gas pricing), setting industrial policy affecting the country’s energy-intensive firms, and for the achievement of energy efficiency targets (Rosen and Houser 2007). Other ministries are also involved: the Ministry of Land and Resources deals with resource extraction licensing and the Ministry of Commerce oversees energy import and export licences. The MoF has some decision-making powers relating to certain financial rules and cost standards, and the State-owned Assets Supervision and Administrative Commission (SASAC) exercises a supervisory role over state-owned enterprises (SERC 2007).

India, on the other hand, has separate regulatory bodies for telecoms, ports, power and is in the process of setting one up for petroleum and natural gas, coal and airports. For the power sector, because it is a concurrent centre-state subject, it has a national regulatory agency, the Central Electricity Regulatory Commission (CERC) as well as state-level agencies, State Electricity Regulatory Commissions (SERCs). In the case of ports, the Tariff Authority for Major Ports (TAMP) has been established.

In India, the approach of relying on public financing of infrastructure has clearly not worked in delivering satisfactory results. The Government of India has, therefore, decided to move towards greater private sector participation. Involvement of private players with a profit motive operating in sectors in which the rational industry structure is a monopoly or a duopoly necessitates regulation to protect the public interest. Regulation also becomes essential because the private players themselves need to be reassured that there is a level playing field vis-à-vis not only the incumbent government enterprises but also other private players. There is also a need for transparency and predictability of the ‘rules of the game’ for the private sector to be willing to invest in infrastructure. The independence of the regulatory authority is necessary so as to have an arms length relation between the government and its public enterprises in a hybrid system of public and private companies. In particular, tariff setting and collection
needs to be distanced from political influence. Confidence in the regulator is essential for impartially adjudicating potential conflicts. For all these reasons, India must set up strong regulatory authorities for infrastructure if it wants to attract private participation in a big way.

China has been able to get by without independent regulators because it has had no compulsions to bring in the private sector—the private sector has played a marginal role in China’s infrastructure development. With the public sector, in hybrid forms, dominating the infrastructure space there has been less of a need in China to have a separate regulator to adjudicate conflicts. So far, the government, as an enlightened owner, has on the whole been able to balance the need for infrastructure investment with the political sensitivities of setting tariffs and subsidies, without destroying the commercial basis of its infrastructure service providers. However, as state-owned enterprises become more commercially oriented (as in the case of power generators and coal mining), and as an increasing number of private players enter the infrastructure space (as in the case of roads), the need for independent regulation will grow even in China. Eventually, the country will need a mechanism to protect the interest of consumers from those of the government and its enterprises.

Coordination and implementation

The unique Chinese experience

Inter-jurisdictional and inter-ministerial coordination is crucial in executing infrastructure projects. In this context, the role of the NDRC is of crucial importance in China. Planning in China is an iterative, detailed bottom-up process. The Plan serves as an effective blueprint for the development of each region and is prepared by the NDRC, in consultation with sub-national levels of government. So, for example, if a port is to be built, the Chinese planning process has the virtue that it provides for the coordinated development, with appropriate involvement of all the organs of bureaucracy concerned, of ancillary infrastructure such as rail and road access to the hinterland.

Beyond its strategy, planning and policy formulation role, the NDRC also coordinates the implementation of the plans. Since several line ministries, institutions, and lower level governments are involved, providing a leadership role in implementation is crucial. The NDRC also visits local areas and carries out field investigations when issues arise or as part of monitoring implementation (Liu 2004). To implement the plan for the power sector, for example, the NDRC would coordinate with relevant central government agencies and local administrations to site new plants, determine equipment manufacturers, fuel types and suppliers, arrange for construction, facilitate all necessary approvals, and
allocate to a power sector enterprise. This role of NDRC that combines top–down
guidance with a trouble-shooting, coordination and clearing house functions has
greatly enhanced execution capacity. It is arguably what underlies China’s ability
to deal with complex cross-jurisdictional infrastructure initiatives very effectively

This is not to say that there are no problems. The planning process for
infrastructure development has not been able to prevent situations of periodic
excess supply followed by acute shortages. This has been particularly the case
with the country’s power sector where it has been argued that the problem lies
with the mismatch in the extent of price deregulation in different parts of the
electricity value chain. Thus, allowing cost-plus pricing for power generators, while
retaining strict control over the end-user prices charged by the transmission and
distribution companies meant that the growth in generating capacity got ahead
of investment in T&D networks, leading to bottlenecks in meeting consumer
demand for electricity (Ni Chun Chun 2006). Another case in point is power
outages resulting from coal prices being subjected to ad hoc price controls.25

China does have a second type of coordination problem, but its nature is very
different from the coordination problems of India. Whereas in India lack of
coordination leads to execution gridlock, in China the same leads to excess capacity.
There has been a traditional tension between the forces of centralization and
decentralization in China. Over-investment by enthusiastic local governments
is a repetitive phenomenon that is in good part responsible for China’s
macroeconomic cycles of periodic overheating, followed by a glut. Thus, for
example, in the most recent episode of overheating, unnerved by power shortages
in 2002–03, local governments invested furiously in power generating capacity.
China doubled its generating capacity in the space of five years from 2002 to 2007,
but an estimated 20 to 25 per cent of the installed capacity was ‘illegal’ in the
sense that these power plants were not part of the planning process and did not
receive central government approval—these plants may not conform to national
building standards and may have to remain idle for some time on account of
insufficient transmission/distribution capacity to evacuate the power they generate
(Lester and Steinfeld 2006).

**Execution gridlock, Indian style**

Planning and implementation has turned out to be woefully inadequate in India.
As an example, the addition of power capacity has lagged far behind the targets set
in the five-year plans. In the last three five-year plans, the shortfall has consistently
been of the order of 50 per cent (see Table 40.11). The actual installation of new
power generation capacity has been barely 3.5 GW on average a year (of which a dismal 2.5 GW of thermal capacity has been added yearly), so one cannot say that the Plan targets are too ambitious. There are many reasons cited for the shortfall from delays due to land acquisition and environment clearances, equipment availability, pipeline of projects not being ready—but in reality it comes back to the issue of inadequate planning and coordination.

Table 40.11: Power capacity addition during the five-year plans—actual versus target (GW)

<table>
<thead>
<tr>
<th></th>
<th>8th Five-Year Plan</th>
<th>9th Five-Year Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total power capacity addition</td>
<td>of which thermal</td>
</tr>
<tr>
<td>Centre</td>
<td>8.2</td>
<td>6.2</td>
</tr>
<tr>
<td>% actual to target</td>
<td>64%</td>
<td>74%</td>
</tr>
<tr>
<td>State</td>
<td>6.8</td>
<td>6</td>
</tr>
<tr>
<td>% actual to target</td>
<td>46%</td>
<td>67%</td>
</tr>
<tr>
<td>Private</td>
<td>1.4</td>
<td>1.2</td>
</tr>
<tr>
<td>% actual to target</td>
<td>50%</td>
<td>46%</td>
</tr>
<tr>
<td>Total</td>
<td>16.4</td>
<td>13.4</td>
</tr>
<tr>
<td>% actual to target</td>
<td>54%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Source: Planning Commission Five-Year Plans; MOP

The political dimension plays an important role in exacerbating the difficulties of coordination and implementation in India. The interplay between a federal constitutional structure and a multi-party system, in which coalition governments at the centre need to co-exist with opposition parties in various states, accentuates a culture of non-cooperation and confrontation.

The Indian Planning Commission is not able to play the same coordinating role that the NDRC so effectively discharges in the Chinese system. The Cabinet system of government, along with a weak PMO, seems to have contributed to increasingly complex and dysfunctional inter-ministerial interactions. As a result, decisions that require inter-ministerial cooperation proceed at a sclerotic pace, causing long delays in the implementation of infrastructure projects which remain mired in inter-ministerial wrangling: for example, between the Ministry of Power and the Ministry of Environment and Forest. The central government is increasingly using incentives too to induce better performance and service delivery—for instance, it is providing financial support conditioned on improving the power distribution system (the Accelerated Power Development Reform Programme), but with uncertain results.
5. ACCESS TO INFRASTRUCTURE

China’s rapid economic growth has witnessed an uneven distribution of benefits. Even though it has improved the lot of the poor overall, inequalities have widened between the rich and poor, between urban and rural populations, and between coastal and interior regions. How has it fared in the provision of infrastructure facilities to the widest range of population? It has a mixed record: China has achieved nearly 99 per cent access to electricity, and fairly high coverage of telecommunications (teledensity is relatively high in China at 63.4 per 100 population as against India’s 17.2 in 2006). But the road network to villages has been relatively poor. More seriously, it has fallen short of providing access to improved water supply and sanitation facilities for the large majority of the rural population. In what follows, we look more closely at access to electricity and roads, particularly in rural areas.

Rural electrification in China: A qualified success

Driven by decentralization and industrial demand, not household demand

Notwithstanding the government’s pro-urban bias, China has achieved almost universal household access to electricity. The number of people with no access to electricity was reduced from 245 million in 1979 to around 20 million, less than 2 per cent of the population by 2002. A substantial expansion of rural electrification made this possible (see Table 40.12). In twenty years, from 1978 to 1998, the share of electricity consumption at county or lower levels increased from 13.3 per cent to 40.5 per cent. The most rapid increase was during the decade 1987 to 1998, when rural electricity generation tripled (see Table 40.12)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rural capacity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15930</td>
<td>100</td>
<td>32090</td>
<td>100</td>
<td>44150</td>
</tr>
<tr>
<td>Small hydro</td>
<td>10660</td>
<td>67</td>
<td>15770</td>
<td>49</td>
<td>21080</td>
</tr>
<tr>
<td>Small thermal</td>
<td>2330</td>
<td>15</td>
<td>8180</td>
<td>25</td>
<td>14790</td>
</tr>
<tr>
<td>Diesel</td>
<td>2900</td>
<td>18</td>
<td>8060</td>
<td>25</td>
<td>7960</td>
</tr>
<tr>
<td>Renewable</td>
<td>40</td>
<td>0</td>
<td>80</td>
<td>0</td>
<td>320</td>
</tr>
<tr>
<td><strong>Rural generation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
<td>99</td>
<td>100</td>
<td>132</td>
</tr>
<tr>
<td>Small hydro</td>
<td>28</td>
<td>69</td>
<td>54</td>
<td>55</td>
<td>65</td>
</tr>
<tr>
<td>Small thermal</td>
<td>10</td>
<td>25</td>
<td>38</td>
<td>38</td>
<td>60</td>
</tr>
<tr>
<td>Diesel</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>7</td>
<td>7</td>
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<tr>
<td>Renewable</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: China Yearbook of Electricity Industry, 1999–2003

Note: *Total figures for 2000 constitute small hydro, small thermal and diesel only
The partial decentralization of responsibility for investment and operation of the electricity system in the mid-1980s gave a major thrust to rural electrification. Prior to 1979, the central government had largely ignored the development of rural electricity supply as it focused on providing power to meet the needs of industrialization. Whatever little capacity was built during the pre-reform period was by county communes and villages. But they were able to develop only small, mostly hydro local power stations which were unreliable due to seasonality, not connected to major grids, and were inefficient with high line losses. In the mid-1980s when local governments were empowered to build power plants and tariffs were adjusted, they expanded small thermal facilities in rural areas in order to meet the growing demand from township and village enterprises (TVE). Thus, even in rural areas, the provision of electricity was driven by industrial demand, not household demand. Only around 18 per cent of the rural electricity generated was for residential use as of 2002, whereas as much as 64 per cent was for industry (see Table 40.13).

Table 40.13: Main purpose of rural electricity usage

<table>
<thead>
<tr>
<th>Year</th>
<th>Industry Amount (billion kWh)</th>
<th>County level and below (%)</th>
<th>Agriculture, forest, herd fishing, water resource and others Amount (billion kWh)</th>
<th>County level and below (%)</th>
<th>Residential living Amount (billion kWh)</th>
<th>County level and below (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>174</td>
<td>59%</td>
<td>69</td>
<td>24%</td>
<td>51</td>
<td>17%</td>
</tr>
<tr>
<td>1994</td>
<td>200</td>
<td>60%</td>
<td>75</td>
<td>22%</td>
<td>61</td>
<td>18%</td>
</tr>
<tr>
<td>1995</td>
<td>225</td>
<td>60%</td>
<td>82</td>
<td>22%</td>
<td>71</td>
<td>19%</td>
</tr>
<tr>
<td>1996</td>
<td>243</td>
<td>59%</td>
<td>89</td>
<td>22%</td>
<td>78</td>
<td>19%</td>
</tr>
<tr>
<td>1997</td>
<td>254</td>
<td>58%</td>
<td>97</td>
<td>22%</td>
<td>85</td>
<td>20%</td>
</tr>
<tr>
<td>1998</td>
<td>268</td>
<td>58%</td>
<td>78</td>
<td>17%</td>
<td>94</td>
<td>20%</td>
</tr>
<tr>
<td>1999</td>
<td>293</td>
<td>59%</td>
<td>104</td>
<td>29%</td>
<td>102</td>
<td>20%</td>
</tr>
<tr>
<td>2000</td>
<td>347</td>
<td>61%</td>
<td>106</td>
<td>19%</td>
<td>114</td>
<td>20%</td>
</tr>
<tr>
<td>2001</td>
<td>387</td>
<td>62%</td>
<td>118</td>
<td>29%</td>
<td>122</td>
<td>19%</td>
</tr>
<tr>
<td>2002</td>
<td>465</td>
<td>64%</td>
<td>125</td>
<td>17%</td>
<td>131</td>
<td>18%</td>
</tr>
</tbody>
</table>

Source: China Electricity Yearbook 1994–2004

Urbanization gives a fillip to increased electricity access

The unprecedented acceleration of urbanization from the mid-1990s also led to increased household access to electricity. In China, the share of urban population in the total rose from 27 per cent in 1991 to 38 per cent in 2001, whereas in India the share of urban population barely grew from 26 per cent to 28 per cent over the
same period. Since 2001, urbanization has continued at a rapid pace in China, with an estimated urban population of 44 per cent in 2006.

**Grid connectivity extended to rural areas**

The central government introduced several programmes in the 1990s to expand rural electrification. But in the aftermath of the Asian Crisis in 1998, it became apparent that the excess supply of electricity in urban areas could not be transmitted to rural areas because of lack of rural connectivity to the grid. The centre’s main contribution was the integration of the electricity systems. From the second half of 1998, China began to implement a rural grid renovation programme, which not only connected rural supply systems to the grid but also reduced rural line losses to less than 10 per cent to 15 per cent. The costs were covered in the national electricity tariff and a unified tariff for urban and rural residents was established. It is estimated that by 2002, almost 80 per cent of rural electricity consumption was from the national power grid, with the rest generated locally (Peng and Pan, 2004).

**Rural electrification in India: Story of failure**

India, on the other hand, has not been as successful in providing its population access to electricity, particularly in the rural areas. Despite a strong political push and rapid pace of rural electrification from the mid-1960s (Fig.40.11), India’s record today is astonishingly poor.

![Figure 40.11: India—pace of rural electrification, 1947–2004](image)

**Source:** MOP (2005)

As of 31 March 2001 (the time of the last Census), the number of villages electrified was 5,08,515 or 87 per cent out of a total of 5,87,258 villages. But before 2005, village electrification meant that electricity was available to farmers at the farm gate and not necessarily to rural households. Indeed, as Table 40.14 shows, only 43.5 per cent of rural households had electricity in 2001.
Table 40.14: Household access to electricity in India

<table>
<thead>
<tr>
<th>All-India</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of households</td>
<td>53,692,376</td>
<td>138,271,559</td>
<td>191,963,935</td>
</tr>
<tr>
<td>Number of households having electricity</td>
<td>47,028,369</td>
<td>60,180,685</td>
<td>107,209,054</td>
</tr>
<tr>
<td>Percentage of households having electricity</td>
<td>87.59%</td>
<td>43.52%</td>
<td>55.85%</td>
</tr>
</tbody>
</table>

Source: Census of India, 2001

Rural electrification driven by irrigation in India

In India, rural electrification was driven by the need to power irrigation facilities. Emerging from the droughts of 1965–66 and 1966–67, there was an urgency to expand irrigation to ensure food security and so the strategy shifted from constructing large-scale long gestation irrigation projects to groundwater-based irrigation relying on tube wells. The tube wells required pumpsets to be powered, which necessitated the delivery of electricity to the farming sector (Lall and Rastogi, 2007). Thus, agricultural production, not household demand, underpinned village electrification in India (just as in China, it was industry, not households that were targeted). Electricity to farms was not metered in India in the 1970s and so the financial burden on state electric utilities started mounting as the share of irrigation in power consumption grew to 24 per cent (see Table 40.15).

Table 40.15: Category-wise power consumption in India, 2003–04 (per cent)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
<td>National</td>
<td>Rural</td>
<td>Urban</td>
<td>National</td>
<td>Rural</td>
</tr>
<tr>
<td>Domestic</td>
<td>12.6</td>
<td>10.7</td>
<td>8.8</td>
<td>11.2</td>
<td>14.2</td>
<td>15.2</td>
<td>10</td>
</tr>
<tr>
<td>Commercial</td>
<td>7.5</td>
<td>6.1</td>
<td>5.9</td>
<td>5.7</td>
<td>5.7</td>
<td>6.1</td>
<td>2</td>
</tr>
<tr>
<td>Irrigation</td>
<td>3.9</td>
<td>6.0</td>
<td>10.2</td>
<td>17.6</td>
<td>21.7</td>
<td>24.2</td>
<td>24</td>
</tr>
<tr>
<td>Industrial and others</td>
<td>74.0</td>
<td>77.2</td>
<td>75.1</td>
<td>65.5</td>
<td>58.4</td>
<td>54.5</td>
<td>15</td>
</tr>
<tr>
<td>of which: industrial</td>
<td>62.6</td>
<td>69.4</td>
<td>67.6</td>
<td>58.4</td>
<td>51.7</td>
<td>47.5</td>
<td>n.a.</td>
</tr>
<tr>
<td>Total</td>
<td>98.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>51</td>
</tr>
</tbody>
</table>

Source: 17th Electric Power Survey of Central Electricity Authority

*Calendar year

Unlike in China where the government connected rural households to the grid, the Indian government did not go the last mile by taking electricity to the households in the village. Now, the government’s goal is ‘Electricity for all by 2010’. But there is an important difference in the way the two countries went about providing rural electricity, which may go a long way in explaining their...
relative success. In China, while the government provided grid connectivity to the rural areas, it charged rural households for electricity—in fact, rural residential consumers had to pay the same price as urban households. In India, political interference in rural infrastructure provision has had deleterious results. Free electricity was extended to a privileged group of farmers and villagers, 29 metering was discontinued, State Electricity Boards (SEBs) started running heavy losses over the years, and the vast majority of the rural population were precluded from getting electricity as the SEBs had neither the resources to, nor interest in, electrifying areas where their losses were doomed to rise. Budgetary resources are allocated to meet operating losses of the SEBs with no room left to provide the needed capital subsidy to extend electrification. Unfortunately, this vicious circle has been difficult to reverse.

Rural roads

The Chinese government seemed to have neglected the development of rural roads until the early 2000s. In contrast to the remarkable development of expressways which grew at an average annual rate of 44 per cent between 1988 and 2002, the length of low quality, mostly rural roads increased very little, by only 3 per cent per year over the same period (Fan and Chan-Kang 2005). Rural roads in China (i.e. roads below Class IV) were only 34 per cent of total road length in 2006 (Table 40.16). Lack of funds was a factor restricting the development of the rural highways programme (Dong 2004). But in recent years, the Chinese have given a major push to rural roads. 30

<table>
<thead>
<tr>
<th>Year</th>
<th>Total (’000 km)</th>
<th>Express-ways</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
<th>Below Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>1985</td>
<td>942.5</td>
<td></td>
<td>0.4</td>
<td>21.3</td>
<td>128.5</td>
<td>456.3</td>
<td>336</td>
</tr>
<tr>
<td>1990</td>
<td>1028.3</td>
<td>0.5</td>
<td>2.6</td>
<td>43.4</td>
<td>169.8</td>
<td>524.8</td>
<td>287.2</td>
</tr>
<tr>
<td>1995</td>
<td>1156.9</td>
<td>2.1</td>
<td>9.6</td>
<td>84.9</td>
<td>207.3</td>
<td>606.8</td>
<td>246.2</td>
</tr>
<tr>
<td>2000</td>
<td>1402.8</td>
<td>16.3</td>
<td>20.1</td>
<td>152.7</td>
<td>276.7</td>
<td>750.3</td>
<td>186.7</td>
</tr>
<tr>
<td>2004</td>
<td>1870.5</td>
<td>34.3</td>
<td>33.5</td>
<td>231.7</td>
<td>335.3</td>
<td>880.9</td>
<td>354.8</td>
</tr>
<tr>
<td>2005</td>
<td>3345.2</td>
<td>41.0</td>
<td>41.7</td>
<td>248.1</td>
<td>347.2</td>
<td>1461.9</td>
<td>1205.3</td>
</tr>
<tr>
<td>2006</td>
<td>3457.0</td>
<td>45.3</td>
<td>45.3</td>
<td>262.7</td>
<td>354.7</td>
<td>1574.8</td>
<td>1174.1</td>
</tr>
</tbody>
</table>

Source: Li (2005), *China Highway and Waterway Transport Statistics Yearbook 2006*

*The series is discontinuous: The data on rural roads is included only starting 2005

In India, on the other hand, substantial resources have been allocated to rural roads driven by political compulsions of winning the rural vote (Figure 40.12 and Table 40.17). As a result, almost 80 per cent of total road length now comprises other...
district and rural roads (ES 2007–08). Of course, the quality of the roads is questionable. Often earthen tracks and gravel roads did not conform to technical norms of compaction, drainage and geometrics, so the roads that were built were hardly all-weather roads (Lall and Rastogi 2007). Accordingly, India’s Pradhan Mantri Grameen Sadak Yojana (PMGSY), launched in December 2000, has been concentrating on providing all-weather connectivity to all the villages with tighter technical specifications and using modern building construction techniques to build rural roads.

![Figure 40.12: India—construction of rural roads, 1950–2005](image)

**Source:** Basic Road Statistics, Road Development Plan Vision: 2021

But once again, there is a clear difference between the two countries in financing and participation. Villagers in India do not pay any direct or indirect taxes, whereas in China villagers have been paying local transport levies and contributing free labour and local material for construction of roads.

**Table 40.17: India—progress of road network**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National highways</td>
<td>22</td>
<td>24</td>
<td>24</td>
<td>32</td>
<td>34</td>
<td>58</td>
<td>67</td>
</tr>
<tr>
<td>State highways</td>
<td>45</td>
<td>62</td>
<td>70</td>
<td>95</td>
<td>127</td>
<td>132</td>
<td>132</td>
</tr>
<tr>
<td>Other roads (incl district roads, village roads, etc.)</td>
<td>333</td>
<td>429</td>
<td>821</td>
<td>1358</td>
<td>2166</td>
<td>3010</td>
<td>3101</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
<td><strong>515</strong></td>
<td><strong>915</strong></td>
<td><strong>1485</strong></td>
<td><strong>2327</strong></td>
<td><strong>3200</strong></td>
<td><strong>3300</strong></td>
</tr>
<tr>
<td>Surface roads</td>
<td>156</td>
<td>234</td>
<td>398</td>
<td>684</td>
<td>1090</td>
<td>1600</td>
<td></td>
</tr>
</tbody>
</table>

**Source:** Basic Road Statistics, Road Development Plan Vision: 2021
In sum, despite China’s pro-urban bias and India’s ostensible village-oriented infrastructure development, China’s record on inclusiveness has been better than India’s. It is also more sustainable as it is based on user charges that, by and large, meet operating costs, whereas India’s provision of infrastructure services in rural areas is heavily, if not totally, subsidized.

6. Environmental Impact and Policies

Power sector: The biggest polluter

The dominance of coal-based power generation has caused greater environmental damage than any other industry in China (Table 40.18 and Figure 40.13). As a result, China is now the largest source of sulphur dioxide emissions in the world and the power sector is responsible for a large share of the sulphur dioxide, nitrogen oxide and carbon dioxide emissions. In fact, China will soon overtake the United States as the largest emitter of carbon dioxide from fossil fuels. While per capita greenhouse gas emissions are still low, the power sector is China’s largest source of these emissions (OECD 2006). In China, between 1990 and 2005, CO\textsubscript{2} emission from thermal power plants as a share of total CO\textsubscript{2} emission in the country increased from 29 per cent to 40 per cent (Figure 40.13). Besides airborne pollutants, thermal power generation, which requires large amounts of process water, is also contributing to severe water shortages and deterioration in many parts of the country. China discharges huge amounts of solid waste each year from thermal plants.

Table 40.18: China and India—installed power capacity and output generated by fuel source

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed capacity, GW</td>
<td>135</td>
<td>217</td>
<td>357</td>
<td>508</td>
</tr>
<tr>
<td>Total output (GWh)</td>
<td>568</td>
<td>944</td>
<td>1675</td>
<td>2407</td>
</tr>
<tr>
<td>Hydropower (%)</td>
<td>22.3</td>
<td>20.2</td>
<td>17.2</td>
<td>16.5</td>
</tr>
<tr>
<td>Thermal power (%)</td>
<td>77.7</td>
<td>78.5</td>
<td>81.1</td>
<td>81.3</td>
</tr>
<tr>
<td>o.w. coal (%)</td>
<td>n.a.</td>
<td>n.a.</td>
<td>77.2</td>
<td>78.7</td>
</tr>
<tr>
<td>Nuclear power (%)</td>
<td>0</td>
<td>1.4</td>
<td>1.6</td>
<td>2.2</td>
</tr>
</tbody>
</table>

Source: SERC (2007); Statistical Yearbook (2007); OECD/IEA 2008
India

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed capacity, GW</td>
<td>66</td>
<td>83</td>
<td>108</td>
<td>118</td>
</tr>
<tr>
<td>Total output (GWh)</td>
<td>264</td>
<td>380</td>
<td>533</td>
<td>618</td>
</tr>
<tr>
<td>Hydropower (%)</td>
<td>27.1</td>
<td>19.1</td>
<td>12</td>
<td>16.2</td>
</tr>
<tr>
<td>Thermal (%)</td>
<td>70.5</td>
<td>78.8</td>
<td>84.1</td>
<td>80.1</td>
</tr>
<tr>
<td>o.w. coal (%)</td>
<td>67.4</td>
<td>72.1</td>
<td>73.1</td>
<td>69.2</td>
</tr>
<tr>
<td>Oil (%)</td>
<td>0.0</td>
<td>0.2</td>
<td>1.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Gas (%)</td>
<td>3.1</td>
<td>6.6</td>
<td>9.9</td>
<td>10.0</td>
</tr>
<tr>
<td>Nuclear power (%)</td>
<td>2.3</td>
<td>2.1</td>
<td>3.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Wind power (%)</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: IEA and CMIE

Figure 40.13: CO₂ emission from thermal power plants and power generation


The total cost of air and water pollution in China in 2003 was estimated between 2.7 per cent of GDP and 5.8 per cent of GDP (World Bank 2007). Air pollution poses a large health risk in urban areas, whereas the burden of polluted water falls disproportionately on rural citizens, up to two-thirds or 500 million of whom do not have access to piped water (World Bank 2007). Northern China, which has 80 per cent of the coal and some of the most seriously polluted water basins, bears a double burden from air and water pollution. In fact, environmental pollution falls disproportionately more on the less economically advanced parts of China, which have a higher share of poor population.

Attempts to control pollution

China’s growth strategy has taken a significant toll on the environment. Decentralisation of power generation and deregulation of coal mining in the 1980s, while increasing investment and production, contributed in large part to the
environmental degradation. Thousands of small village-collective and individually-run coal mines that used inefficient, severely polluting technology sprang up. The government then attempted to close down smaller, mainly private mines which did not comply with environmental standards and to consolidate the coal industry. It is not clear to what extent mines were actually closed. Official statistics show a sharp decline from 1996 to 2000 in coal-based energy output and then a sharp rise, which may simply reflect false reporting by local governments (Naughton 2007). As part of the consolidation drive, the central government formed Shenhua in 1995, which has since become the largest coal producer in the world. The government also imposed taxes on land use and the environment as well as introduced a bidding system to secure coal which, in effect, screens out the smaller operators. As a result, the share of large mines is gradually increasing, although even now there are as many as 25,000 enterprises, with the top 10 producers accounting for less than 30 per cent of the market. Large-scale mining will enable investment in more efficient pollution-control technologies.

Similarly, there has been a major move to upgrade the power sector and reduce the share of small-scale, inefficient coal-burning plants. Relatively large-size plants—of 300 MW or more—have increased their share in total capacity from 17 per cent in 1990 to around 40 per cent today. Since 2002 all new, expanded or retrofitted coal plants are required to install desulphurisation equipment. The government in its White Paper on Energy (December 2007) states that such plants are now 30 per cent of all thermal plants, up from 2 per cent in 2000.

The government is taking several other measures to curb environmental pollution. These include stricter environmental standards, the switch to alternative technologies and energy saving devices, demand-side management (DSM) and diversifying the sources of energy, especially renewable energy.

Legislation introduced in 2003 significantly increased penalties for the emission of air and water pollutants. Yet, pollution fees do not cover the cost of pollution control. Observers claim that the problem is not China’s environmental laws—many of which are adopted from the best European legislation—but in their lax enforcement. When incentives are weighed heavily towards economic growth, environmental issues would surely be relegated to lower priority by local governments. The effectiveness of the State Environmental Protection Agency (SEPA) and poorly funded local Environmental Protection Bureaux (EPBs) has been hindered by intervention from other agencies. In a move to strengthen the environmental agency, the government has recently created a new Environment Ministry (March 2008) by upgrading the status of SEPA.

The Chinese have made some use of DSM, albeit limited. The main area of focus has been load management, which has used time of use (TOU) pricing, interruptible
tariffs, and deployment of energy storage (cooling and heating). By these means, the Chinese were able to reduce peak loads and shift use from peak to off-peak periods. But while government action reduced peak load by over 10 GW in selected provinces in 2003, only 30 per cent was due to DSM and the rest was due to energy rationing imposed by government orders, request or advice to modify schedules (World Bank 2005).

Diversification of energy sources—is there any hope?

Whilst all the above types of measures will have some effect and must be pursued, the greatest impact could be if China diversified away from coal to using other fuel sources. China’s heavy reliance on coal stands out in international comparisons. The world excluding China depends much less on coal (only 21 per cent) than China does (Naughton 2007). About 40 per cent of world energy consumption is based on the relatively ‘clean’ technologies based on natural gas, nuclear and hydropower. The US, which consumes a quarter of the world’s energy, draws from diversified fuel sources. France relies on nuclear power for almost 40 per cent of its energy, while Russia draws on its huge natural gas reserves for over 50 per cent of its energy. Only India comes anywhere close to China’s reliance on coal.

Indeed, China’s recent long-term policy shift to diversify fuel sources has assumed growing importance in controlling environmental pollution. Larger hydropower, long distance lines to transmit it, and nuclear and gas-fired power plants have been planned. China is gearing up to become a large-scale energy importer. The government is also making a big push to increase the use of renewable energy (see Box 40.6). Notwithstanding China’s determination to diversify, it is likely that coal will continue to dominate, given China’s vast coal reserves.

The Eleventh Five-Year Plan (2006–10) aims to reduce energy intensity by 20 per cent.36 But after two decades of declining energy intensity, there has been a reversal in the trend as the growth of heavy industry rises. And with per capita consumption of electricity still at around developing country levels, it will surely rise in coming years, straining the government’s capacity to control emissions. It is projected that electricity output may quadruple over the next 20 years or so. This would imply that even with significant productivity improvement, coal output would at least double over this period.

China has become the second-largest coal consumer in the world and it is predicted that coal may continue to account for between 60 per cent and 70 per cent of generation capacity in 2020 (China Energy Development Strategy and Policy Research Group, 2004). For this reason, the power sector is—and may continue to be—the largest emitter in the near future, of some of the most prominent pollutants in China.
Box 40.6: Renewable energy in China

China is keen to develop her renewable sources of energy (wind, solar and biomass). In 2005, the Renewable Energy Promotion Law was enacted giving priority to renewable electricity (connection to grid, preferential price, and public sharing of costs). Estimates of actual installed capacity and consumption of renewables vary, and it is difficult to verify since much of it is off-grid, but it may be around 7 per cent. The ‘Medium and Long-term Development Program’ of NDRC aims to increase renewable energy to 10 per cent of total energy consumption by 2010 and 15 per cent by 2020. It is likely that China will meet and even exceed its renewable energy development targets for 2020. Total power capacity from renewables could reach 400 GW by 2020, nearly triple the 135 GW existing in 2006, with hydro, wind, biomass, and solar PV power making the greatest contributions.

Since the last couple of years, China is trying to use as much solar power as possible, especially for heating purposes. As it is off-grid (200–300 MW by 2005), this energy is not reflected in the statistics. The central government gave grants and preferential loans to enterprises for solar energy pilot projects (using photo voltaic cells) in the remote areas of China. The government allows wind farm equipment to be imported without customs tariff and VAT on wind power generation. On grid tariff from wind power, generators are allowed double the normal tariff. The government is also encouraging biomass energy, including development of ethanol, bio-diesel, methane and bio-mass power generation.

China has a strong commitment to becoming a world leader in renewables manufacturing. Already, China is a global manufacturing powerhouse for solar PV, third only to Japan and Germany, with huge investments in recent years. China is the world’s largest market for solar hot water, with nearly two-thirds of global capacity. The country’s 40 million solar hot water systems mean that more than 10 per cent of Chinese households rely on the sun to heat their water. China is now also one of only a few countries capable of mass production of wind turbines.

Lessons for India

The Indian power sector is also heavily dependent on coal (Table 40.18). But due to lack of coal sector reforms, it has not exploited its coal on as large a scale as yet. Going forward, therefore, there is an opportunity to learn from China’s experience. Large-scale coal mining with improved technology is necessary in such an hazardous industry. Thus, India must open up the sector to experienced private operators, ensure transparent, competitive bidding for coal blocks, and introduce appropriate pricing. The announcement of a coal regulator is a positive step in this regard. Centre-state tensions over revenue-sharing from resource extraction also need to be resolved. In order to reduce air and water pollution emanating from coal mining and coal-based thermal power plants, India must forcefully implement strict environmental standards while ramping up its power generation capacity.
It must also rely on improved pricing for DSM, an aspect that China has not emphasized as much. China has mainly relied on load management rather than end-use energy efficiency. International experience has shown that DSM can improve energy efficiency significantly, result in dramatic savings and address power shortages.

Finally, India also needs to follow through in continuing to provide adequate incentives to develop renewable sources of energy as well as for research and development (see Box 40.7 for a summary status of renewable energy in India).

**Box 40.7: Renewable energy in India**

Renewable energy is an important element in India’s power policy aimed to meet the needs of remote areas in an environmentally sustainable manner. India is the first country to have a separate ministry for developing and promoting non-conventional energy sources in the country (MNRE). The major sources of renewable energy are wind, solar, biomass and small hydro-electric power plants (size less than 25 MW). Whereas many small plants in remote areas are standalone, a few plants are captive and some are grid-connected systems. In the past few years, total grid-connected installed capacity has grown to 10,813 MW (7.8 per cent of total installed capacity) in 2007 compared to 1,628 MW (1.6 per cent of total installed capacity) in 2001.

Besides growing power deficits and the worldwide focus on greenhouse gas emission, the opportunities offered by carbon trading have pushed private entrepreneurs to invest in renewable energy plants in India. Wind energy has been the most popular. A package of financial and fiscal incentives which mainly includes 80 per cent accelerated depreciation, concessional customs duty on specified items and tax exemption for 10 years gave a push to wind energy in the country. In addition, grid-connected wind power enjoys preferential tariffs in almost all the states in India and the Electricity Act provides for SERCs to fix a minimum percentage of energy purchase from renewable sources. Generation and distribution of renewable energy is encouraged in notified rural areas without any need for obtaining a licence from SERCs. Moreover, as a further incentive, the Indian Renewable Energy Development Agency provides concessional funds to renewable energy projects.

Whilst wind energy has been the most exploited, solar photo voltaic (SPV) power, which is mainly used in lighting, water pumping and battery charging in remote rural areas, has hardly been exploited. Technological advances have brought down the costs significantly globally. Given the huge potential it offers in India and the need to electrify vast remote off-grid areas, some amount of government subsidy could play a crucial role in helping it to take off. Probably the first solar energy-based grid connected system will come on stream in 2009. Biomass energy is used both in standalone and grid-connected mode for combined heat and power co-generation. The central government has been promoting small hydro off-grid power generation in remote areas of the country.
### Existing % share of Potential (MW) total power (MW)

<table>
<thead>
<tr>
<th>Installed capacity of renewables</th>
<th>Existing (MW)</th>
<th>% share of total power</th>
<th>Potential (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Of which: wind</td>
<td>7,660</td>
<td>5.4%</td>
<td>45,000</td>
</tr>
<tr>
<td>Bio-mass</td>
<td>1,178</td>
<td>0.8%</td>
<td>19,500</td>
</tr>
<tr>
<td>Small hydro*</td>
<td>1,975</td>
<td>1.4%</td>
<td>15,000</td>
</tr>
<tr>
<td>Solar PV</td>
<td></td>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td>Total power capacity</td>
<td>141,080</td>
<td>100%</td>
<td>129,500</td>
</tr>
</tbody>
</table>

**Note:** As of January 2008

**Source:** India Infrastructure Research—Renewable Energy Development, 2007

7. **Conclusions and Key Lessons**

**Infrastructure financing**

Effective user charges to end-users of infrastructure services in India are significantly lower than in China, implying that the subsidy buried in the infrastructure finance chain is considerably greater in India than in China. The degree of subsidization from the banking system seems limited in both countries—the debt is being serviced by borrowers and asset quality in the banks does not appear to be deteriorating on account of lending to infrastructure.

Budgetary allocations to infrastructure are significantly smaller (relative to funding needs) in China than India. In fact, the government budgetary contribution to the sector is limited to capital subsidies for fixed investment. By and large, costs of both capital expenditure and operating expenses are recovered by local governments and their agencies through extra-budgetary levies and sales of land lease rights.

The importance of extra-budgetary revenues for local governments is huge, so the effective tax burden is much higher than budgetary numbers would suggest. Many of these extra-budgetary resources are dedicated funds at different levels of government and comprise in good part proceeds from the sale/development of local government-owned land. This stream of revenue provides the bulk of the equity invested in the sector. The implicit subsidy to the consumer is therefore paid, not through the budget, not through the banks, not through accumulating losses, but through a sub-market return on the equity contribution of a range of state-owned enterprises and agencies engaged in the infrastructure value chain.

In comparison, in India, the tax-funded government budget bears the brunt of the burden of subsidizing the end use of infrastructure services. Little effort is made to monetize government land holdings for the purpose of raising resources for infrastructure development. Government spending generally goes as grant without effective cost recovery and may not even earn positive returns. Budgetary
expenditures are allocated to funding losses and there are large subsidies to a certain class of users, so investment from state-owned agencies involved in infrastructure service delivery earns low to negative returns. On the other hand, the private sector equity providers earn superior returns.

In essence, in China the subsidy implicit in the infrastructure financing chain is intended more to incentivize the creation of new capacity than to protect the end-user. In India, the subsidy goes towards pleasing end-users of infrastructure services, on the one hand, covering up for the inefficiencies and operating losses of state-owned service providers, on the other; and safeguarding the superior returns to the equity of private investors in the space. This results in a huge strain on fiscal health, creates commercially unsustainable delivery systems, and leads to systematic underinvestment in infrastructure.

The big lesson for India from the Chinese experience with infrastructure finance is: a) to find a better balance between user costs and subsidies; b) to explore more creative and commercially sustainable ways of using state-owned enterprises to deliver services at possibly modest financial rates of return, but high economic rates of return, and, c) to explore more sources of investible public funds, notably from the sale/development of land owned by municipalities and government agencies.

The institutional framework

The institutional framework in China is highly effective in delivering projects speedily and within cost. While much of the planning is centralized, the construction as well as operations and maintenance take place at the provincial level or below. Thus, a high degree of coordination is required. The Plan is a very important device to make that coordination happen. For instance, a substantial part of the Plan is sufficiently detailed to cater to the development of ancillary infrastructure requirements, such as hinterland development of ports. Underlying the Plan is, in effect, a blueprint for a particular region. Inter-ministerial coordination is more effective than in India, arguably on account of the unique role played by the NDRC. Although China has managed without recourse to independent regulators, as state-owned infrastructure providers become more commercial in nature, the need for regulation will become unavoidable.

Given the much more active role of profit-seeking private players in the infrastructure space, India cannot do without strong and truly independent regulators, some of whom are beginning to make their presence felt. India, on the other hand, has a huge challenge in improving its governance and decision making framework which is hobbled by inter-jurisdictional and inter-governmental wrangling and complicated by the country’s federal structure and dependence on coalition politics.
Access to infrastructure

Despite China’s pro-urban bias and India’s ostensible village-oriented infrastructure development, China’s record on inclusiveness has been better than India’s. Notably, whilst China has been successful in providing almost universal household access to electricity, India has not. Similarly, on roads, while China was a laggard in the development of its rural road network, it has made important recent strides to providing reliable connectivity to rural households. India has embarked on important recent initiatives to deliver on greater access to infrastructure services, but it is too early to assess the results.

One lesson is however very clear: China’s initiatives at developing inclusive infrastructure are likely to be more sustainable as they are based on user charges that, by and large, meet operating costs. In India, however, provision of infrastructure services in rural areas is heavily, if not totally, subsidized.

The environment

The rapid growth of China’s infrastructure and, in particular, its heavy reliance on coal for meeting energy demand has resulted in serious adverse environmental and social consequences. India, too, relies significantly on coal for power generation, but as yet has not exploited it on as large a scale. This is an opportune time to draw lessons from the Chinese experience to exploit coal in a better manner using superior technology. One way is to develop large-scale mines with ancillary infrastructure to wash, treat, and transport the coal using improved technologies. Power plants also need to be encouraged to equip themselves with the requisite pollution control technology, for which appropriate incentives may be provided by the government as China is doing now. Second, unlike China, India may still have an opportunity to focus on DSM to forge for itself a somewhat less energy-intensive growth path in the coming years. This has implications for fuel pricing. Finally, India must pursue a focused policy of encouraging the development of renewable energy.

Rajiv Lall, Ritu Anand and Anupam Rastogi

REFERENCES

5. CEA. 2007. *17th Electric Power Survey*
37. Planning Commission—Ninth and Tenth Five-Year Plans


## ANNEXURE

### Table 40.19: India—macroeconomic indicators

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Real GDP (%) (% of GDP)</td>
<td>4.4</td>
<td>5.8</td>
<td>3.8</td>
<td>8.5</td>
<td>7.5</td>
<td>9.4</td>
<td>9.6</td>
</tr>
<tr>
<td>Gross Domestic Savings</td>
<td>23.7</td>
<td>23.5</td>
<td>26.4</td>
<td>29.8</td>
<td>31.8</td>
<td>34.3</td>
<td>34.8</td>
</tr>
<tr>
<td>Of which</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household sector</td>
<td>21.60</td>
<td>22.15</td>
<td>23.19</td>
<td>24.35</td>
<td>23.05</td>
<td>24.22</td>
<td>23.80</td>
</tr>
<tr>
<td>Pvt corporate sector</td>
<td>3.85</td>
<td>3.38</td>
<td>3.86</td>
<td>4.38</td>
<td>6.56</td>
<td>7.50</td>
<td>7.78</td>
</tr>
<tr>
<td>Public sector</td>
<td>-1.75</td>
<td>-2.03</td>
<td>-0.65</td>
<td>1.07</td>
<td>2.19</td>
<td>2.58</td>
<td>3.22</td>
</tr>
<tr>
<td>GDCF</td>
<td>24.3</td>
<td>22.9</td>
<td>25.2</td>
<td>28.2</td>
<td>32.2</td>
<td>35.5</td>
<td>35.9</td>
</tr>
<tr>
<td>Government revenue</td>
<td>19.7</td>
<td>19.1</td>
<td>20</td>
<td>18.7</td>
<td>19.6</td>
<td>20.2</td>
<td>21.1</td>
</tr>
<tr>
<td>Government expenditure</td>
<td>30.9</td>
<td>31.1</td>
<td>31.1</td>
<td>27.8</td>
<td>26.9</td>
<td>26.9</td>
<td>27.2</td>
</tr>
<tr>
<td>Overall budget balance</td>
<td>10.4</td>
<td>10.8</td>
<td>10.4</td>
<td>9.1</td>
<td>7.3</td>
<td>6.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Primary balance</td>
<td>3.9</td>
<td>4</td>
<td>3.4</td>
<td>2.7</td>
<td>1.2</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>FDI, net (US$ bn)</td>
<td>5.9</td>
<td>6.7</td>
<td>4.2</td>
<td>13.7</td>
<td>13</td>
<td>15.5</td>
<td>15.5</td>
</tr>
<tr>
<td>Investment in infrastructure*</td>
<td>4.5</td>
<td>4.1</td>
<td>3.3</td>
<td>3.5</td>
<td>3.5</td>
<td>4.7</td>
<td>5.6</td>
</tr>
<tr>
<td>Memo items:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal GDP (in bn Rs)</td>
<td>19254</td>
<td>21002</td>
<td>22653</td>
<td>25382</td>
<td>28777</td>
<td>32756</td>
<td>37900</td>
</tr>
</tbody>
</table>

*Source: Economic Survey 2007–08*

*Lall & Rastogi (2007), Planning Commission*
Table 40.20: China’s listed power companies, end-2003
Domestic A-share listings except where noted (Rmb mn)

<table>
<thead>
<tr>
<th>Company Name</th>
<th>Assets</th>
<th>Revenues</th>
<th>Profit</th>
<th>Profitability</th>
<th>Return on assets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Huaneng Power International, Inc (A-share and HK)</td>
<td>53,277</td>
<td>23,480</td>
<td>5,457</td>
<td>23%</td>
<td>10%</td>
</tr>
<tr>
<td>Datang International Power Corp. (HK)</td>
<td>35,544</td>
<td>9,951</td>
<td>1,812</td>
<td>18%</td>
<td>5%</td>
</tr>
<tr>
<td>China Yangtze Power Co.</td>
<td>29,617</td>
<td>2,986</td>
<td>1,438</td>
<td>48%</td>
<td>5%</td>
</tr>
<tr>
<td>SP Power Development Co.</td>
<td>22,749</td>
<td>4,846</td>
<td>675</td>
<td>14%</td>
<td>3%</td>
</tr>
<tr>
<td>Huadian Power International (HK)</td>
<td>20,580</td>
<td>8,066</td>
<td>1,029</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>China Resources Power Holdings</td>
<td>15,894</td>
<td>5,206</td>
<td>589</td>
<td>11%</td>
<td>4%</td>
</tr>
<tr>
<td>Shenergy Co.</td>
<td>13,493</td>
<td>3,042</td>
<td>1,034</td>
<td>34%</td>
<td>8%</td>
</tr>
<tr>
<td>Inner Mongolia Mengdian Huaneng Thermal Power Corp.</td>
<td>11,680</td>
<td>3,037</td>
<td>334</td>
<td>11%</td>
<td>3%</td>
</tr>
<tr>
<td>Shanghai Electric Power Company Ltd</td>
<td>10,825</td>
<td>5,448</td>
<td>402</td>
<td>7%</td>
<td>4%</td>
</tr>
<tr>
<td>Guangzhou Development Industry (Holdings) Co.</td>
<td>10,143</td>
<td>3,518</td>
<td>805</td>
<td>23%</td>
<td>8%</td>
</tr>
<tr>
<td>Zhejiang Southeast Electric Power Co. (B-shares)</td>
<td>8,680</td>
<td>4,738</td>
<td>609</td>
<td>13%</td>
<td>7%</td>
</tr>
<tr>
<td>Hunan Huayin Electric Power Co.</td>
<td>5,285</td>
<td>1,003</td>
<td>4</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Top Energy Co., Shanxi</td>
<td>5,144</td>
<td>1,868</td>
<td>234</td>
<td>13%</td>
<td>5%</td>
</tr>
<tr>
<td>SDIC Huajing Power Holdings Co.</td>
<td>4,601</td>
<td>1,377</td>
<td>215</td>
<td>16%</td>
<td>5%</td>
</tr>
<tr>
<td>Heilongjiang Electric Power Co.</td>
<td>3,605</td>
<td>1,125</td>
<td>249</td>
<td>22%</td>
<td>7%</td>
</tr>
<tr>
<td>Zhengzhou Coal Industry &amp; Electric Power Co.</td>
<td>2,515</td>
<td>908</td>
<td>85</td>
<td>9%</td>
<td>3%</td>
</tr>
<tr>
<td>Sichuan Mingxing Electric Power Co.</td>
<td>2,294</td>
<td>409</td>
<td>103</td>
<td>25%</td>
<td>4%</td>
</tr>
<tr>
<td>Chongqing Jiuong Electric Power Co.</td>
<td>2,256</td>
<td>397</td>
<td>62</td>
<td>16%</td>
<td>3%</td>
</tr>
<tr>
<td>Beijing Jingneng Thermal Power Co.</td>
<td>2,094</td>
<td>1,110</td>
<td>86</td>
<td>8%</td>
<td>4%</td>
</tr>
<tr>
<td>Sichuan Minjiang Hydropower Co.</td>
<td>1,681</td>
<td>344</td>
<td>69</td>
<td>20%</td>
<td>4%</td>
</tr>
<tr>
<td>Dalian Thermal Power Co.</td>
<td>1,550</td>
<td>408</td>
<td>17</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Guangxi Guidong Electric Power Co.</td>
<td>1,304</td>
<td>330</td>
<td>62</td>
<td>19%</td>
<td>5%</td>
</tr>
<tr>
<td>Chongqing Three Gorges Water Conservancy and Electric Power</td>
<td>1,180</td>
<td>333</td>
<td>8</td>
<td>2%</td>
<td>1%</td>
</tr>
<tr>
<td>Sichuan Xichang Power Jointstock Co.</td>
<td>1,156</td>
<td>164</td>
<td>23</td>
<td>14%</td>
<td>2%</td>
</tr>
<tr>
<td>Leshan Electric Power Co.</td>
<td>1,147</td>
<td>271</td>
<td>5</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>Shenyang Jinshan Thermoelectric Co.</td>
<td>717</td>
<td>109</td>
<td>49</td>
<td>45%</td>
<td>7%</td>
</tr>
<tr>
<td>Xinjiang Tianfu Thermoelectric Co.</td>
<td>681</td>
<td>505</td>
<td>60</td>
<td>12%</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: Shanghai Stock Exchange, Hong Kong Stock Exchange, companies
### Table 40.21: Road mileage (by technical condition) (km)

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard road mileage</td>
<td>2,282,872</td>
<td>2,139,887</td>
</tr>
<tr>
<td>Expressway</td>
<td>45,339</td>
<td>41,005</td>
</tr>
<tr>
<td>Class I</td>
<td>45,289</td>
<td>41,687</td>
</tr>
<tr>
<td>Class II</td>
<td>262,678</td>
<td>248,199</td>
</tr>
<tr>
<td>Class III</td>
<td>354,734</td>
<td>347,160</td>
</tr>
<tr>
<td>Class IV</td>
<td>1,574,833</td>
<td>1,461,835</td>
</tr>
<tr>
<td>Sub-standard road mileage</td>
<td>1,174,128</td>
<td>1,205,299</td>
</tr>
<tr>
<td>Percentage of standard road to the total</td>
<td>66%</td>
<td>64%</td>
</tr>
</tbody>
</table>

**Source:** Li (2005), *China Highway and Waterway Transport Statistics Yearbook 2006*

### Table 40.22: Road mileage (by payment classification) (km)

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paved road</td>
<td>996,455</td>
<td>839,893</td>
</tr>
<tr>
<td>Simply-paved road</td>
<td>528,633</td>
<td>523,548</td>
</tr>
<tr>
<td>Unpaved road</td>
<td>1,931,911</td>
<td>1,981,744</td>
</tr>
<tr>
<td>Percentage of paved road and Simply paved road to the total mileage</td>
<td>44.1%</td>
<td>40.8%</td>
</tr>
</tbody>
</table>

**Source:** Li (2005), *China Highway and Waterway Transport Statistics Yearbook 2006*

### Table 40.23: Road mileage (by administrative level) (km)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total mileage</th>
<th>National road</th>
<th>Provincial road</th>
<th>Country road</th>
<th>Township road</th>
<th>Accommodation road</th>
<th>Village road</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>1,278,474</td>
<td>114,786</td>
<td>189,916</td>
<td>383,747</td>
<td>536,813</td>
<td>53,167</td>
<td>-</td>
</tr>
<tr>
<td>1999</td>
<td>1,351,691</td>
<td>117,135</td>
<td>192,517</td>
<td>398,045</td>
<td>589,886</td>
<td>54,108</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>1,679,848</td>
<td>118,983</td>
<td>212,450</td>
<td>461,872</td>
<td>800,681</td>
<td>85,861</td>
<td>-</td>
</tr>
<tr>
<td>2001</td>
<td>1,698,012</td>
<td>121,587</td>
<td>213,044</td>
<td>463,665</td>
<td>813,699</td>
<td>86,017</td>
<td>-</td>
</tr>
<tr>
<td>2002</td>
<td>1,765,222</td>
<td>125,003</td>
<td>216,249</td>
<td>471,239</td>
<td>865,635</td>
<td>87,096</td>
<td>-</td>
</tr>
<tr>
<td>2003</td>
<td>1,809,828</td>
<td>127,899</td>
<td>223,425</td>
<td>472,935</td>
<td>898,300</td>
<td>87,269</td>
<td>-</td>
</tr>
<tr>
<td>2004</td>
<td>1,870,661</td>
<td>129,815</td>
<td>227,871</td>
<td>479,372</td>
<td>945,180</td>
<td>88,424</td>
<td>-</td>
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<tr>
<td>2005</td>
<td>3,345,187</td>
<td>132,674</td>
<td>233,783</td>
<td>507,493</td>
<td>987,932</td>
<td>63,446</td>
<td>1,419,864</td>
</tr>
<tr>
<td>2006</td>
<td>3,456,999</td>
<td>133,355</td>
<td>239,580</td>
<td>506,483</td>
<td>987,608</td>
<td>57,986</td>
<td>1,531,987</td>
</tr>
</tbody>
</table>

**Source:** Li (2005), *China Highway and Waterway Transport Statistics Yearbook 2006*
Table 40.24: China—electricity prices in selected provinces in 2004
(US$ per MWh)

<table>
<thead>
<tr>
<th>Province</th>
<th>Urban residential</th>
<th>Rural residential</th>
<th>Non-residential lighting</th>
<th>Commerce</th>
<th>General industry</th>
<th>Large industry</th>
<th>Agricultural production</th>
<th>Agricultural irrigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beijing</td>
<td>53.2</td>
<td>53.2</td>
<td>76.6</td>
<td>77.4</td>
<td>68.5</td>
<td>50.8</td>
<td>57.9</td>
<td>36.1</td>
</tr>
<tr>
<td>Tianjin</td>
<td>49.6</td>
<td>49.6</td>
<td>75.9</td>
<td>71.3</td>
<td>67.7</td>
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<td>53.6</td>
<td>49.7</td>
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<td>51.0</td>
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<td>50.8</td>
<td>75.0</td>
<td>86.8</td>
<td>63.5</td>
<td>47.5</td>
<td>52.0</td>
<td>13.9</td>
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<tr>
<td>Guangdong</td>
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<td>75.0</td>
<td>108.0</td>
<td>83.9</td>
<td>72.8</td>
<td>72.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shannxi</td>
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<td>59.3</td>
<td>77.6</td>
<td>92.1</td>
<td>62.4</td>
<td>47.2</td>
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<td>53.3</td>
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<td>40.0</td>
<td>30.5</td>
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<td>54.1</td>
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<td>60.7</td>
<td>36.5</td>
<td>43.8</td>
<td>26.0</td>
</tr>
<tr>
<td>Average</td>
<td>57.1</td>
<td>56.0</td>
<td>75.7</td>
<td>90.0</td>
<td>68.2</td>
<td>50.0</td>
<td>50.3</td>
<td>25.8</td>
</tr>
</tbody>
</table>

Table 40.25: India—electricity prices in selected states in 2004
(US$ per MWh)

<table>
<thead>
<tr>
<th>State</th>
<th>Domestic</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Agriculture/irrigation</th>
<th>Railway traction</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maharashtra</td>
<td>61.7</td>
<td>107.9</td>
<td>81.5</td>
<td>30.8</td>
<td>92.5</td>
<td>85.9</td>
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<tr>
<td>Gujarat</td>
<td>68.3</td>
<td>105.7</td>
<td>92.5</td>
<td>22.0</td>
<td>112.3</td>
<td>63.9</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>35.2</td>
<td>107.9</td>
<td>88.1</td>
<td>8.8</td>
<td>90.3</td>
<td>41.9</td>
</tr>
<tr>
<td>Punjab</td>
<td>58.6</td>
<td>99.1</td>
<td>80.0</td>
<td>11.7</td>
<td>0.0</td>
<td>46.3</td>
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<tr>
<td>Haryana</td>
<td>73.8</td>
<td>97.6</td>
<td>92.5</td>
<td>13.4</td>
<td>83.3</td>
<td>93.2</td>
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<tr>
<td>Rajasthan</td>
<td>50.2</td>
<td>109.9</td>
<td>86.1</td>
<td>26.4</td>
<td>88.1</td>
<td>84.1</td>
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<td>Tamil Nadu</td>
<td>45.8</td>
<td>121.2</td>
<td>93.4</td>
<td>4.8</td>
<td>0.0</td>
<td>75.1</td>
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<tr>
<td>Andhra Pradesh</td>
<td>50.7</td>
<td>130.0</td>
<td>90.3</td>
<td>8.8</td>
<td>99.1</td>
<td>30.8</td>
</tr>
<tr>
<td>Karnataka</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BESCOM</td>
<td>79.5</td>
<td>0.0</td>
<td>72.9</td>
<td>15.2</td>
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<td>105.3</td>
</tr>
<tr>
<td>GESCOM</td>
<td>84.1</td>
<td>133.3</td>
<td>103.5</td>
<td>16.5</td>
<td></td>
<td>95.2</td>
</tr>
<tr>
<td>HESCOM</td>
<td>70.5</td>
<td>133.7</td>
<td>103.1</td>
<td>10.6</td>
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<td>85.0</td>
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<tr>
<td>MESCOM</td>
<td>68.9</td>
<td>134.8</td>
<td>97.6</td>
<td>12.1</td>
<td></td>
<td>85.5</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>62.3</strong></td>
<td><strong>116.5</strong></td>
<td><strong>90.1</strong></td>
<td><strong>15.1</strong></td>
<td><strong>80.8</strong></td>
<td><strong>74.3</strong></td>
</tr>
</tbody>
</table>

*Source: IDFC, prepared for Power Advisory Group*
NOTES

1. The Chinese Statistical Yearbook does not present irrigation as a separate item in the fixed assets table. Irrigation infrastructure comes under the heading of ‘Management of Water Conservancy, Environment and Public Facilities’. Note that the item ‘Water Transport’ includes coastal and river ports and conservancy costs associated with that.

2. There are potential inconsistencies in data sources which need to be examined. Urban investment in fixed assets refers to all investments that take place in the county towns and urban areas, including investment in construction projects by government agencies, enterprises and institutions.

3. The increase in power and irrigation investment is partly attributable to the very large spending on the Three Gorges Dam which will be the largest multi-purpose hydroelectric power plant in the world. According to OECD (2005), the National Bureau of Statistics (NBS) rarely presents comprehensive information on the sources, methods and procedures of the statistics. The Statistical Yearbook offers approximately one page of general explanations for each section (such as investment) and definition of variables.

4. In 2003, China had the highest investment in infrastructure as a percentage of GDP, followed by Thailand. Developing countries as a whole invested 4% of their GDP on infrastructure (PPIAF, WB).

5. That said, there remains a degree of financial repression in the financial system: bank lending margins and profitability are still low, arguably implying some level of implicit subsidy to borrowers (more on this in Section 3).

6. The increase in asset prices, including real estate, may explain some of the increase. ‘Urban Investment in Fixed Assets’ refers to all investments that take place in county towns and urban areas, including investment in construction projects by government agencies, enterprises and institutions.

7. State budget includes central government budget, including development funds for less developed areas, as well as local budgetary funds transferred from the central budget. This is consistent with the rising share of enterprise savings in total savings.

8. For different models see Chan and Doloi (2007).

9. There are reports of local governments attempting to get around their prohibition on borrowing by setting up investment trusts that are able to take advantage of leverage (see Box 40.3).

10. FDI includes a limited amount of foreign borrowings from foreign governments and international financial institutions, export credit, commercial loans from foreign banks, and issuance of overseas bonds.

11. According to the Statistical Yearbook, self-raised funds refer to extra-budgetary funds for investment in fixed assets received by investing units from central government ministries, local governments, enterprises and institutions, including their own self-raised funds.
13. For example, a number of local government-owned industrial companies may contribute equity capital to create local electricity generating capacity.

14. The speed with which land leasing was adopted can be seen from Shanghai’s records. Between 1988 and 1991, twelve land leases were granted in Shanghai. The total rose to 201 in 1992 and 3,000 in 1993 (Fu, 1996).

15. Because comprehensive municipal budgets are not publicly available, it is difficult to put together reliable data on the magnitude of land leasing except through case studies. A study carried out by the World Bank suggests that direct revenues from land leasing can generate a substantial part of the municipal capital budget for a period of 10 to 15 years, even when investment levels are as high as they have been in China (Peterson 2006).

16. By restricting supply, the central government has been able to allow bonds to be issued at comfortable interest rates as low as 3 per cent, creating an implicit subsidy for favoured enterprises (Zhang and Heller 2004).

17. Although they became disenchanted later when the government reneged on their PPAs following the Asian Crisis glut in the power market.

18. At their peak in 1999, these surcharges added about 20 to 24 per cent on average to the grid selling price (although residential consumers paid 10 per cent extra, commercial users paid as much as 30 per cent more).

19. Our calculation of simple average electricity price in selected provinces in cents per kWh given in Table 40.9 is marginally lower than the EIA calculation given in Figure 40.5.

20. All these companies have coal-fired plants and hence their operating profits are impacted by coal prices. As may be seen in Table 40.7, coal companies’ returns have been very high in recent years, as coal prices have risen, while profits of power generation companies may have been squeezed somewhat. In late 2007, with inflation rising sharply, the government implemented price controls, freezing electricity prices among others. This led to coal companies curtailing supply to power generators which, in turn, led to power outages.

21. The top five power generators have been raising their generation capacity by 10 per cent per annum and financing it by retained earnings, corporate bonds and by raising equity from the stock market. Their bonds are AAA rated bonds. Besides these big five companies, the profitability of the 30 listed companies which are under the provincial governments also seems reasonable and returns on assets are in a similar range to the big five (see Table 40.20).

22. This abstracts from the wider argument with respect to financial repression on account of which the Chinese banking system is arguably subsidizing the real economy at the cost of its own profitability.

23. In terms of number of units of electricity produced per unit of coal.

24. There is some evidence to suggest that part of the Chinese banking system, notably the State Development Bank, has absorbed losses on account of lending to infrastructure projects in non-coastal states. But the extent of these losses does not seem to be very large.
25. Severe disruption in power in the winter of 2007 was not due to shortage of generation capacity but price controls implemented in the second half of 2007, including on power, in an effort to ensure that inflation did not spread to the rest of the economy. Global coal prices, in the meantime, soared by 50 to 60 per cent, with the largest rise occurring in December 2007 and January 2008 because of the Australian floods. Therefore, Chinese coal companies did not supply coal to power generators at prices lower than world market prices.

26. The gap in mobile teledensity is, however, narrowing rapidly.

27. Access to piped water is not available to two-thirds of the rural population (2003 National Health Survey), and access to improved sanitation services was lacking, especially in rural areas, in 1998 (ADB-JBIC-WB 2005).

28. Accordingly, a new scheme on creation of rural electricity infrastructure and household electrification, called Rajiv Gandhi Gramin Vidyutikaran Yojana (RGGVY), was launched in 2005. To address the concern of revenue sustainability, an important feature of this programme is to put in place “franchisees” from and beyond a sub-station or a feeder or a distribution transfer with complete contractual and commercial obligations.

29. Power is supplied intermittently to villagers at highly subsidized or at no cost, generally during off-peak hours.

30. In China, the target for 2005–10 is that all ‘suitable’ townships and villages will have highways with regular bus service. Highways from counties to townships should be paved by cement or asphalt and highways from townships to villages are paved.

31. It is estimated that the power sector is responsible for 44 per cent of sulphur dioxide (SO₂) emissions, 80 per cent of nitrogen oxide (NOₓ) emissions, and 26 per cent of carbon dioxide (CO₂) emissions.

32. Coal plants also discharge significant amounts of mercury, exposure to which can cause neurological and developmental effects in children (Berrah, Lamech and Zhao 2001).

33. Over the same period, CO₂ emission from thermal power plants as a share of total CO₂ emission in India increased from 42 per cent to 52 per cent.

34. In 1995, there were 34,200 village collective-run mines and 34,700 individually run mines which accounted for 46 per cent of total coal output, more than the big nationally run mines (Naughton 2007).

35. For instance, the pollution fee for sulphur dioxide emission was raised to ¥600 (US$72.5) per ton in 2005 from ¥200 (US$25) but the cost of sulphur dioxide control is about ¥1,000 (US$120.8) per ton (World Bank, 2005).

36. NDRC and many state research institutes are putting enormous effort into researching energy efficiency and renewable energy sources. Research on coal liquefaction is a key project.

37. This paper, titled “Developing Physical Infrastructure—A Comparative Perspective on the Experience of the People’s Republic of China and India”, was included by Asian Development Bank (ADB) in its 2010 publication Resurging Asian Giants—Lessons from...
The paper was written in June 2008 as part of the Program of Studies on the Development Experience of the People’s Republic of China and India and funded by ADB.

This paper could not have been written without the help of many people in the PRC and India. Constraint of space does not make it possible to acknowledge them individually. The authors would like to thank Professor Ning Sao and Professor Yang Jian for their help and would like to acknowledge support from Mr Binod Singh who arranged meetings in different cities at short notice, worked as an interpreter and happily answered many queries raised in the course of our field work. We would like to thank Devika Fernandes, Mamata Samant and Gracinda Rodrigues for their background research and, despite the language barrier, checking and rechecking factual information from various sources.
1. **Introduction**

As elsewhere in the world, the mining industry in India is treated differently from other industries in fiscal terms because of its uniqueness, which arises from its ability to generate economic rent. It is the scarcity of exhaustible resources such as minerals which leads to the generation of economic rent when it is extracted (Baunsgaard, 2001). In reforming the way the mineral industry is taxed—which involves questions such as how much to tax, through what instruments and by which level of government—the key challenge is to balance two objectives: attracting investment into the sector and enhancing revenue for the government. Mineral tax reforms in India, which have lagged behind general fiscal reforms, have attempted to address this challenge at a time when there is a simultaneous increase in the need for investment in this sector as well as the demand for (state) governments for larger revenues. Reforms have also attempted to address the long-standing centre-versus-state issue related to fiscal autonomy.¹ Mining poses the additional challenge of environmental degradation. As mining investment grows, the environment issue will intensify. Against this backdrop, the aim of this paper is to assess the reforms in the light of existing issues and suggest the exploration of some new options.

Section 2 provides a brief review of the mineral sector and its taxation in India. The following section lists the major issues that reforms need to address (Section 3). Section 4 outlines the reforms—already undertaken or proposed—and assesses their suitability to address the current issues. In the light of this assessment, new options are explored (in Section 5). The question of addressing environmental objectives through taxes is discussed in Section 6. Section 7 concludes this discussion.
2. A REVIEW OF MINING SECTOR AND ITS TAXATION IN INDIA

2.1 Salient features of mining sector

Before focusing on the mineral taxation regime, it may be useful to outline some of the salient features of the Indian mining sector:

- India is a geologically significant country, accounting for a fairly large portion of the world’s production in a number of minerals: chromite (17.7 per cent), bauxite (7 per cent), coal and lignite (8 per cent) and iron ore (10 per cent). For mining companies, geological significance is a major factor in determining their investment destination.

- Mining and quarrying account for less than 3 per cent of India’s GDP (see Annexure 1). Fuel minerals (crude oil, natural gas and coal) accounted for 75 per cent of the total value of minerals in 2006–07; coal alone accounted for about a third of the total value of mineral production. Major minerals, whose regulation and development are under the control of the central government, account for about 88 per cent of the total, leaving only a small fraction for the state governments. Further, mineral deposits are concentrated in fourteen states which accounted for about 97 per cent of the total value of India’s minerals (excluding Bombay High) in 2005–06 (Annexure 2).

- India’s major mineral producing districts are characterized by large forest covers; the average forest cover of the 50 major mineral producing districts stands at 28 per cent. Forest land diversion for mining has been rising. During 1998–2005, 216 mining projects were granted forest clearance annually, as against 19 per year during 1980–97 (CSE, 2008).

- Mining regions have high air pollution. Towns such as Korba, Bhilai, Satna and Dhanbad have been declared critical by the Central Pollution Control Board (CSE, 2008).

- Major mineral producing regions have high incidence of poverty. It can be seen from Figure 41.1 that states in which mineral production accounts for a large part of GDP have low per capita income.

- The Indian mining industry is characterized by a large number of small mines. The total number of mine leases, excluding fuel minerals, atomic minerals and minor minerals, stood at 9131 in 2004–05. Large-scale mines dominate production in all major minerals except diamond, iron ore and bauxite. Minor minerals are dominated by small- and medium-scale mines—both in terms of numbers as well as production (CSE, 2008).

- Investment in the mining sector remained stagnant between the mid-1980s and the mid-1990s and actually fell in real terms subsequently. It has picked
up momentum since 2002–03 (Annexure 3) in a spectacular manner. Historically, the private sector has accounted for a much smaller share of investment in mining than economy-wide investment (see Annexure 3).

![Graph: Per capita income and royalty as percentage of GDP in 2004–05](source)

**Figure 41.1: Per capita income and royalty as percentage of GDP in 2004–05**

*Source: Economic Survey 2007–08 and Hoda Committee Report, 2006*

### 2.2 Mineral taxation system in India

Worldwide, three sets of fiscal instruments are applied to mining activities: (a) levies representing the government’s general taxation powers, (b) levies to extract government’s legitimate share as mineral owner such as progressive profits tax, etc.; non-tax instruments such as royalties, product sharing and equity sharing fall in this category, and (c) levies meant to achieve environmental objectives (Sarma and Naresh, 2000).

In India, the first category relates to the tax revenue that mining companies generate for central, state and local governments like companies in any other economic activity. Some of these are pooled (such as corporate income tax, excise and customs), while others are not (for example, stamp duties). It is necessary to recognize the presence of this category for two important reasons. First, in India, rates of taxation on mining activities under the former category are no different from those on others. This, however, does not have to be the case. Second, if for some reason—including an onerous fiscal regime—investment does not occur in a given region, the resulting revenue loss will go well beyond the mining-specific revenues. Besides, the development of the region will suffer. The implication is that while attempting to change a fiscal regime, the overall tax impact must be taken into account and not just the mining-specific levies.
In addition, there are levies specific to the mining sector. They include royalty, dead rent, reconnaissance fees, prospecting fees, etc. They are typically non-tax in nature and accrue to the respective states where the mining takes place, on the ground that in India, states are the owners of the minerals. It is this category of taxation which would be the focus of our discussion.

As regards environment, there are levies that are motivated by concerns for environment; but none specifically designed for the mining sector. Levies such as Pollution Consent Fee, Water Rate, Local Area Welfare Development Charge, Environment and Forest Charge, etc. cover all polluting industries, including mining (Sarma and Naresh, 2000). These levies are not significant sources of revenue as compared to the other two categories of levies stated above.

Let us now turn to the division of legislative powers between the centre and the states. List I in the Seventh Schedule of the Constitution empowers the central government to regulate mining activities and the development of minerals, while List II in the Seventh Schedule empowers the state governments to frame rules and regulations with respect to mining activities and mineral development, subject to the provisions of List I.

The division of mineral taxation powers between the centre and the states is also biased towards the former. It is based on the distinction between major and minor minerals. The central government has taxation powers over the former while states have powers over the latter. How does one know whether a given mineral is major or minor? The simple rule is that a mineral is assumed to be a major mineral, unless it is notified by the central government as a minor mineral. In other words, the central government has the power to decide its own tax jurisdiction.3

Although royalty and dead rent rates (see below) with respect to major minerals are to be fixed by the central government, they are collected and retained entirely by the producing states. In the case of minor minerals, state governments have the powers not only to fix the rates, but also to collect and retain royalty and dead rent. The rationale for states retaining royalty and dead rent is that in terms of articles 294–296 of the Constitution, states have the ownership rights on all land and mineral resources located within their respective territories.

Of all mineral-specific levies, royalty accounts for the predominant part. Dead rent is collected from lessees who have not been operating their mines due to some reason or the other and hence not been paying royalty. This levy aims at discouraging lessees from keeping the leased areas idle. Dead rents are based on the area of lease and the value of minerals. For a given area, the higher the value of minerals, the higher is the dead rent. The royalty rates and dead rents are specified in the MMDR Act. In addition to royalty and dead rent, states get a meagre revenue from initial
application fee from concession seekers, annual fee payable by RP/PL holders on the basis of the area held and surface rent. Further, Orissa and West Bengal have imposed a cess on mineral-bearing land leading to litigation regarding the constitutional validity of such levies (see below).

It is useful to distinguish between the tax regimes applicable to the following four broad categories of minerals: (i) petroleum and natural gas, (ii) coal, (iii) other major minerals and (iv) minor minerals.

- Petroleum and natural gas are subject to production-sharing contracts as well as royalty (see Section 4).
- Coal has historically attracted specific rate royalty, but since August 2007 has been subject to a regime which has elements of both fixed and variable (ad valorem) components (see Table 41.1). The fixed component is higher for higher grades of coal. This provision aims at correcting the bias for mining higher grade minerals that royalty systems generally entail (see below).
- Non-fuel minerals are subject to either specific rate royalty (on the basis of weight) or ad valorem royalty. The Hoda Committee deals with this category of minerals. Although more and more minerals under this category are being covered under ad valorem royalty, 22 minerals (out of 61 major minerals listed in the MMDR Act) still attract specific rates, some of which (for example, iron and limestone) yield significant revenue. Tax rates vary widely across minerals in both specific rate category as well as ad valorem category. In the latter category, for example, rates vary from 1 per cent (manganese concentrate) to 20 per cent (gypsum).
- Minor minerals are generally subject to specific rate royalty and annual or multiple-year auctions. For the same minerals, the royalty rates could vary widely among states. For example, the tax rate on marble in Rajasthan is very different from that in Madhya Pradesh.

Table 41.1: Revision of coal royalty over the years

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group-I Coking Coal SG-I,II WG-I</td>
<td>7.00</td>
<td>150.00</td>
<td>195.00</td>
<td>250.00</td>
<td>=180+(0.05)P</td>
</tr>
<tr>
<td>Group-II Coking Coal WG-II,III Non-coking A,B</td>
<td>6.50</td>
<td>120.00</td>
<td>135.00</td>
<td>165.00</td>
<td>=130+(0.05)P</td>
</tr>
<tr>
<td>Group-III Coking Coal WG-IV, Non-coking-C</td>
<td>5.50</td>
<td>75.00</td>
<td>95.00</td>
<td>115.00</td>
<td>=90+(0.05)P</td>
</tr>
</tbody>
</table>
Table 41.1: Revision of coal royalty over the years (contd...)

<table>
<thead>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group IV Non-coking D,E</td>
<td>4.50</td>
<td>45.00</td>
<td>70.00</td>
<td>85.00</td>
<td>=70+(0.05)P</td>
</tr>
<tr>
<td>Group-V Non-coking F,G</td>
<td>2.50</td>
<td>25.00</td>
<td>50.00</td>
<td>65.00</td>
<td>=55+(0.05)P</td>
</tr>
</tbody>
</table>

Where, \( P \) = Basic pithead price of run-of-mine coal as reflected in the invoice, excluding taxes, levies and other charges

Source: Rao, 2003 and Ministry of Coal notification dated 1 August 2007

2.3 Revenue from mining sector

Other than royalty, no data are available on the revenue accruing to the government from mining activities (such as income tax paid by mineral companies, customs on imports of machinery for mining, etc.). Even data related to royalty are publicly available only for a few years. The data compiled by the Hoda Committee on total collection of revenue from royalty on minerals in 2002–03, 2003–04 and 2004–05 in states with significant mining activities are given in Annexure 4. These accounted for about 0.2 per cent of India’s GDP (about 10 per cent of the value of mineral production). While royalty appears to be an insignificant source of revenue at the national economy level, its contribution is substantial in the case of some mineral-rich states, such as Chhattisgarh, Jharkhand, Orissa and Madhya Pradesh (see Table 41.2).

Table 41.2: Significance of royalty in state finances (2004–05)

<table>
<thead>
<tr>
<th>State</th>
<th>Ratio of royalty (all mining) to:</th>
<th>Ratio of royalty (coal mining) to:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total revenue</td>
<td>Own revenue</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>9.6</td>
<td>15.5</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>12.5</td>
<td>25.2</td>
</tr>
<tr>
<td>Orissa</td>
<td>5.6</td>
<td>12.0</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>3.7</td>
<td>6.0</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>3.3</td>
<td>5.6</td>
</tr>
<tr>
<td>Karnataka</td>
<td>0.8</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Source: Hoda Committee Report, 2006 and RBI Bulletin

In the absence of comprehensive time series data for other states, the data on royalty collection on major minerals available for the state of Orissa may be indicative (see Annexure 5). Royalty on major minerals in Orissa grew from Rs 161.3 crore in 1995–96 to Rs 836.8 crore in 2006–07, registering a compound annual growth rate of 16.1 per cent. In terms of the percentage of state GDP, royalty collection from major minerals in Orissa rose from 0.7 per cent in 1995–96 to 1.1 per cent in 2005–06, demonstrating a moderate degree of buoyancy. An important point to note is that major minerals account for the bulk of royalty collection.
3. **Major Issues**

There are four major issues relating to mining taxation that reforms must address:

**Issue # 1**

*Recent upturn in private investment must be sustained over a fairly long period.*

To sustain the current high growth rate, India will have to step up its investment in infrastructure and industries, many of which are intensive users of minerals. Power, for example, accounts for 70 per cent of coal production in India. The target growth rate for coal production has been set at 9.6 per cent per annum during the Eleventh Plan as against the realized growth rate of 3.6 per cent per annum in the preceding 10 years. While higher investment in mining is indispensable, public investment in the sector has been sluggish, emphasizing the need for stepping up private investment in the coming years. It is only in the recent years that private investors are showing keen interest in mining (see Figure 41.2); perhaps the rapidly rising prices of minerals in recent years have made mining an attractive proposition. To sustain the interest of private investors, it is important to review the mineral tax regime, which plays a key role in investment decisions.\(^5\) Private mining companies after all have many options to choose from for their investment destination and they screen opportunities using criteria balancing risk and reward. The perception of international investors of India’s mining sector, however, does not appear to be favourable. In a survey conducted by Fraser Institute, 38 per cent respondents (mining companies) in India as compared to 20 per cent in Tanzania thought the taxation regime in India to be either a strong deterrent or felt that they would not pursue investment due to this factor (see Figure 41.2).

![Figure 41.2: Percentage of surveyed mining companies that consider mining taxation regime an impeding factor](image)

*Source: Fraser Institute Annual Survey of Mining Companies 2005–06.*
States have very little autonomy over mineral taxation, although the revenue from the sector belongs to them.

As stated earlier, major minerals over which the central government has jurisdiction, account for the bulk of the revenue, leaving very little for the states to use their autonomy over. Besides, it is the central government which decides whether a mineral is major or not. This factor is not so much a matter of contention as the central government’s discretion over the frequency and the quantum of revision. While revisions are supposed to take place once in three years, there have been frequent and substantial “delays”, particularly in coal (see below). Since 1981, coal prices have been revised only four times. There are also allegations that the quantum of revision is less than adequate because of the lobbying pressure of the mining companies.

To overcome this problem, many states in the past have attempted to tax mining activities by levying cess on mineral-bearing land, which has been a source of contention between the centre and the states. In many cases, the levies have been struck down by courts following challenges by affected industries. From the viewpoint of autonomy, two cases are particularly worth noting. In 1992, the Calcutta High Court struck down the West Bengal laws levying cess on coal-bearing land. This was challenged in the Supreme Court by West Bengal. In 2004, the Supreme Court upheld the right of states to levy cess on coal-bearing land. Meanwhile, the central government retaliated by not allowing West Bengal to levy revised royalty rates. So, while West Bengal continues to levy cess, its royalty rate has been frozen at the pre-1992 level.

Encouraged by the Supreme Court decision, Orissa, Chhattisgarh and Madhya Pradesh have levied cess on mineral-bearing land. These were all challenged in their respective High Courts. The levies were struck down in Orissa, but upheld in Chhattisgarh and Madhya Pradesh. Now these matters are with the Supreme Court. Even as they are pending with the apex court, the Ministry of Coal in its notification (of 1 August 2007) has stated that: “For states other than West Bengal that levy cess or other taxes specific to coal bearing lands, the royalty allowed shall be adjusted for the local cesses or such taxes as to limit the overall revenue to the formula based yield.” Thus even if the Supreme Court upholds the states’ plea, the states now have no scope for earning additional revenue through cess in the case of coal. A similar stance by the central government in the case of other minerals cannot be ruled out in future.
Issue # 3

*States’ revenues have been affected by central government’s actions.*

This issue is related to issue # 2, because loss of autonomy can and does mean a loss of revenue too. With the aim of imparting stability to the fiscal regime, the MMDR provides that, “… the central government shall not enhance the rate of royalty in respect of any mineral more than once during any period of three years”. While the central government is within its rights to revise (which invariably involves enhancement) at any point beyond three years, state governments feel aggrieved when revision takes more than three years. This is so, because, in the face of rising mineral prices, ad valorem incidence of specific rates falls rapidly; for example, for iron ore, it fell from 5–10 per cent in the years 2002–04 to 1–2 per cent in 2004–05, as estimated by the Hoda Committee. The revenue forgone on this count can be substantial. The Hoda Committee estimates that ad valorem rate of 7.5 per cent for all grades of iron ore would have yielded 5–8 times more royalty revenue than what was realized under specific rate regime. While this has been an issue for decades, it has become significant in recent years in view of the rapidly rising prices (see Figure 41.3).

![Figure 41.3: Implicit index of mineral prices in India](image)

*Source:* CSO

Issue # 4

*There is a conflict between states’ revenue objective and the need to keep prices under control.*

This is particularly true of coal, one of the biggest revenue earners among minerals. Since the deregulation of coal prices in 2001, individual coal companies are “free” to revise prices at their discretion. The basis for price revision reportedly are: market forces (like demand for coal), changes in input cost, changes in the landed prices of imported coal, acceptability of coal price in the market and the need for capital investment in new projects. In reality, however, subsidiaries of the CIL—a Government of India-owned company which works in a monopolistic environment—revise prices minimally and by an amount much lower than international prices. Thus, while international prices went up by about 150 per cent
during 2002–2007 (see Figure 41.4), the WPI of non-coking coal rose by only 27 per cent. Price revisions are subdued primarily because of their potential impact on inflation directly and more importantly through power, fertilizer, steel and cement where coal serves as an input/raw material (see Box 41.1). That the notified price (i.e. the price at which coal is made available to power, fertilizer, etc.) is 30–70 per cent below the e-auction price gives a clear indication that coal prices are set below the market-determined ones. Clearly, for coal producing states, the fiscal revenue benefits of the ad valorem regime that coal has moved into since 2007 have been, and will continue to be, much less than otherwise.

**Box 41.1: How deregulated are the coal prices in India?**

In spite of soaring international prices and mounting operational costs, the state-owned monopoly, Coal India Ltd, has decided against raising prices of supplies to power plants during the entire 2008–09 fiscal to avoid putting further pressure on inflation. Coal fuels almost 50 per cent of power utilities in the country and any upward revision in prices would further increase cost of electricity and adversely impact the manufacturing sector, particularly steel and cement, all of which have heavy weightage in the price index.

Company chairman Partho S Bhattacharya told the *Times of India* (TOI) on Wednesday that CIL is offering five times the quantity of coal for e-auction and has lowered its floor price from 30 per cent of the notified price to 5 per cent to keep the priceline under check in the spot market. “In April–May, the average price in e-auctions was 73 per cent above the notified price. The latest e-auction has seen the priceline slide to barely 30 per cent above the notified price,” Bhattacharya said. CIL periodically has been revising prices in accordance with market dynamics since coal pricing was deregulated in 2000. The last revision took place in December 2007, according to which CIL charges Rs 2,380 for a tonne of coking coal and Rs 1,600–2,000 for various types of non-coking coal. Following deregulation, the price increase affected by CIL had averaged 3.5 per cent per annum.

“Today, the price of coal in real terms (deflated by inflation index) happens to be 8 per cent less than the price in 2000.” In contrast, global price for coal has been moving up sharply, with Japanese generation utilities signing agreements with Australian mines at US$135 a tonne against an average price of US$55.65 in 2007. Merrill Lynch has projected a US$300 per tonne cost of coking coal in 2008.

“It is like walking on a double-edged sword. It is a challenge to deliver targeted quantities in such a situation, considering that we too are bearing the brunt of high input costs. But it is also our corporate responsibility to maintain a check on domestic coal pricing when the economy is facing so much pressure,” Bhattacharya said. Aware that he has a target of producing 520 million tonnes by 2012, Bhattacharya said CIL is stressing on cost-control measures, improving productivity and efficiency to overcome the situation. The impact of any increase in CIL prices would have a widespread impact as the company accounts for 46 per cent of thermal coal supplies in the country.

*Source: Times of India, 10 July 2008*
4. **RECENT REFORMS AND THEIR EVALUATION**

In India, beginning in the early 1990s, the mining sector has been progressively liberalized through amendments to the MMDR Act, 1957. For example, exploration and mining were opened up to private investments, foreign technology and foreign participation were encouraged; foreign equity investments in joint ventures in mining promoted by Indian companies were allowed; states were given greater powers in respect of licences; area restrictions of RP/PL/ML were liberalized and so on. In the case of coal, the Nationalisation Act has been amended to allow mining of coal by companies (public and private) engaged in iron and steel, power generation and cement manufacture. Further, coal prices have been “deregulated” since 2001. While attempts have been made to attract private capital and improved technology into exploration and mining, the fiscal regime has drawn the serious attention of the policy makers only recently. The Hoda Committee, whose report was submitted to the government in December 2006, went into the fiscal issues in a comprehensive manner and made wide-ranging recommendations. Since these recommendations are currently being evaluated by the government, a brief discussion on them is considered necessary.

The Committee recognizes that the “primary aim of the government in granting mineral concessions is to stimulate sustainable utilization of the country’s mineral resources to enable wealth creation and employment generation.” In making its recommendations on the fiscal structure against this overarching objective, the Committee was guided on two major considerations. On the one hand, it recognizes that states are not happy with the growth in revenue from the mining sector and that
the current fiscal regime is partly to blame for it. On the other hand, the Committee observes that in the case of several minerals, the Indian royalty rates are higher than those of other countries and that for Indian minerals or mineral-based products to remain competitive in both international and domestic markets, it is important especially in a scenario of increasing globalization that Indian royalty rates are not out of tune with the rates in other countries. The main recommendations of the Committee are as follows:

• **System:** The fiscal regime should move forward decisively from specific rate basis to ad valorem basis, unless there are very strong reasons for retaining specific rates. “In a system of ad valorem rates of royalty, revision of rates becomes necessary only when fundamental changes take place in the mineral economy, justifying a review of the rates.”

• **Rates:** In conversion of specific rates to ad valorem rates and in resetting the existing ad valorem rates, rates prevailing in Western Australia should be used as a benchmark. As a rule, (i) rates should be raised to the Western Australian level unless there are factors justifying a lower rate in India, and (ii) leave the rates unchanged if the rates are higher than those in Western Australia unless there are indications that the existing rates are inhibiting mining operations.

• **Valuation:** The valuation of minerals for the purpose of royalty should be based on the transaction value and should include a profit element over and above the unit cost of production. For export consignments, the base price would be the FOB minus the transport cost, loading and unloading charges and port charges. For domestic sales, the sale price (adjusted for transport and loading and unloading costs) rather than pit mouth value should be taken into account. It is only in the absence of sale price that the present system of 20 per cent mark-up on the pit mouth value could continue.

• **Transfer pricing:** For captive mines only arms length transaction prices should be taken into account to avoid transfer pricing.

• **Exploration costs:** All expenditures on exploration and development in the 10 years preceding the commencement of commercial production (instead of four years as at present) should be allowed for deduction in mining operations. Further, the mining company should be given the option to claim deductions either in the first years of commercial production or during the useful life of the mine.

• **Illegal mining:** Penalties for illegal mining, which is a cause for loss of revenue for states, should be increased several fold.

• **Dead rent:** To act as an effective deterrent against miners keeping their land idle, an escalating scale of dead rent should be worked out.
4.1 Assessment

While specific recommendations relating to valuation of mineral products, captive mines, exploration costs, illegal mining and dead rent are unexceptionable, the broad framework suggested by the Committee needs a more detailed analysis. The crux of the recommendations lies in: (i) the transition from specific rate royalty to an ad valorem regime; and (ii) fixing the ad valorem rates against an international benchmark, using a transparent criterion. As regards the first part, the process is already on, albeit slowly; the Committee has (appropriately) suggested only an acceleration of this process. The most significant benefit from the transition is that the ad valorem system adjusts to price changes immediately while maintaining fiscal stability. Secondly, it makes revisions generally unnecessary. Finally, royalties assessed on volume or weight of production tend to reduce the output path by reducing initial output (Baunsgaard, 2001), a problem which can be overcome by moving to ad valorem. It may, however, be noted that only a few among the 39 minerals still subject to specific rate royalty yield significant revenue (such as iron ore). So, from the revenue viewpoint, the recommendation of transition per se is of limited significance. The second part, which relates to setting of rates, is significant for two reasons. First, internationally benchmarked rates would impart competitiveness to minerals and mineral-using industries and a tax structure thus rationalized is likely to yield higher revenue buoyancy (through its impact on investment). Second, the transparent method recommended by the Committee is likely to reduce the discretion in the setting of royalties, which is often a source of controversy.

Royalty as an instrument of taxing mineral extraction has been historically favoured by many nations. Its attractiveness to governments stems from the fact that they ensure revenue streams as soon as production begins. Further, in the case of India, the experience of administering such a system—whether production based or value based—already exists. It is, therefore, not surprising that the Committee has favoured the continuation of royalty as the dominant instrument. Royalties, however, have two major shortcomings. First, they are an imperfect proxy for tax on economic rent, primarily because they ignore all (sunk) capital costs involved in resource exploitation. As a result, they discourage projects with high exploration costs (Broadway and Flatters, 1993). The non-deductibility also leads to double taxation of capital income. In an ad valorem-type royalty regime, for example, royalties are a tax not only on economic rent, but also on capital income derived from resource exploitation. Corporate taxes are also levies on capital income. Double taxation makes the mining sector less attractive as compared to other sectors. Second, the royalty system encourages developers to extract only relatively high-value (or low-cost) deposits, leaving otherwise economic deposits (low-value or high-cost) undeveloped. “Mining operators are encouraged to close down mines before all socially valuable deposits have been extracted.”
In addition, there are some significant implementation issues. First, while setting royalty rates, the government has to identify “factors justifying a lower rate (than Western Australian rates) in India” (circumstances when Indian rates are lower than Western Australian rates, but should not be raised) and assess whether there are “indications that the existing rates are inhibiting mining operations” (circumstances when Indian rates are higher than Western Australian rates, and need to be lowered). Both entail discretion and are difficult in practice. Secondly, as the Committee itself recognizes, the main difficulty in the ad valorem system is the determination of the price on which royalty is to be applied. For several minerals, there is no benchmark such as traded price on international commodity exchanges.11 In such cases, sale price rather than pit mouth value is a better base, as the latter can be easily underreported; but what if there is a string of intermediaries between the miner and the ultimate user? The Committee recognizes this, but offers little by way of remedy. Valuation of minerals from captive mines is also problematic because of the possibility of transfer pricing. The recommendation to follow arm’s length price is appropriate, but difficult to enforce. The problem is going to grow in future, as the share of captive mines in the mining industry grows.12 In the coal sector, for example, the only way the private sector can participate in coal mining is through captive mines, which currently account for only 5 per cent of the total output, but is likely to grow rapidly in the next few years, as investment is sought to be accelerated. Merchant mining is not allowed for the private sector, as the Coal Mines Nationalisation (Amendment) Bill 2000, which seeks merchant mining of coal by the private sector is still pending in Parliament.13 Finally, how can ad valorem system help when prices of minerals are kept under implicit control? The case of coal has been discussed in Section 3.

5. WAY FORWARD: NEW OPTIONS

From the point of view of outstanding issues relating to mineral taxation in India, the advantages of the ad valorem over the quantity-based system are well known and the support for a transition to ad valorem is almost unanimous among the states. But in the light of the assessment in Section 4, there is a need to continue the search for other options as well. Before making its recommendation, the Hoda Committee had evaluated the profit-based system for calculation of royalty in addition to quantity-based and ad valorem systems. Under the profit-based system, royalty is calculated as a percentage of net profits of the miner at the project level. Unlike quantity-based and value-based royalty, which do not take into account profitability of an operation, profit-based royalty is payable only when a miner makes a profit. The system takes into account both the value of the minerals produced by the project and a set of allowable project costs (such as capital costs, production
costs, marketing and transportation costs, etc.). In that sense, it is related to the concept of rent. In addition, the tax is more equitable, as more profitable companies are required to pay higher taxes. Despite its merits, the profit-based royalty system was not chosen because of uncertainty in yield and problems in administration.

An additional option that needs to be explored, for which India by now has a fair amount of administrative experience, is production sharing contract (PSC). So far, PSCs have been applied in India in the case of crude oil and natural gas. But can the concept be extended to other minerals? The rest of this section would focus on how the system works and its experience.

First of all, what is the concept? PSC is a long term arrangement between the government and an investor, where the investor assumes all the pre-production risks (exploration risks) and recovers both cost and a share of profit out of production. Under the system, the state remains the owner of the resource and the company is contracted to extract the resource in return for a share of production. These contracts are more common in the petroleum sector. When production begins, “profit petroleum” is derived from gross revenue by deducting allowable costs and is then shared between the government and the contractor.

With the introduction of the New Exploration Licencing Policy, which became effective from 1999, the national oil companies (ONGC and OIL) are treated on a par with private companies and instead of being nominated, as earlier, now have to compete with each other and with private companies for acquiring exploration acreages. Selection is based on a competitive bidding process. Financial strength (net worth) is only a qualifying criterion. Bids have two components: the work programme (i.e. the bidders’ commitment to carry out drilling, etc.) and the fiscal package, which includes profit share and annual cost recovery (see below). The fiscal package is based on a set of assumptions, which are disclosed for bidders to arrive at a profit share scenario. (Typically, contractors commit themselves to sharing a rising part of the profit petroleum as their pre-tax investment multiple [PTIM] rises. PTIM is defined as cumulative net cash flows divided by cumulative exploration and development cost.) The contractor is allowed full cost recovery on all costs incurred in an exploration block. There is, however, a limit on annual cost recovery (i.e. the amount of production costs that the contractor can claim in any given year); the limit is determined as a percentage of annual revenue and is a bid variable as stated above. The excess costs are carried forward till they are fully exhausted. The process of limiting annual cost recovery ensures that the government begins to get a share of profit petroleum immediately after production begins. Bids are objectively evaluated on the basis of bidders’ committed work programme, bid cost recovery limit and profit share offered to the government. Government of India
enters into a contract with the successful bidder as per the Model Production Sharing Contract (MPSC). The MPSC provides, inter alia, proforma of guarantee and exploratory and profit-sharing terms accepted by the government as well as the accounting procedures. It ensures fiscal stability during the tenure of the contract.

Under the NELP, the government has exempted companies from payment of cess on crude oil, which was applicable earlier. Imports have been exempted from customs duties and a seven-year tax holiday is available from the date of commencement of commercial production. While the central government had to forgo revenue on these counts, states were persuaded to reduce their royalty rate on crude in onland areas from 20 per cent to 12.5 per cent on crude oil production. While central and state governments lose revenue in terms of traditional instruments, they gain by way of a share in profit petroleum. The government’s share of profit petroleum arising out of contractual provisions in the case of NELP blocks is shared between the union government and the state from where mineral oils are produced in the ratio of 50:50.

This system has a number of advantages. Its biggest attraction is its flexibility. The share of profit petroleum that the government gets may vary from project to project, but there is no need to change the overall fiscal framework. The government clarifies the factual position on tax provisions before bidding under NELP, so that bidders can factor in the applicable taxes while evaluating and bidding for the block and accordingly offer profit petroleum to the government. So, there is no fear of forgoing investment because of an onerous fiscal regime. Nor is there a possibility of the government feeling short-changed when it perceives mining companies to be making excessive profits. (In a production-sharing regime, the share of the government fluctuates in tandem with oil and gas prices.) Secondly, it is incentive-compatible. Investors can raise their return through higher cost efficiency, while the revenue objective of the government is aligned with the success of the project. Third, government does not have to make any investment on exploration; the entire risk is transferred to the mining companies. Finally, this would attract varied and multiple investors—domestic and foreign—that can usher in new technology and geological ideas.

India’s experience with production-sharing contracts has been encouraging. Investor interest has been robust. While in the decade preceding NELP, only 28 contracts were bid out, some 162 contracts have been bid out under NELP (with minimum committed investment of US$8.3 billion) in the past 8 years. By March 2008, total investment under NELP was US$5988 million, of which PSUs accounted for US$2067 million, domestic private investors US$3332 million and foreign investors US$589 million (see Table 41.3). As exploration activities progress, investments in
already-concluded rounds and other subsequent rounds will increase. As of now, 62 oil and gas discoveries have been made in 17 exploration blocks under the NELP. Further, the quality of exploration has substantially improved, as some of the blocks relinquished earlier by the ONGC and OIL due to lack of success and awarded under NELP have yielded major oil and gas recoveries.

### Table 41.3: Investments made in exploration and production sector in NELP (provisional; US$ million; as on 31 March 2008)

<table>
<thead>
<tr>
<th>Total investment</th>
<th>Exploration</th>
<th>Development</th>
<th>Total</th>
<th>PSU</th>
<th>Private</th>
<th>Foreign</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEPL-I</td>
<td>2,257</td>
<td>1,438</td>
<td>3,695</td>
<td>695</td>
<td>2,637</td>
<td>364</td>
</tr>
<tr>
<td>NEPL-II</td>
<td>433</td>
<td>9</td>
<td>442</td>
<td>332</td>
<td>61</td>
<td>49</td>
</tr>
<tr>
<td>NEPL-III</td>
<td>768</td>
<td>—</td>
<td>768</td>
<td>251</td>
<td>461</td>
<td>56</td>
</tr>
<tr>
<td>NEPL-IV</td>
<td>684</td>
<td>—</td>
<td>684</td>
<td>612</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>NEPL-V</td>
<td>398</td>
<td>—</td>
<td>398</td>
<td>177</td>
<td>137</td>
<td>84</td>
</tr>
<tr>
<td><strong>Total NELP</strong></td>
<td><strong>4,540</strong></td>
<td><strong>1,447</strong></td>
<td><strong>5,987</strong></td>
<td><strong>2,067</strong></td>
<td><strong>3,332</strong></td>
<td><strong>589</strong></td>
</tr>
</tbody>
</table>

*Source: Ministry of Petroleum*

By now, India has had sufficient experience in production-sharing contracts. In view of the fact that the regime is proving to be investor-friendly and that neither the central nor any state government had any major issue with this regime, it is time to explore the possibility of replicating this arrangement for other minerals. The most attractive feature of this regime is that without making any financial commitment, the government can attract significant investment in a manner that optimizes the government’s revenue objectives. The biggest shortcoming of this method is that it is complex to administer. Difficulties relate particularly to the determination of allowable costs (Baunsgaard, 2001). It is therefore more suitable for high value minerals, where capital and technology requirements are significant. A beginning can perhaps be made with a few select major minerals. An important point to note is that the new regime can be applied only to the new blocks being offered.

### 6. The Environment Angle

Before analyzing the Indian case, it would be useful to examine the theoretical framework for suitability of a tax system from an environmental viewpoint. For this, we rely on the framework provided by Muzondo. A matter of greater public concern is when mining entails external effects, affecting the general public. This can take the form of pollution of surface water or aquifers, degradation of land, and air pollution. The extent of externalities depends on the rate of extraction and cumulative amounts of minerals already extracted. This calls for an appropriate
corrective tax (such as a Pigouvian tax) to ensure that mining firms take into account the social costs they impose on others. Such a tax on an extractive firm would help “internalize” both current and cumulative externalities. Muzondo has argued that a neutral tax such as a resource rent tax must be combined with an appropriate corrective tax to ensure efficient resource allocation. “In the absence of such a corrective tax, neutral taxes may perform worse (especially from an environmental point of view) than non-neutral taxes, such as specific taxes, because the latter partially offset the impact of environmental externalities on resource allocation” (Muzondo, op. cit).

In India, there is no environment tax specific to the mining industry. Although there is a tax (water cess) that closely resembles Pigouvian taxes, it applies to all polluting industries. The Water (Prevention and Control of Pollution) Cess Act of 1977 requires designated industries and local governments such as municipalities, to pay a cess for water consumption, which would help meet the expenses of the central and state water pollution control boards. “The water cess is not a pollution tax—it is not levied on the externality per se, and is motivated by revenue considerations. But it does distinguish between different uses of water. Therefore, it is the closest that India has to a Pigouvian tax on pollution” (Gupta, 2001). In addition, entrepreneurs need to pay consent fees (for combined consent for one term under the Water and Air Acts) to the Pollution Control Boards for processing their applications. The term of consent for Red, Orange and Green categories of industry (depending on their potential to pollute) is one, two and three years respectively. These fees are typically linked to project costs.

In environmental regulation in India, there is much more reliance on “command and control” methods than corrective taxes. These regulations have not been effective, as evidenced by growing pollution caused by industries, including mining. Using the theoretical framework outlined above, it would be fair to infer that until we have a more effective mechanism—“command and control” type or corrective tax type—to curb pollution, specific rate royalty would be preferable to neutral taxes, at least from the environmental viewpoint.

Let us now turn to examine how mineral taxes fare in terms of their impact on the environment (through their influence on rates of extraction). A once-for-all flat rate per unit tax (or specific tax) has the impact of reducing the rate of extraction because the mining firm can increase its net present value by postponing production into the future. This is so, because while the tax liability of the marginal production in each period remains constant, the present value of the future tax liability is smaller than that for the present period. From the point of view of environmentalists and conservationists, once-for-all specific taxes are attractive, because they reduce the
rate of extraction and increase the reserves left in situ. But if the tax changes over

time, its impact depends on whether the rate of change of the tax is greater, equal to

or less than the rate of interest. In the case of ad valorem taxes, changes in the price

of the mineral play a key role. The rates of extraction will remain unchanged, reduced

or increased depending on whether prices rise at rates equal to, greater than or less

than interest rates.18

Although it appears that there is some scope for advancing environmental objectives

by changing the fiscal regime, it can be extremely complicated in practice, since

there can be conflicts between such objectives and revenue and stability objectives,

which are the primary focus of mineral taxation instruments. Further, while

theoretically there may be a case for migrating to a neutral tax (such as resource

rent tax), in practice the conditions of neutrality of resource rent tax are not satisfied

(Muzondo op. cit.). The upshot of the discussion is that the focus of tax efforts

from the environmental viewpoint must be on corrective taxes and not on mineral

tax instruments.

What has been the policy approach to environmental degradation due to mining?
The National Mineral Policy 2008 (NMP) recognizes that several environmental

problems—such as land degradation in opencast mining and land subsidence in

underground mining, atmospheric pollution, pollution of rivers and streams, soil

erosion due to the disposal of solid wastes like overburden and so on—result from

mining activities. The problem is aggravated by the fact that a large part of India’s

important minerals are in areas that are under forest cover. Recognizing these factors,

the NMP suggests that

Prevention and mitigation of adverse environmental effects due to mining

of minerals and repairing and re-vegetation of the affected forest area

and land covered by trees in accordance with the latest internationally

acceptable norms and modern afforestation practices shall form integral

part of mine development strategy in every instance. All mining shall be

undertaken within the parameters of a comprehensive Sustainable

Development Framework which will be so devised as to take all these

aspects into consideration.

Further, no mining lease would be granted to any party, private or public, without

a proper environmental management plan (approved and enforced by statutory

authorities), which should adequately provide for controlling environmental

damage, restoration of mined areas and for planting of trees according to prescribed

norms. Clearly, the approach towards environmental degradation continues to be

one of “command and control”, even in the latest policy statement, with absolutely

no mention of reliance on any corrective tax instruments.
7. **SUMMARY AND CONCLUSION**

To continue on its current high growth path, India will have to step up its investment in mining. Investment in the sector has begun to pick up momentum only in the past 2–3 years, with the private sector beginning to show interest. To maintain the momentum, one of the important factors to be taken into account is the fiscal regime. At the same time, states as owners of minerals are concerned that their revenues from the sector are not keeping pace with the price of the minerals. Frustrated with the inadequate and infrequent revision of royalty, some states have attempted to levy additional tax in the form of cess to earn higher revenue, but have not succeeded due to court orders and the central government’s retaliation. There is, therefore, a need to move to a fiscal regime that balances the requirements of both the government and the investors. In this context, the Hoda Committee has made wide-ranging recommendations with the thrust on a quick transition to ad valorem basis and a rationalization of the tax rates by using an international benchmark. These recommendations are in the right direction, but there can be some major implementation issues. In the case of coal, some reforms have been undertaken, but without adequate price reforms, allocation will continue to be distorted and states’ revenues will suffer. To take the reform process forward, there is a need to explore a fiscal regime that has worked satisfactorily under Indian conditions, especially keeping in view the current major issues as well as the implementation challenges of the proposed reforms. Production-sharing contracts in the petroleum sector are one such example. Significantly, they have not given rise to the same kind of centre–state issues as in the case of other minerals. It is, therefore, perhaps not too early to explore the possibility of extending the arrangement to some other minerals. As regards the environment, it would be useful to strengthen Pigouvian-type corrective taxes rather than rely on mineral taxes to address environmental objectives.

**REFERENCES**


**ANNEXURE 1**

**Table 41.4: Value of domestic production from mining and quarrying (Rs crore)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Value of output</td>
<td>53,016</td>
<td>76,269</td>
<td>134,638</td>
</tr>
<tr>
<td>Major minerals</td>
<td>49,151</td>
<td>64,546</td>
<td>119,487</td>
</tr>
<tr>
<td>Fuel minerals</td>
<td>43,306</td>
<td>54,935</td>
<td>100,598</td>
</tr>
<tr>
<td>Coal</td>
<td>24,485</td>
<td>34,098</td>
<td>44,147</td>
</tr>
<tr>
<td>Metallic minerals</td>
<td>3,691</td>
<td>6,683</td>
<td>15,229</td>
</tr>
<tr>
<td>Iron ore</td>
<td>1,924</td>
<td>3,851</td>
<td>11,646</td>
</tr>
<tr>
<td>Non-metallic minerals</td>
<td>2,155</td>
<td>2,928</td>
<td>3,660</td>
</tr>
<tr>
<td>Minor minerals</td>
<td>3,864</td>
<td>11,723</td>
<td>15,151</td>
</tr>
<tr>
<td>less: Inputs</td>
<td>11,172</td>
<td>17,316</td>
<td>32,117</td>
</tr>
<tr>
<td>less: FISIM</td>
<td>250</td>
<td>659</td>
<td>705</td>
</tr>
<tr>
<td>GDP from mining</td>
<td>41,594</td>
<td>58,294</td>
<td>101,816</td>
</tr>
<tr>
<td>Total GDP</td>
<td>1,952,035</td>
<td>3,117,371</td>
<td>4,145,810</td>
</tr>
<tr>
<td>Share of mining in GDP</td>
<td>2.13%</td>
<td>1.87%</td>
<td>2.45%</td>
</tr>
</tbody>
</table>

*Source: Central Statistical Organization*
## ANNEXURE 2

<table>
<thead>
<tr>
<th>States/UTs</th>
<th>2001–02</th>
<th>2005–06</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>6053</td>
<td>9590</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>44</td>
<td>152</td>
</tr>
<tr>
<td>Assam</td>
<td>2947</td>
<td>6540</td>
</tr>
<tr>
<td>Bihar</td>
<td>195</td>
<td>114</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>4584</td>
<td>8838</td>
</tr>
<tr>
<td>Goa</td>
<td>397</td>
<td>1114</td>
</tr>
<tr>
<td>Gujarat</td>
<td>4478</td>
<td>10888</td>
</tr>
<tr>
<td>Haryana</td>
<td>293</td>
<td>418</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>74</td>
<td>80</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>5882</td>
<td>10201</td>
</tr>
<tr>
<td>Karnataka</td>
<td>1150</td>
<td>3491</td>
</tr>
<tr>
<td>Kerala</td>
<td>163</td>
<td>279</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>4660</td>
<td>7738</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>3342</td>
<td>5239</td>
</tr>
<tr>
<td>Manipur</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>435</td>
<td>946</td>
</tr>
<tr>
<td>Mizoram</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Nagaland</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Orissa</td>
<td>3432</td>
<td>8821</td>
</tr>
<tr>
<td>Punjab</td>
<td>34</td>
<td>39</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>2427</td>
<td>4278</td>
</tr>
<tr>
<td>Sikkim</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>1792</td>
<td>2762</td>
</tr>
<tr>
<td>Tripura</td>
<td>85</td>
<td>156</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>148</td>
<td>515</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>2713</td>
<td>3770</td>
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</table>
Table 41.5: State-wise value of output from mining and quarrying (contd...)

<table>
<thead>
<tr>
<th>States/UTs</th>
<th>2001–02</th>
<th>2005–06</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Bengal</td>
<td>3232</td>
<td>4079</td>
</tr>
<tr>
<td>A&amp;N Islands</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Dadra and Nagar Haveli</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Daman &amp; Diu</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Delhi</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Lakshadweep</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Puducherry</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Chandigarh</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bombay High</td>
<td>13961</td>
<td>32914</td>
</tr>
<tr>
<td>All India</td>
<td>62584</td>
<td>123015</td>
</tr>
</tbody>
</table>

Source: CSO

ANNEXURE 3

Figure 41.5: Total investment in mining sector in India in 1999–2000 prices

Source: CSO
Figure 41.6: Share of private investment in mining and overall

Source: CSO

ANNEXURE 4

Table 41.6: Royalty accruals on minerals in states with significant mining activities (Rs crore)

<table>
<thead>
<tr>
<th>State</th>
<th>Total royalty collection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2002–03</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>552</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>798</td>
</tr>
<tr>
<td>Karnataka</td>
<td>84</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>591</td>
</tr>
<tr>
<td>Orissa</td>
<td>441</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>400</td>
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<tr>
<td>Maharashtra</td>
<td>401</td>
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<tr>
<td>Gujarat</td>
<td>173</td>
</tr>
<tr>
<td>Kerala</td>
<td>2</td>
</tr>
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<td>Goa</td>
<td>15</td>
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<tr>
<td>Tamil Nadu</td>
<td>297</td>
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<tr>
<td>Andhra Pradesh</td>
<td>770</td>
</tr>
<tr>
<td>Uttaranchal</td>
<td>23</td>
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<tr>
<td>Uttar Pradesh</td>
<td>262</td>
</tr>
<tr>
<td>Haryana</td>
<td>118</td>
</tr>
<tr>
<td>Assam</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>4,934</td>
</tr>
</tbody>
</table>

Source: Hoda Committee Report, 2006
ANNEXURE 5

Table 41.7: Mineral-wise collection of major minerals in Orissa (Rs crore)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>161</td>
<td>231</td>
<td>305</td>
<td>302</td>
<td>307</td>
<td>342</td>
<td>357</td>
<td>417</td>
<td>520</td>
<td>619</td>
<td>717</td>
<td>837</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>106</td>
<td>164</td>
<td>236</td>
<td>233</td>
<td>227</td>
<td>250</td>
<td>261</td>
<td>311</td>
<td>386</td>
<td>442</td>
<td>460</td>
<td>516</td>
</tr>
<tr>
<td>Iron ore</td>
<td>9</td>
<td>9</td>
<td>13</td>
<td>13</td>
<td>20</td>
<td>17</td>
<td>31</td>
<td>42</td>
<td>59</td>
<td>73</td>
<td>76</td>
<td>128</td>
</tr>
<tr>
<td>Bauxite</td>
<td>7</td>
<td>8</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>15</td>
<td>28</td>
<td>25</td>
<td>29</td>
<td>38</td>
<td>50</td>
<td></td>
</tr>
</tbody>
</table>

Source: Government of Orissa, Mining Department

Notes

1. A high-level committee was constituted by the Government of India to go into the issues related to the development of the mineral sector (including fiscal issues) and suggest measures for improving investment climate. The committee was headed by Mr Anwarul Hoda and is referred to as the Hoda Committee in this paper. The committee submitted its report to the government in December 2006.

2. Barring minor exceptions such as special deductions (on expenditures incurred on reconnaissance and prospecting), tax holiday, concessions on import of capital goods, etc.

3. Currently, there are 26 minor minerals.

4. In 2006–07, while royalty on major minerals was Rs 836.8 crore, revenue from minor minerals was about Rs 100 crore. The bulk of the revenue from minor minerals was by way of auction value. Dead rent was about Rs 2 crore to Rs 3 crore.

5. Other factors that play a key role in these decisions are geological significance of the region, physical infrastructure and political stability.

6. It may be noted that land is a state subject.

7. From 183.6 in 2002 to 233.9 in 2007 (Source: CSO).

8. Thirteen major minerals—iron ore, manganese ore, chrome ore, sulphur, gold, diamond, copper, lead, zinc, molybdenum, tungsten, nickel and the platinum group of minerals—which were reserved exclusively for the public sector, were opened up to the private sector.

9. Royalty rates are predominantly 2 per cent in China, and 3–5 per cent in Indonesia. African countries have very low royalties.

10. Currently, for the purpose of royalty calculation, the average pit mouth value (filed by mine operators with the IBM) is marked up by 20 per cent for domestic sales. The mark-up is intended to take into account the difference between pit mouth value and sale price.

11. Traded prices are available only for some metals.
12. Captive mines account for a significant part of production in some major minerals such as iron ore (25 per cent), limestone (93 per cent), bauxite (73 per cent) and zinc concentrates (100 per cent).

13. The Coal industry was nationalized in the 1970s.


15. They include industries such as ferrous and non-ferrous metallurgical mining, ore processing, coal, petroleum and petroleum chemicals, cement, textile, paper, fertilizer, etc.

16. These boards constitute a regulatory apparatus, having the powers to establish effluent standards. The discharge of pollutants into water bodies beyond established standards is prohibited. Further, generators of all new and existing sources of discharge into water bodies have to get the prior consent of pollution control boards. Penalties, such as fines and imprisonment, are laid down for not complying with these regulations.

17. Uses that entail higher pollution attract higher cess.

18. For details, see Muzondo, 1992.
INTRODUCTION

It was not so long ago that infrastructure investment in India was financed almost entirely by the public sector—from government budgetary allocations and internal resources of public sector infrastructure companies. In the span of 10 years, and particularly in the last four, the private sector has emerged as a significant player in bringing in investment (see Figure 42.1) and building and operating infrastructure assets from roads to ports and airports and to network industries such as telecom and power. Private investment now constitutes almost 20 per cent of infrastructure investment. Yet, total infrastructure investment remains low, at around 5 per cent of GDP. In contrast, China spent an estimated 14.4 per cent of GDP on infrastructure investment in 2006 and, contrary to popular perception, with little dependence on the state budget. The Government of India aims to raise infrastructure investment to over 9 per cent of GDP by the end of the Eleventh Five-Year Plan (2007–12), or an average of 7.4 per cent of GDP a year during the plan, and projects a rise in the share of the private sector to 30 per cent.

It is conceivable that the public sector can develop world-class infrastructure of the magnitude envisaged—as China and other countries have shown. But India has embarked on a model that includes private participation in infrastructure. The government recognises that public savings are not sufficient and also that the public sector, given its limited implementation capacity, cannot meet the huge infrastructure requirements to underpin economic growth of 9 per cent per annum. Moreover, the private sector brings greater efficiency in service delivery. To attract the private sector, the government has been putting in place the appropriate regulatory and institutional frameworks. At present, private investment in
Financing Infrastructure

Infrastructure is barely 1 per cent of GDP and most of the investments are in greenfield projects in telecom and energy, with concessions mainly in transport (Figure 42.2). Clearly, there is considerable scope to increase this. Countries which had impressive private investment in infrastructure in the 1990s had levels ranging from 4 to 6 per cent of GDP. Besides purely private projects, the government aims to catalyse private investment through public–private partnerships (PPP); the Eleventh Plan envisages private infrastructure investment to rise to 2.8 per cent of GDP by 2012. Private investment is expected to constitute more than 65 per cent of investment in telecom, ports and airports, 26 per cent in power and 36 per cent in roads. Is this doable or are these ambitious targets simply unrealistic? What is holding back a real take-off? What is required to make it happen?

If we set aside institutional and governance issues and focus on financial aspects, the problem may not seem insurmountable—abstracting from the current financial turmoil, which is temporary. After all, India has a high domestic savings rate which, at almost 35 per cent of GDP (in 2006–07), compares well with that of East Asian countries. Savings of the corporate sector have been rising steadily and were almost 8 per cent of GDP in 2006–07, while public savings also contributed, rising to over 3 per cent of GDP (from negative savings until 2002–03). What is of relevance, though, is that of the total household sector savings of around 23–24 per cent of GDP, less than half are in financial assets and more than half of the financial savings are in bank deposits, leaving a limited portion in other financial instruments. Contractual savings—those that are in long-term financial instruments—are just around 4 per cent of GDP (Table 42.1). Thus, the issue is not the lack of domestic savings.
savings or even of foreign capital, but that of financial intermediation, that is, how to channel long-term savings into infrastructure.

Table 42.1: Household saving in financial assets (% of GDP)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Financial assets (gross)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currency</td>
<td>16.7</td>
<td>18.6</td>
<td>15.5</td>
</tr>
<tr>
<td>Deposits</td>
<td>7.8</td>
<td>10.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Claims on government</td>
<td>2.4</td>
<td>1.0</td>
<td>-0.6</td>
</tr>
<tr>
<td>Investment in shares, debentures &amp; mutual funds</td>
<td>0.9</td>
<td>1.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Contractual savings†</td>
<td>4.1</td>
<td>4.5</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>B. Financial liabilities</strong></td>
<td>5.1</td>
<td>6.8</td>
<td>4.4</td>
</tr>
<tr>
<td><strong>C. Saving in financial assets (net) (A–B)</strong></td>
<td>11.6</td>
<td>11.8</td>
<td>11.1</td>
</tr>
</tbody>
</table>

Source: RBI Annual Report 2007–08

Notes: * Provisional; ** Preliminary; † comprise life insurance funds and provident and pension funds

Figure 42.2: Sectoral investment by private sector in infrastructure, 1990–2007 (US$ million)

Source: World Bank PPIAF database
What is special about infrastructure financing?

Building infrastructure is a capital-intensive process, with large initial costs and low operating costs. It requires long-term finance as the gestation period for such projects is often much longer than, say, for a manufacturing plant. Infrastructure projects are characterised by non-recourse or limited recourse financing, that is, lenders can only be repaid from the revenues generated by the project. Thus, the market and commercial risks, including uncertainty of (traffic) demand forecasts, assume greater significance for lenders. Besides the usual project risks, infrastructure development has other unique risks because of the public interest nature of most projects and the interface with regulators and government agencies. These risks could include tariff increase reversals due to public unacceptability of the tariffs determined, challenging of environmental clearances, arbitrary reneging of contracts and non-payment by (financially weak) monopoly public utilities. As a result, complex risk mitigation and allocation arrangements are embedded in the financial and contractual agreements amongst multiple parties—project sponsors, commercial banks, domestic and international financial institutions, and government agencies. And infrastructure projects have significant externalities—where the social returns exceed the private returns—which call for some form of subsidisation, such as government guarantees or viability gap funding to make them attractive for private sector involvement.

Infrastructure projects are generally executed through individual project companies called special purpose vehicles (SPV). The main reason for this is to better protect the parent company from possible adverse impact in the concession business. Separate SPV projects are then held by the parent company or its subsidiary in a holding company structure. SPVs typically do not have recourse to their parent companies after the initial capitalisation, nor do they have a credit history and strong balance sheets. This naturally affects their ability to secure financing from outside. Thus, infrastructure financing presents a number of challenges. The scale of investment is large and investors have to be prepared for a long horizon for debt repayment and return on equity. Many financial institutions are limited in their ability to invest in very long-term illiquid assets. The non-recourse nature, the unique risks of infrastructure development as well as the complexity of the arrangements also call for special appraisal skills. Since the output is non-tradable (with revenues accruing in domestic currency), infrastructure projects should generally be domestically financed to avoid high foreign exchange risk, although there are financial instruments to mitigate such risks in well-developed financial markets.

As a country’s financial system matures and becomes more sophisticated it is able to respond to these challenges in flexible, innovative ways. It can bring a range of investors at various stages of the project. Investors with the requisite skills and risk
appetite are needed to provide the initial financing, but should then be able to offload the assets to other investors when the projects start yielding revenues, thus moving on to invest in new projects. By this time, the major risks (especially construction risks) have already been borne by the initial investors and the projects have a prospective stable revenue stream. A different type of investor may come in at this stage, thus widening the pool of investors that can be tapped and lowering the overall financing cost of the project.

**Limits to existing financing sources**

**Debt financing**

Notwithstanding the difficulties, infrastructure financing has grown rapidly over the past few years in tandem with the increase in private investment in infrastructure. This is because of the pivotal role played by commercial banks, primarily a few key public sector banks that have been willing to provide the project finance. Table 42.2 provides indicative estimates of debt financing. Commercial bank lending to infrastructure took off four years ago, in 2004–05, followed by specialised non-bank finance companies (NBFCs), which are largely dependent on bank funding, in 2005–06. The insurance sector, dominated by the Life Insurance Corporation of India (LIC), has also steadily increased its financing of infrastructure. Data on foreign borrowing are hard to come by but a (gross) disbursement estimate for 2006–07 indicates that external commercial borrowings (ECB) account for less than 20 per cent of the total debt finance to infrastructure.

These are positive trends, no doubt. But the Planning Commission’s estimate of total debt needs for infrastructure investment during the Eleventh Plan—Rs 984,500 crore (at 2006–07 constant prices) implies, on average, 2.5 times increase in the annual amount from Rs 80,000-plus crore in 2006–07 (see Table 42.2). After projecting that the traditional sources of finance can expand to Rs 825,500 crore, the Planning Commission estimates a gap of Rs 159,000 crore. Realising the overall debt target is a huge challenge given the constraints to growth in each of the sources of debt finance.

Commercial banks have driven the increase in infrastructure finance, both direct and indirect. The first year of the plan (2007–08) recorded high growth but a continued rapid expansion of such finance may not be sustainable as it is leading to a growing concentration of risks on banks’ balance sheets. These risks arise from the maturity mismatch created by financing long duration infrastructure projects from the essentially short-term nature of banks’ liabilities. Within six years, between March 2002 and March 2008, total bank lending to infrastructure trebled from 3.1 per cent of total non-food gross bank credit outstanding to 9.2 per cent. The growing asset–liability maturity mismatch on account of infrastructure has been exacerbated
Table 42.2: Debt financing of infrastructure (Rs crore)

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial banks</td>
<td>10,927</td>
<td>41,775</td>
<td>33,831</td>
<td>29,286</td>
<td>60,180</td>
<td>128,862</td>
<td>423,691</td>
</tr>
<tr>
<td>NBFCs</td>
<td>8,802</td>
<td>8,351</td>
<td>14,087</td>
<td>19,444</td>
<td>25,380</td>
<td>72,415</td>
<td>224,171</td>
</tr>
<tr>
<td>Insurance companies</td>
<td>6,104</td>
<td>6,182</td>
<td>10,573</td>
<td>15,215</td>
<td>16,737</td>
<td>13,289</td>
<td>55,414</td>
</tr>
<tr>
<td>ECBs</td>
<td>n.a.</td>
<td>n.a.</td>
<td>17,635</td>
<td>19,593</td>
<td>29,851</td>
<td></td>
<td>122,263</td>
</tr>
<tr>
<td>Total</td>
<td>25,833</td>
<td>56,308</td>
<td>58,491</td>
<td>81,580</td>
<td>121,889</td>
<td>244,417</td>
<td>825,539</td>
</tr>
</tbody>
</table>

Estimated debt requirement * | 282,744 | 984,472 |

Source: RBI, Capitaline, company websites/annual reports, LIC & IRDA annual reports and Planning Commission

Notes: * by Planning Commission
1. Financing refers to net flows, except for ECBs which are gross flows.
2. NBFCs included are IFCI, IIFCL, REC, HUDCO, IRFC, PFC, IDFC, IL&FS, SREI and L&T Infra Finance.
3. For insurance companies, outstandings in March 2008 are projected at the average growth of the previous three years, in the absence of actual data.
4. ECBs for 2007–08 are projections of the Planning Commission.
5. For the Eleventh Plan, the Planning Commission projects likely debt resources of Rs 825,539 crore as against its estimated debt requirement of Rs 984,472 crore, leaving a gap of Rs 158,933 crore.
by a concurrent rise in other long-term assets, in particular housing loans. Together, these long-term assets now account for 21 per cent of total non-food bank credit (see Figure 42.3). In fact, the exposure of banks to infrastructure and housing is actually higher as banks lend to NBFCs who on-lend to these sectors.

If we assume that non-food bank credit will grow at 20 per cent a year for the rest of the Plan period, the Planning Commission’s projections imply that bank lending to infrastructure will account for about 13 per cent of total non-food bank credit by 2011–12. These are overall numbers; individual bank exposure would be significantly higher for some, since many banks do not have the skills set or balance-sheet size to engage in infrastructure lending. Moreover, the share of housing loans in bank portfolios is also likely to increase given the thrust on financing affordable housing. Thus, the share of total long-term assets could very easily rise to above 30 per cent of banks’ non-food credit. The risks are higher on banks than evident in these numbers as specialised NBFCs also rely on bank funding.

The increasing share of long-term assets comes at a time when the maturity of deposits has been shortening, thus exacerbating the liquidity risk of financing long-term assets with short-term liabilities. Term deposits with maturity of three years and above have declined from 32.9 per cent of total term deposits in March 2000 to 22.7 per cent by March 2007 (and only 7 per cent are at five years or more). Banks have been dealing with this situation by relying on annual interest resets and put/call options on the loans, thereby passing the market risks to the projects. However, if projects are unable to bear all the risks, they could become a credit risk to banks.

Figure 42.3: Share of banks’ long-term loans and deposits

Source: RBI
It should be noted, though, that savings account deposits have been in the region of 24–28 per cent of aggregate deposits for several years. Therefore, if we assume that 80 per cent of savings deposits are fairly stable and consider them along with term deposits of maturity of three years and over, about 35 per cent of aggregate bank deposits may be viewed as stable as of March 2007 (down from 40 per cent in March 2000). So, 35 per cent of total deposits (assuming that the share of long maturity term deposits does not decline any further) would cover the projected 30 per cent of long-term loans by 2011–12. However, it should be noted that the maturity period of the loans is typically over 10 years and the bulk of the long-term deposits is in the three-year original maturity period. In fact, only about 3 per cent of deposits have a five-year or greater residual maturity as of March 2007.

On its own, the maturity mismatch may not seem severe, but combined with other vulnerabilities in the balance sheets of banks, it could lead to problems. Take, for instance, the current situation. Banks had been lending at breakneck pace over the past few years, with incremental credit–deposit ratios often of 90 per cent and over. As a result, they had to borrow from non-bank sources. When the global credit crisis broke out and domestic liquidity tightened due to capital outflows, the over-extended banks had difficulties meeting their liabilities as short-term borrowing from the non-bank sources dried up. And, as happens in times of crisis, the maturity structure of bank liabilities shortens quickly—so if banks are vulnerable due to other factors, it could lead to further stress in the banking system.

In addition, many banks are reaching exposure limits to infrastructure-related borrowers (because of large project size relative to bank capital). Indian banks are relatively small. Only 11 banks had equity above US$1 billion in March 2007, of which two were private sector banks. The largest bank, the State Bank of India, had just over US$7 billion of capital in March 2007. The next three public sector banks together would be equivalent in capital strength to SBI. The total equity of the 82 scheduled commercial banks (including 29 foreign banks) was US$49.8 billion. Thus, there are many small banks, most of which do not engage in infrastructure lending and the handful of banks that are actively lending to infrastructure are likely to reach exposure limits if they continue lending at this pace.

Specialised NBFCs have become a significant source of infrastructure finance but their growth is constrained by their access to bank finance, in the absence of alternative wholesale funding sources. Tighter prudential limits on bank lending to NBFCs in 2007 have effectively capped the latter’s access to commercial bank funds. Even if there is some headroom on bank exposure limits to NBFCs and bank resources are forthcoming, these would be at significantly higher costs due to the incidence of a higher capital charge and provisioning requirement on standard assets for bank lending to NBFCs. Moreover, banks are increasingly providing shorter
tenor finance and have an annual reset in interest rates, thereby passing the interest rate risk to NBFCs.

Another funding source for NBFCs is insurance companies. Pension funds and insurance companies are well suited to fund infrastructure because of their long-term liabilities but, in India, they are still a small source of finance for infrastructure despite the rapid growth in insurance penetration. Why is this? First, while insurance penetration has grown from 1.9 per cent in 2000 to around 4 per cent of GDP, it still remains low compared to the figure of about 9 per cent of GDP in the USA and Europe and 10.7 per cent of GDP in Japan and the newly-industrialised Asian economies in 2006. Second, statutory preemptions by the government and other restrictions essentially limit investments in infrastructure. Some key restrictions include minimum credit rating for debt instruments and minimum dividend payment record of seven years for equity. These are difficult conditions for private infrastructure projects to meet as they have been set up recently and do not enjoy high credit rating in the initial years. Accordingly, the Parekh Committee recommended a relaxation of these guidelines for infrastructure projects and companies. Third, irrespective of these regulatory guidelines, public insurance companies are inherently very risk averse. This is clear from the fact that they invest more than required in government securities (between 51–52 per cent of the life insurance investments, dominated by LIC, were in central government securities in FY 06 and FY 07 as against the minimum required of 25 per cent) and they invest mostly in the paper of publicly-listed infrastructure companies towards meeting their mandated minimum infrastructure and social sector requirements (15 per cent of Life Fund for life insurance companies and 10 per cent for general insurance companies) rather than funding infrastructure projects. Fourth, the rapid growth in private insurance is not reflected in greater investments in infrastructure because 85 per cent of the policies sold by private insurance players are unit linked. In fact, even LIC expanded unit-linked policies with the result that, overall, ULIP funds in the insurance sector have grown forty-fold between FY 04 and FY 07, rising from less than 0.5 per cent to 11 per cent of total investments of life insurers. Finally, with the exception of LIC, insurance companies, pension and provident funds rarely invest in paper with a maturity longer than five to seven years.

It was hoped that some of these constraints would be eased by modifying the investment regulations governing insurance companies. In August 2008, new investment guidelines were issued by the Insurance Regulatory and Development Authority (IRDA). While these guidelines have broadened the definition of infrastructure and aligned it with RBI’s definition (as proposed in the Parekh Committee), they have not relaxed the conditions sufficiently to permit insurers to potentially hold a wide range of infrastructure projects in their investment portfolio.
Although the approved category of investments includes more instruments, such as asset-backed securities with underlying infrastructure assets, and corporate debt based on a minimum rating criteria, the rating quality is not less than AA whereas a typical non-recourse infrastructure project is rated BBB. Moreover, 75 per cent of all debt investments in an insurance company’s portfolio (excluding government and other approved securities) must now have AAA rating. In effect, therefore, the modifications of August 2008 have made investment criteria even more stringent by raising the bar on rating requirements. This will not facilitate direct investments in many private infrastructure companies, let alone infrastructure project SPVs.5 ECBs, another option, were also constrained by limits placed in 2007. For some time, ECBs were cheaper than domestic term loans even after taking into account the hedging cost, but they were discouraged.6 The restrictions, which were aimed at curbing the monetary expansion effects of capital inflows, affected the infrastructure sector as it has a high domestic expenditure component. There was also a restrictive cap on interest rates which affected infrastructure project financing since the inherently riskier nature of infrastructure development calls for a higher risk premium. In particular, interest rate caps prevent access to different debt or quasi-equity instruments (like mezzanine financing), the pricing of which needs to be commensurate with the associated risks. Recently, after credit market conditions tightened, the ECB policy was relaxed in October 2008 to enable up to US$500 million per borrower per year for rupee or foreign currency expenditure without prior approval and the all-in-cost ceilings were raised (to 300 bps above LIBOR for three to five year ECB maturity and to 500 bps for over five years). However, the more liberal policy does not apply to financial intermediaries who still need to get prior approval. Thus, even if international financing were to become available, at those rates it would only be the large well-established firms that could have access to it. Infrastructure projects under SPVs would be unlikely to gain access either directly or through financial intermediaries.

**Equity financing**

Supporting higher levels of debt requires more equity, with the amount varying with the level of project risk. Equity is mainly provided by the project sponsor who, in turn, may tap the primary market for capital. Substantial resources were raised by infrastructure companies from IPO with the secondary market boom in recent years, peaking in 2007–08 before drying up more recently due to the financial turmoil (see Table 42.3). Clearly, developers have a limited amount of capital and have to tie it up for a significant length of time for each project. It is, therefore, important to bring in financial investors so that the promoters’ risk capital can be recycled into other projects. In recent years, financial investors have shown keen interest in India:
witness the number of private equity (PE) infrastructure funds formed. However, rules for sell-down of equity can be quite stringent and act as a deterrent to the entry of more financial investors who would like greater flexibility in exit options. Moreover, sales of unlisted projects, unlike listed investments, are subject to the full weight of the capital gains tax. Since most infrastructure projects are unlisted, this acts as a disincentive to equity investors in infrastructure. Also, equity investors perceive termination payments for government agency defaults (for example, not providing the right of way in road projects) to be inadequate in many concession agreements. In some cases, the lenders are repaid whereas the equity holders suffer. This encourages a greater use of debt.

Table 42.3: Capital raising of infrastructure companies and PE investments in infrastructure

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of issues</th>
<th>Rs crore</th>
<th>No. of deals</th>
<th>US$ mn</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004–05</td>
<td>4</td>
<td>6,221</td>
<td>7</td>
<td>92</td>
</tr>
<tr>
<td>2005–06</td>
<td>9</td>
<td>4,649</td>
<td>10</td>
<td>613</td>
</tr>
<tr>
<td>2006–07</td>
<td>12</td>
<td>6,646</td>
<td>40</td>
<td>2,782</td>
</tr>
<tr>
<td>2007–08</td>
<td>21</td>
<td>20,647</td>
<td>77</td>
<td>7,824</td>
</tr>
<tr>
<td>2008–09</td>
<td>3</td>
<td>987</td>
<td>48</td>
<td>3,805</td>
</tr>
</tbody>
</table>

Sources: NSE, IDFC-SSKI database, Dealtracker by Grant Thornton & India Infrastructure Research 2008

Notes:
1. Data for 2008–09 up to 24th October, 2008
2. The Reliance Power Ltd issue alone has raised half the funds (Rs 10,260 crore) in IPO for 2007–08

The biggest constraint on the development of a strong domestic PE industry is the very narrow base of domestic investors. Globally, PE firms rely on a mix of institutional investors such as pension funds and insurance companies and contributions from high net-worth investors (HNIs). In India, the ability of insurance companies and pension funds to invest in alternative asset classes is still quite restricted and HNIs will take some time to take up this asset class.

What can be done?
As far as equity capital is concerned, various measures can be taken to facilitate the entry of financial investors in infrastructure. Some things can be done easily and have an effect relatively quickly, such as removing or loosening of restrictions on financial investors as owners of concessions, including improving exit and tax policies.
to make it easier for them to exit from unlisted infrastructure projects. Over the longer term, pension reform should also bring in other investors such as privately managed pension funds into domestic private equity.8

Relying on domestic banks to meet the bulk of the future requirements of infrastructure debt finance is resulting in a growing concentration of risks in banks. Can banks continue to play an important role—at least until other sources of finance are developed—while mitigating their balance sheet risks?

To do so will require decisive changes, some of which are difficult in the current scenario. First, banks will need to raise additional capital in order to avoid sector concentration risk. However, until the government is willing to relax its majority ownership of public sector banks or to provide commensurate capital increases, the public sector banks may have to rely more on Tier II capital such as perpetual debt and other capital structure devices. Second, to make the syndication of loans more effective, appraisal capacity needs to be strengthened in more banks. Third, bank consolidation could also ease the exposure constraint somewhat for individual banks (as many small banks do not have any infrastructure exposure), although consolidation has not taken off so far despite much talk and a few attempts at merging public sector banks. Fourth, swap market development is required to facilitate term transformation and hedge interest rate risk. Finally, securitisation of the loan portfolios of banks is necessary to spread risks more widely and to enable banks to invest in new projects. Needless to say, proper regulation and supervision needs to be in place to avoid perverse incentives kicking in with the transfer of risks, as witnessed in the recent subprime mortgage crisis in the US.

Is there a role for specialised NBFCs going forward? The main advantage of NBFCs is their deep knowledge of the sector and its complexities as well as their risk appetite for such long-gestation projects. In an environment where appraisal skills for infrastructure projects are scarce and there is limited experience with PPP arrangements, specialised NBFCs can play a crucial role in originating loans. Insurance companies may also be more comfortable lending to highly rated NBFCs to on-lend to infrastructure projects, given the conservative investment policies of such institutional investors. But NBFCs need access to low-cost wholesale funding sources, which a developed debt market with multiple institutional players provides. Besides their lack of access to low-cost funding sources, they face—perhaps even more severely than banks—exposure norm constraints. Thus, for NBFCs to continue playing an important role, they need to be able to manage risks and optimally utilise their capital and balance sheets by being able to churn their assets through various mechanisms, including securitisation.

Thus, whatever other measures are taken, securitisation is particularly important for allowing banks and NBFCs to distribute their risk more widely. But securitisation
itself cannot take off without access to deep and liquid debt capital markets, whether domestic or foreign. Greater access to foreign debt capital markets entails further movement towards capital account convertibility which does not seem imminent. Hence, the urgent need to develop domestic debt capital markets, the single most important catalyst for which is expanding and diversifying the base of institutional investors. A large, diversified investor base with differing perceptions is essential for developing a liquid market.

Whilst private placement of debt can work in a limited way, as is currently the case in India, a bond market is necessary to provide the mechanisms for greater liquidity and risk minimisation. In India, the bond market is small (compared to the size of the financial sector and to GDP) and undeveloped.\(^9\) In fact, the corporate bond market is the least developed and totally illiquid segment of the financial market. Trading in the Indian corporate debt market is insignificant, and most of the issuance is currently on a private placement basis. Indeed, it has been called ‘a privately placed loan market in the guise of a bond market’. With the development of an active and liquid market for securitised corporate debt, commercial banks, mutual funds, and financial institutions could also emerge as potentially large investors.

About three years ago, the Patil Committee came out with a series of detailed recommendations but there has been very little progress since then in developing the market. In Box 42.1 we summarise what, in our view, are the priorities to jumpstart an active bond market.

**Box 42.1: Priorities for developing an active bond market**

- Diversified, large investor base with differing perceptions
  - permit greater foreign investment in rupee debt with suitable qualifications—such as investment in long-term instruments issued by infrastructure companies
  - remove asymmetry between bonds and bank loans by allowing banks to invest in unrated and unlisted bonds of infrastructure companies (Basel II will remove mark-to-market asymmetry)
- Simplify all primary market regulations
  - private placement should be confined only to qualified institutional buyers and the number restrictions should be removed
  - all regulations pertaining to the issuance of corporate debt securities should be consolidated under aegis of SEBI (SEBI, Company Law Board, stock exchanges, etc., issue guidelines relating to issue of debt securities)
  - reduction and uniformity in stamp duty on issuance of debt instruments
- Put in place market infrastructure for exchange trading
  - clearing and settlement mechanism is a prerequisite for participants to move to an exchange trading platform
• Introduce instruments that will improve liquidity and hedge risks
  – short-selling of demat bonds
  – repo transactions on corporate bonds through a specialised clearing and settlement platform
  – hedging instruments—interest rate futures, credit derivatives
• Develop benchmark government bond yield curve
• Bring in lower-rated credit in the next phase through credit enhancement

If our financial system is unable to quickly gear up to intermediating huge flows for infrastructure, one option is to consider relying more on international funding until the domestic financial sector matures in terms of investors, markets and instruments. Although currently foreign investors may not be forthcoming, once the financial turmoil settles they would be attracted by the infrastructure growth opportunities. Admittedly though, the international banking system is likely to be more cautious about high leverage after the crisis than has been customary. And if they have to play a much bigger role than in the past, they would expect assurances through various risk mitigation measures (of political risk, regulatory risk and so on) which raise project costs—risk perceptions of foreign investors tend to be more acute than those of their domestic counterparts. However, there are limits to foreign borrowing for infrastructure financing. It entails a potentially risky currency mismatch which is not easy to hedge given the long tenor of the borrowings involved. Even if it were possible to hedge this risk effectively, it would be costly given the volatile exchange rate movements faced by developing countries. Moreover, domestic infrastructure companies’ access to international bond markets is likely to remain limited unless they have an established track record—getting projects rated internationally on a non-recourse basis is very difficult even for the most experienced of development companies let alone the large number of newcomers into the space.

While a mix of international and local funding is desirable, excessive dependence on foreign financing is clearly too risky. It is widely acknowledged that balance sheet weaknesses due to currency mismatches have played a key role in virtually every major financial crisis affecting emerging market economies since the early 1980s. Accumulating foreign currency debt against local currency revenues (as in many infrastructure projects) was the main cause, or at least a major aggravating factor, as it made countries more vulnerable to large currency depreciation. It was exacerbated by a maturity mismatch with excessive reliance on short-term debt to finance long-term projects, thereby leading to the ‘double mismatch’ problem. One way to address this problem is to allow foreign investment in local currency so that foreign investors bear the exchange rate risk. As a result, many emerging markets have started developing local currency bond markets and opened them
up to cross-border flows. Currently, we have limited the amount of such investment to a paltry US$6 billion. To start with, we could liberalise investment in local debt of long-term maturity.

But all these measures by themselves are unlikely to suffice. For risks to be distributed more widely across the financial landscape, what is needed is the development of a wide array of sophisticated investors and financial products, a process that will take too long to incubate in the Indian context. In the interim, there is a strong case for the government to act as a catalyst. In this context, we make two suggestions.

First, the government could create a refinancing facility intended to mitigate the asset–liability mismatches of banks and specialised NBFCs engaged in infrastructure lending. This facility would use its sovereign rating to borrow long-term funds (minimum five years) in domestic and international markets through the issuance of bonds (similar to National Bank for Agriculture and Rural Development [NABARD] bonds). The resources so raised would go towards refinancing infrastructure loans of banks and specialised NBFCs. The facility would charge a spread sufficient to cover all its operating expenses as well as the credit risk of lending to the particular bank or NBFC. The virtue of this mechanism is that the risk of lending would continue to be borne by the originating banks/NBFCs who would, therefore, have to remain disciplined about how they originate infrastructure risk.

The facility would take on, and would be appropriately compensated for, only the credit risk of the banks/NBFCs seeking refinancing. Created in 2005 to help with long-term funding for infrastructure development, the India Infrastructure Finance Company Limited (IIFCL), a fully government-owned company, could be modified to function effectively as this facility.10 Though this mechanism would take care of the maturity mismatches in the balance sheet of banks and NBFCs, it would not address the problem of concentration of risk. To confront that, banks and NBFCs will have to find a way of shedding the risk from their respective balance sheets. Hence, our second proposal.

In this option, a government-supported intermediary (such as IIFCL) would purchase infrastructure loans from loan originators such as banks and NBFCs and repackage them into long-term securities backed by cash flows for sale to other investors. Unlike in the US where there is a large array of sophisticated investors, including hedge funds ready to purchase such securities, the only potential investors in India, at least for the foreseeable future, are insurance companies and pension funds though even their demand for infrastructure paper is likely to be tempered by their own risk aversion as well as the stringent investment guidelines imposed by a cautious regulator. In this environment, a credible specialised government agency, as in our proposal, could play a significant catalytic role as credit
enhancer, making large volumes of infrastructure paper of a minimum acceptable credit quality available to cautious investors. This mechanism would meet the twin goals of mitigating liquidity risk to banks/NBFCs originating infrastructure loans, and spreading the credit risk of infrastructure projects more evenly across the financial system.

There is no doubt that our second proposal is a difficult one to implement. It requires assembling a talent pool that may be hard to attract on public sector salaries. The proposed government agency could also be vulnerable to political interference in the Indian context—something that could lead to a disastrous socialisation of losses from reckless and politically-directed underwriting. Moreover, to the extent that the role envisaged for this agency as aggregator and credit enhancer is similar to that played by the now-discredited Fannie Mae and Freddie Mac for housing loans in the US, the timing of our proposal is not propitious.

We must, nevertheless, be careful not to throw the baby out with the bathwater in learning from the experience of the credit crisis. The fact is that Fannie Mae and Freddie Mac played a most valuable role in expanding home ownership in the US at a time when the eco-system of sophisticated investors and financial products did not exist. We should try to learn from the mistakes of the Fannie and Freddie experience (and from our own experience with politically-directed support for agricultural lending) to create an effective mechanism that serves the need of the hour.

Whether or not either or both of our proposals are pursued, the key points to be understood are: (a) that at a time when the institutional structure of our financial markets is such that these markets are not capable of autonomously intermediating domestic savings into infrastructure, the government has a legitimate and constructive role to play as a catalyst to help finance the development of a sector that has huge externalities and public good characteristics; (b) this role need not involve any financial subsidy—whether the proposed government agency merely provides refinancing or acts as an aggregator and credit enhancer, it could and should charge market rates for the services it provides to bank and NBFC originators of infrastructure loans; and (c) even though our proposals would involve an addition to the government’s contingent liabilities because of the implicit guarantee that the government-owned agency’s borrowings would enjoy, in a macroeconomic sense this would not add to the fiscal deficit in the same way if the government were to develop infrastructure projects on its own account.

Ultimately, the stark reality is that we do not have too many options. If we continue trying to finance private infrastructure as we have, we will be putting our banking system at risk. If we eschew the type of government initiatives proposed here, we would most likely have to reconcile ourselves to a much slower pace of infrastructure
build-out than we need because, given its abysmal implementation record and the attendant fiscal implications, relying on the government and its enterprises to take on the full burden of infrastructure development would seem unrealistic.

**Conclusion**

The bank-dominated financial system has been able to step up and meet the needs of the first wave of private investment in infrastructure in a fast-growing credit environment. Going forward, the magnitude of the infrastructure funding requirement is huge. The limits of traditional sources have more or less been reached and certainly cannot be stretched to meet the projected quadrupling of real private infrastructure investment in five years. The problem is not lack of domestic savings, but rather the lack of a sufficiently sophisticated system of financial intermediation capable of channelling domestic savings into infrastructure in a way that does not create unmanageable risk. Reliance on foreign capital is no solution—foreign borrowing for the scale of infrastructure investment we need is not feasible and, even if feasible, would be quite imprudent.

There is no substitute to improving the functioning of our domestic financial system. And, it is important to create mechanisms to address (a) the problem of mismatched assets and liabilities in banks and NBFCs lending to infrastructure; and (b) the challenge of distributing risks more widely across the domestic financial system so that they do not accumulate in a handful of banks and specialised NBFCs.

To make this work, at least two building blocks must be in place: (a) securitisation to allow originators to lay off the risk to other investors; and (b) a deep and liquid domestic bond market with a wide variety of participants willing and able to invest in infrastructure paper. This is a tall order, especially in the current scenario. The global credit crisis has undermined the credibility of securitisation mechanisms. Efforts to breathe life into domestic debt capital markets have been frustrated by turf battles between our regulators. The truth is even worse—even if all the now-familiar recommendations of the Patil and Parekh committees are diligently and expeditiously implemented, building a deep eco-system of sufficiently sophisticated investors and financial products to allow proper intermediation of infrastructure risk will still take a long time—time that we cannot afford. This makes a strong case for the government to play a catalytic role in the business of infrastructure financing by putting in place a third building block: empowering a government-sponsored agency to refinance, purchase, and repackage infrastructure loans originated by banks/NBFCs for sale with suitable credit enhancement to domestic insurance companies and pension funds that otherwise would not be easily persuaded to purchase these securities on a large enough scale.
With this in mind we offer the following salient recommendations:

- Let us start with learning the right lessons from the credit crisis. We must nurture the growth of securitisation mechanisms, albeit subject to balanced regulatory scrutiny.

- Second, we must work urgently to deepen the corporate debt market by attracting new participants. Specifically, measures must be taken to make it easier for domestic insurance and pension funds as well as foreign institutional investors to invest in a wider range of long-term corporate debt and simplify procedures for primary issuance of debt securities. Measures to launch a transparent trading platform for corporate debt linked to appropriate payment and settlement systems must be accelerated as also measures to improve liquidity, such as the introduction of repo transactions on corporate bonds and the launch of a wider array of hedging instruments (interest rate futures and credit derivatives).

- Third, the government should act as a catalyst by transforming IIFCL into a specialised government-supported institution that would, at the very least, refinance infrastructure loans from banks and NBFCs or, if we are to be more ambitious, which would purchase infrastructure loans, re-package them as credit-enhanced securities and sell them to other investors, notably insurance companies and pension funds.

Failing these measures, the alternative is to leave the government to build the country’s infrastructure or just be reconciled to not building as much infrastructure as we need.

Rajiv B. Lall and Ritu Anand

NOTES

1. This paper was written in December 2008 and included by Business Standard Limited in its publication *Business Standard India 2009* (copyright 2009, BS Books, New Delhi).

2. While infrastructure definitions vary across agencies, the attempt here is to use, as far as possible, the Planning Commission definition which includes the following 10 sectors: electricity, gas, telecom, roads, rail, airports, ports, storage, irrigation and water supply and sewerage.

3. RBI guidelines limit bank exposure to an infrastructure-oriented NBFC at 15 per cent of the bank’s capital funds. The risk weight for bank exposure was prescribed at 125 per cent regardless of the credit rating of the borrowing NBFC. Provisioning for standard assets for bank exposure to NBFCs was increased from 0.4 per cent to 2.0 per cent. These measures significantly affected access to bank funds and also increased NBFCs’
cost of funds. In November 2008, the risk weight was reduced to 100 per cent and the required provisions for standard assets were reduced to 0.4 per cent in response to the tight liquidity.

4. The funds of general insurance companies are much smaller and 26–28 per cent of their investments were in central government securities in the same period as against the required 20 per cent.

5. It may, however, allow insurance companies to increase their indirect investment in infrastructure by allowing them to hold more paper issued by highly rated financial intermediaries that specialise in infrastructure lending. Infrastructure-focused NBFCs can now be considered ‘approved investments’ as the new guidelines have eliminated the earlier condition of secured bonds of corporates in this category, and introduced a minimum rating criteria (for example, AA or its equivalent).

6. RBI approval was required for external borrowing for any domestic expenditure and, in any case, a maximum domestic expenditure of US$20 million was set.

7. A survey of 104 PPP projects shows that about 80 per cent of the equity in a project SPV is promoter contribution (with less than 8 per cent from strategic investors and financial institutions, and another 10 per cent from the government).

8. The anticipated roll-out of the new pension scheme of the government on April 1, 2009 will be a start. There is also a proposal to extend a pension scheme to the private sector. While this will expand the potential base of investors, pension fund managers are likely to be cautious in investment for some time at least, as in the insurance sector.

9. According to the Bank for International Settlements (BIS), the size of India’s corporate bond market was 0.9 per cent of GDP in December 2007, whereas Malaysia’s was 42 per cent and South Korea’s was 24 per cent.

10. In its current form, IIFCL is supposed to supplement bank lending to infrastructure projects according to a complex formula which, in practice, means that IIFCL becomes just another party to a syndicate of infrastructure lenders.

REFERENCES


BACKGROUND

Infrastructure projects are typically capital-intensive and have long gestation periods, and so require significantly high levels of long-term financing. With the exception perhaps of airports and ports, which have an international side to their operations (and power projects set up for cross border sales of the power generated), the earnings of most infrastructure projects (energy, telecommunication, roads, railways, urban transportation, water supply, sanitation and other urban infrastructure) are denominated entirely in their respective local currencies. Since projects of this nature have very little natural hedge, their ability to absorb cross-border financing in significant volumes is rather limited; more so, given the lack of standard long-term foreign exchange risk hedging products (usually not over two years) and little market depth for long-term swaps in most developing countries. The availability of domestic financing of the required magnitude is therefore critical to the development of infrastructure in any location.

Since capital markets across developing countries are at different stages of development, the ability to implement projects either as pure private investments or under public private partnership (PPP) structures also depends on the domestic finance market in each of these locations. Where markets are reasonably developed, domestic financing by way of equity and debt, and to a lesser extent mezzanine finance structures, become common sources of funding for infrastructure projects. Other locations would still need to access multi-lateral or bilateral credit sources (including export lines of credit) for funding infrastructure projects, with the exchange risk absorbed by the government; and therefore project implementation is usually undertaken by government authorities directly or through specialised government agencies, although; in most instances, not very effectively.
The availability of domestic finance, of course, is not the only pre-requisite for the development of private infrastructure, though it is certainly a very important one. Other pre-requisites for the development of a private infrastructure market include putting in place appropriate legal and policy frameworks, comprehensive project preparation, transparent procurement processes, equitable concession/contractual structures, entrepreneurial resources of the required order, and perhaps, most importantly, political will in appropriate measure.

This paper broadly reviews the experience of India over the last decade in the development and financing of private infrastructure projects and the role of a specialised institution, namely, the Infrastructure Development Finance Company Limited (IDFC) in policy advocacy, development and financing of private infrastructure projects during this period. Admittedly the developments over the last year which have caused a serious meltdown in global financial markets have altered the financial landscape for private investment in infrastructure in India. The response so far to these challenges and a possible way ahead to meet the challenges of developing critical infrastructure in a fund-starved environment, have been briefly set out at the end of the note.

**DEVELOPMENT OF PRIVATE INFRASTRUCTURE IN INDIA**

Till the nineties, investment in infrastructure was almost exclusively in the public domain, made by government departments, specialised government agencies (SGAs) and public sector undertakings (PSUs). These investments were financed by budgetary allocations, surpluses of SGAs/PSUs, market borrowings (mainly from the bank market), borrowings from multi-lateral agencies and a few capital market bond issuances. The nineties also saw the pursuit of policies of economic liberalisation such as de-licensing of industry, increased market access by reduction in customs duties, freeing of the exchange rate on the current account, and enhancement of the limits for foreign direct investment, resulting in an increased alignment of the Indian economy to global markets.

Investment in infrastructure, however, continued to be low at levels ranging, over the years, between 3–6% of the gross domestic product (GDP), well below the investment levels of comparable economies like China and other East Asian economies, given the overall inadequacy of public resources. Given this backdrop, it was inevitable that the government looked at increasing the levels of infrastructure investment through private investment. To begin with, in 1991, a national power policy was announced which opened up power generation to the private sector and provided various financial and fiscal benefits to investors. This was followed by the national telecom policy in 1994, guidelines for private sector participation in major
ports in 1996, and a new civil aviation policy, all encouraging private investment in these sectors.

Various state governments\(^4\) followed suit with the development of sector-specific policies encouraging private investment; some of these states also enacted infrastructure development legislation\(^5\) with the prime focus being infrastructure development through PPPs. A major fillip was provided by the announcement in 1999 of the National Highway Development Programme (NHDP) for systematic capacity enhancement (mainly four-laning) of 13000 kilometres (km) of national highways in two phases. This was followed by a decision to levy a cess on sales of petrol and diesel which would be deposited in a Central Road Fund specially created for this purpose and which would fund the development of national highways and rural roads.

The experiences in both the power and telecom sectors were not initially very encouraging. Creation of power generation assets was limited by the lack of creditworthiness of the state electricity boards, the main purchasers of the power generated. Many state governments unbundled and corporatised their power assets; however, power distribution—the real challenge—was opened to the private sector in only 2 states. What helped though was the setting up of electricity regulatory authorities at the centre and in a few states. The enactment of the Electricity Act, 2003—which fully opened up power generation to the private sector, enabling the creation of a new breed of merchant and captive power plants—envisages power transmission through a national grid and encourages power trading. Reforms in power distribution, with a significant potential to reduce commercial power losses, continues to be a key challenge.

The telecom story, which began with investors horribly overpricing the value of the market and submitting unrealistic bids, was largely redeemed by the new telecom policy of 1999, migration to a revenue-sharing regime, introduction of newer players to enhance competition and defining rules for access across networks, made possible by an effective independent regulator\(^6\) for the sector. Some challenges remain—such as ensuring rural connectivity and allocating spectrum equitably—but all in all it has been India’s success story. The subscriber base for telecom services has since grown to a level of over 350 million subscribers\(^7\) by September 2008 (35% penetration) and currently India is the fastest growing market in the world, largely driven by private investment. Prices of mobile telephony have dropped from 33 cents per minute (in 1996) to around 1 cent per minute.

The first two phases of the NHDP which envisaged smaller levels of private investment (14% of the number of projects) have still offered around 48 projects to private investors. Given the initial success and speedy implementation of the private
sector projects, the programme has since been expanded to a seven-phase programme covering 46000 km of national highways, with the bulk of investment in the ensuing phases expected to come by way of private investment. Under a PPP framework, new airports have been established at greenfield locations in Hyderabad and Bangalore; the modernisation and expansion of the existing airports at Delhi and Mumbai are underway. Plans are underway for developing landside infrastructure at smaller airports under administrative control of the Airports Authority of India through private investment. A few smaller airports have been handed over by some state governments to private investors for modernisation and expansion. Several berth concessions (container terminals and some bulk/multi-purpose berths), have been awarded to private players at several major ports; a number of minor ports have been handed over by various state governments (notably Gujarat and Andhra Pradesh) to private investors for expansion and upgradation. Several of these facilities are operating successfully, though there have been some regulatory challenges (over issues such as competition and tariff setting) to overcome in major ports. A few small sections on the Indian Railways (mainly for port connectivity) and more recently, container services, have also been developed as private infrastructure projects.

In the urban sector, a few bulk water supply projects have been implemented with private investment, although with mixed success; the attempts to open up water distribution have been rather tentative and are yet to see any significant measure of success. Other areas of private investment have been in solid waste management, special economic zones, bus terminals, urban renewal projects, multi-level car parks and urban transportation. A few pilot projects are now being developed in areas such as healthcare and education under PPP frameworks.

All this has translated to aggregate private sector infrastructure investment of a little over US$96 billion over the period 1990–2007. It is estimated that private infrastructure investment which now contributes to ~20% of the total investment in infrastructure and therefore around 1% of the GDP would increase to a level of 30% of the total infrastructure investment during the Eleventh Plan period (2007–12), which is expected to translate to a level of 3% of the GDP by 2011–12. In the current context, this could pose a challenge unless newer sources of funding are channelised for funding infrastructure investment.

**FINANCING OF PRIVATE INFRASTRUCTURE PROJECTS**

As mentioned earlier, the feature of long gestation in infrastructure projects—longer project implementation period due to their capital intensive nature, issues such as land acquisition and time required to obtain environmental and other statutory clearances, and the elapse of time to reach operating break even (especially in
transportation and telecom projects)—necessitate the provision of long-term funding to these projects. Further, given their return-on-equity considerations, private sponsors seek to maximize the quantum of debt financing for these projects, which can vary from levels as low as 40–50% (telecom and port projects), to more common levels of 60–70% (energy, toll roads, urban sector projects, airports) and may even go up to 80–90% (projects involving payment for services by the government authority, for instance road projects where government pays an annuity over the project life).

Since infrastructure projects are exposed to different types of risks—policy and regulatory risks (tariff setting, competition, legal and policy changes), counter-party risks (for payment when services are purchased by a government authority or for supply of fuel or other vital inputs), implementation risks (construction delays, cost overruns and contractor failures), operating risks (obsolescence, cost variance, inflation and contractor failures) and revenue risks (demand/traffic and inflation), among others—project sponsors rarely expose their existing operations and balance sheets to these risks. Project implementation is undertaken through a special purpose company/vehicle (SPV) set up exclusively for each project, achieving a bankruptcy-remote structure. Debt financing for the project is usually raised on non-recourse, or in some instances on partial recourse terms by the SPV, with sponsors limiting risk to their equity investment in the SPV, or in some instances by an additional underwriting commitment to cover cost overruns.

As a result, the underlying project contracts (concession agreements, EPC and O&M\textsuperscript{12} contracts, fuel supply agreements, purchase agreements, etc.) and insurances are assigned to the lenders. The financing structures and agreements are often elaborate and complex and cash flows secured through structured escrow/cash retention agreements, so that financing risks are appropriately mitigated. The process of raising finance is therefore characterised by intense negotiations between lenders and sponsors.

**DOMESTIC FINANCING OF PRIVATE INFRASTRUCTURE PROJECTS**

Private infrastructure projects have been mainly financed by equity and debt funding sources. Till the late nineties, debt financing in India was provided largely by two main sources—development finance institutions\textsuperscript{13} (DFIs) providing long term debt for capital expenditure and commercial banks providing short term credit to meet the working capital requirements of projects. The process of economic liberalisation of the early nineties also resulted in increased exposure of the financial sector to global markets and trends. As a consequence, the distinctions between DFIs and commercial banks reduced, with IDBI and ICICI eventually...
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converting to commercial banks. Several new private sector banks also commenced operations and the propensity of banks to provide long term credit also increased. This was also helped by easy liquidity conditions that prevailed over much of the last decade.

The bulk of domestic debt financing so far has been provided in the form of senior secured debt by commercial banks and non-banking finance companies (which include some of the erstwhile DFIs like IFCI and specialised entities like IDFC) and to a lesser extent by insurance companies. With the exception of one public bond offering to retail investors,14 there has been no reliance on the capital markets. The bulk of the credit is provided in the form of loans which are not easy to sell down, though issuance of debt securities (more amenable to secondary trading) is popular with some of the market participants. In practice though, the absence of a deep secondary market for corporate debt has not enabled sell down and secondary trading in debt instruments of any significant volume. The few securitisation transactions undertaken have been mainly to refinance existing debt, taking advantage of a declining interest rate scenario in the period up to 2007.

While projects need long-term funding, the bulk of the financing raised so far has been of a relatively short term nature, with projects taking on the re-financing risk. Even where loans have been given for longer tenures (in some cases even up to 12–15 years), they would carry re-pricing options at shorter intervals of one, three or five years. This would pass on interest rate re-pricing risks to projects. While this has worked so far, given the current financial crisis and the increasing expectations from private financing over the next few years, this cannot be sustained. Passing on the liquidity/interest-rate risks to projects could, beyond a point, result in a “blowback”—severe credit stresses on banks’ portfolios. It has also been argued that banks (even the large players) and NBFCs would soon reach their prudential exposure limits, both on account of credit exposure and maturity mismatches,15 giving little head room for assuming very significant levels of new exposure in the near-term. It would, therefore, be necessary to bring in players with the ability to provide long-term liquidity at affordable costs into debt financing. This issue has been discussed further in the last section of this paper.

Most PPP projects impose a minimum shareholding commitment on sponsors of projects—typically 51% of the equity in the first five years and 26% thereafter. After negotiating with lenders for the maximum possible leverage, equity capital was, initially, entirely provided by project sponsors out of their existing balance sheets. There have been instances where minority equity stakes have been placed with EPC/O&M contractors for these projects as well as with strategic investors, who would directly benefit from the project’s operations—but these have not been
of a significant order. Increased leveraging has also been accomplished through mezzanine finance (subordinated debt structures), but these too have rarely exceeded 10–15% of the cost of project.

A common form of raising capital (initially used in the telecom sector) was by investing through a holding company which allowed significant dilution in the quantum of equity funds to be invested by sponsors, more so as these became multi-layered. The minority stakes at each level were funded through private placements with domestic and international private equity and venture capital funds. As more and more projects got successfully implemented, these holding companies made successful public offerings at impressive valuations particularly in the 2005–2007 period, which opened new institutional and retail equity funding sources for infrastructure investment. With the currently depressed state of the equity markets, it would be a while before the momentum of the earlier years of this decade is regained; however, companies with a good track record of project implementation could always access markets at appropriate junctures.

The clutch of private equity funds set up for infrastructure over the last few years would now have opportunities to “cherry pick” good quality assets; it remains to be seen how committed many of these would be to investment in India and whether investors would be able to bring in the committed levels of funding into these funds. A new category of funds, targeting international pension funds and “steady return” investors, are project equity funds which would invest directly into SPVs—either in equity or mezzanine products. Such funds, which seek steady rather than spectacular returns, could also provide equity dilution opportunities to sponsors after the project is implemented. Since the SPVs are unlikely to list, the funds themselves could list after a few years to provide exit routes for investors.

**Securitisation:** Securitisation transactions have been undertaken both by project sponsors and lenders. Project sponsors (directly or through the project SPVs) have securitised the revenues from projects to refinance projects as well as raise additional funds for investments in other projects, taking advantage of the declining interest rate scenario till 2007. Transportation projects, in particular the road sector, has been most popular candidates for such transactions. Securitisation of a steady stream of annuity payment receivables in a declining interest rate scenario has helped to refinance these projects at lower costs, while at the same time raise additional funds for investment in other projects. Similarly toll receivables have either been securitised to lenders or tolling rights auctioned to private investors by government sponsors, and used to advantage to refinance the debt raised for these projects. For instance,
the Maharashtra State Road Development Corporation (MSRDC), which constructed several grade separators and bridges in the city of Mumbai, got the costs of these projects retroactively financed through the sale of tolling rights on a few bridge entry points into the city to private investors. MSRDC, which also constructed the Mumbai–Pune expressway, auctioned the project subsequently to private investors under a tolling-cum-O&M concession, enabling repayment of the earlier debt raised by it for the project. The market has also seen lenders, mainly commercial banks, securitizing their assets—both debt securities and project loans—by selling them down to other debt investors, both on credit and maturity risk considerations. This has helped shore up capital adequacy, provide liquidity and generate profits from sale of high yield assets.

**SPECIALISED FINANCIAL INTERMEDIARIES: ROLE OF IDFC**

It is within this backdrop that the role of a specialised financing intermediary like IDFC needs to be assessed. In the early nineties, the Government of India (GOI) set up a committee chaired by Dr Rakesh Mohan (then Director General, National Council of Applied Economic Research) to review investment requirements in infrastructure and issues in commercialisation and financing of infrastructure. The report, titled *India Infrastructure Report* (1996), more popularly called the Rakesh Mohan Committee Report, estimated infrastructure investments of the order of US$330 billion over the next ten years. Given inadequate budgetary resources, it argued for an increasing role for the private sector in infrastructure. It also highlighted the need for a specialised financial intermediary which would focus on the development and financing of private infrastructure in the country.

On the basis of the recommendations made in this report, GOI took the initiative to set up a company focussed on development and financing of private infrastructure. In its budget for 1996–97, GOI earmarked an amount of Rs 10 billion as its contribution to this company. An inter-institutional working group set up to prepare a business plan. IDFC was conceived as a public private partnership with GOI holding 40% of the equity. The group also recommended that IDFC’s Board of Directors should comprise representatives of shareholders and independent directors and that a professional management team—hired from the market at private sector compensation levels—should be entrusted with the day-to-day operations of the company. The initial capitalisation of the company was an amount of Rs 16.5 billion—Rs 10 billion of equity share capital, and Rs 6.5 billion by way of subordinated debt from GOI. The equity of Rs 10 billion was placed with three GOI investors (40%), five domestic investors (20%) and nine international investors (40%).

The initial years following its incorporation in December 1997 were years of consolidation. As mentioned earlier, infrastructure till then had largely been with government—some sectors showed little inclination to change. The policy, legal and regulatory frameworks in most sectors needed substantive changes to enable private sector interest, for which there was a need for policy advocacy and advisory services to governments. Since project preparation and development skills had to be developed by government, there was clearly a need for transaction advisory services. At that point there was not enough private sector experience—only a few large investors evinced interest in infrastructure investment; there was clearly a need to stimulate interest in the private sector. The risk allocation frameworks needed to be fully developed with consensus from all stakeholders. Given the initial mistakes in the power sector it was also clear that a transparent process for selection of investor selection process needed to be defined and tested. The initial mistakes and imbroglios in power and telecom also underlined the need for significant changes in their policy frameworks.

IDFC initially constituted independent expert groups for the power, roads and ports sectors. It provided policy advisory inputs to government and regulatory authorities. In the power sector, for instance, it highlighted the need for unbundling assets, suggested a private sector model for distribution in cities, argued on the need to focus on distribution, and also provided inputs when the draft of the Electricity Act, 2003, was discussed. It provided inputs and comments to TRAI for the Telecom Policy, 1999, and various consultation papers, released by TRAI, from time to time.
As Secretariat to a task force set up by the Prime Minister, IDFC helped to define the contours of the NHDP. It prepared the outline for the bidding process, suggested entry criteria and concession outlines for major ports and national highway projects. IDFC also prepared the first model contract documents for direct toll and annuity concessions to be implemented under BOT frameworks for national highways and model license agreement for port sector projects. It helped prepare a road map for reform in the water sector in the state of Maharashtra. It also institutionalised the preparation of an annual report, the *India Infrastructure Report*—a thematic report prepared each year in partnership with the Institute of Management, Ahmedabad, and the Indian Institute of Technology, Kanpur.

IDFC also engaged in several transaction advisory services to the government to enable the roll out of some of the initial private infrastructure projects. In the roads sector, IDFC advised the National Highways Authority of India (NHAI) on the first direct toll road and for eight projects structured as annuity payment concessions. It advised the Government of Kerala in the setting up of a road fund, preparation of a tolling policy, and an operations plan for PPP roads in Kerala. In the power sector, it prepared the basic power sector strategy for the states of Maharashtra and Uttarakhand. It prepared solid waste management plans for a few cities (Delhi and Trivandrum) and assisted in configuring the initial PPP projects in these areas. In the ports sector, IDFC helped define the corporatisation plan for the first corporate major port at Ennore and also advised the Kochi Port Trust for private sector investment in a container berth at a new location.

All this could be accomplished because governments at the highest level were committed to enhancing the role of private investment in infrastructure. As a result, private sector investments in infrastructure came to stay, with PPPs being the default mode in many sectors. This also created financing opportunities for IDFC and other lenders. The focus then moved from policy and project development in the established sectors to financing challenges, especially raising equity and mezzanine finance. While debt funds were easily available at that juncture, it was clear that availability of equity funds for infrastructure would pose the bigger challenge to sustain private investment in infrastructure. In 2002, IDFC set up the first private equity fund for infrastructure in the country, the India Development Fund, with a corpus of Rs 8.4 billion. IDFC thus assumed a leadership position in pursuing infrastructure opportunities and identifying critical needs across the spectrum of infrastructure. Helped by easy liquidity conditions and given the overall global growth, the stage was set for rapid growth.

During this period, IDFC’s balance sheet grew rapidly, helped to no small extent by the overall growth story of India (GDP growth of 6.2% over the period 1996–2005). The total disbursements over the four-year period from FY 2005 to FY 2008 grew at a compounded annual rate (CAGR) of 48%, with total exposure at 44%. While in the initial years telecom was the largest part of IDFC’s portfolio, the portfolio has gradually shifted to a higher quantum of assets in the energy and transport sectors. What is also noteworthy is the fact that the level of net non-performing assets as a percentage of total assets was 0% as on 31 March 2008.
In July 2005, IDFC made an initial public offering of its shares, subsequent to which they were listed. This was followed by an offering to qualified institutional purchasers in June 2006. IDFC’s shareholding at the end of FY 2008 is set out in Figure 43.5.

IDFC’s operations today span a wide spectrum of activities across infrastructure. Its core business, debt financing for infrastructure projects, is undertaken across four verticals—energy, telecom, transportation and industrial/commercial real estate. IDFC also takes minority equity positions in companies as part of its principal...
investment strategy, both as a strategic and a financial investor. It provides advisory services to corporate clients and advises government clients through a dedicated PPP trust that it has set up for capacity building and project development services. Over two years ago, IDFC took over the operations of an infrastructure-focussed investment banking company, SSKI Limited. Re-christened IDFC-SSKI Limited, the investment bank offers a range of capital market services. IDFC has also set up a company to implement and operate infrastructure projects; this would enable value capture from the principal side of the business.

Another area of focus in recent years has been its asset management services. IDFC Private Equity manages three private equity funds with an aggregate corpus of Rs 57 billion (~US$1.3 billion). IDFC also introduced the first project equity fund in the Indian market with a current corpus of ~US$800 million for SPV-level investment in infrastructure projects. Last year, IDFC also took over the mutual fund assets of Standard Chartered Bank (re-christened IDFC Mutual Fund since). IDFC also manages a small fund for listed equities and is in the process of setting up a Fund of Funds out of its Singapore office.

Three case studies attached to this note set out some of the transactions (in the roads sector) over the years, which reflect the changing role that IDFC has played over the last decade.

**UNCERTAIN TIMES (2009 ONWARDS): NEW CHALLENGES**

The current global financial crisis would result in lower economic growth all around and certainly affect infrastructure investments. For any investor, maintaining asset growth would be imprudent; it would be essential to focus on profitability at the cost of growth. In doing so maintaining asset quality and actively monitoring the portfolio for any deterioration would be of paramount importance. The key challenges would be to raise funds from wholesale sources at optimal costs as well as to carefully nurture its investment banking and mutual funds businesses in depressed market conditions. IDFC’s private and project equity funds are currently liquid and would have opportunities to selectively invest in assets. Advisory services, while not a large revenue earner, would provide stable opportunities for engagement. It is clearly a time to re-consolidate and prepare for the future.

Some of the key lessons learnt over the years would be critical to IDFC’s future success. The first is that since IDFC is a unique organisation with no historical precedent, its ability to quickly adapt to change, as it has done in the past, is crucial. The second is the need to constantly innovate in a rapidly changing environment—raising funds, developing products, and developing projects. Third, IDFC would need to continuously enhance the depth of its management, developing internal
resources for all critical functions. Its people are its main strength, often motivated by a strong sense of “mission”; the challenge is in keeping it that way.

**INDIA INFRASTRUCTURE FINANCE COMPANY LIMITED (IIFCL)**

Another significant development in the last few years has been the incorporation of a state-owned company, with a view to providing long-term debt to infrastructure projects. IIFCL was incorporated in January 2006 with an initial capitalisation of Rs 10 billion as a company owned by GOI to provide long-term finance to infrastructure projects and to re-finance existing lenders in infrastructure. The company would also be in a position to access GOI support (sovereign guarantee) for its borrowings, which would enable it to borrow funds at very competitive rates. IIFCL’s Board comprises nominees from GOI, management representatives and independent directors.

IIFCL’s direct finance operations are unique in that it usually limits its exposure to 20% of the project cost, the balance coming from other existing lenders such as banks and financial institutions. It normally provides loans of a higher tenure than the other lenders, deliberately assuming a subordinate position, with a view to stimulate lending by banks to infrastructure projects. IIFCL also does not undertake its own independent appraisal of projects, but relies on the due diligence of the designated lead bank for the project. This has ensured a very lean organisation structure, with the focus more on participation financing. This also makes it an ideal source of last mile (gap) finance for projects, and could enable a role for IIFCL very similar to that of the sovereign mortgage refinance entities in the US housing market.

In the three years since its inception, IIFCL has been active in the infrastructure financing space. As on 31 March 2008, IIFCL had disbursed funds to the extent of Rs 27 billion to 52 projects, and had approved, in aggregate, loans of Rs 184 billion. IIFCL’s ownership structure would enable a very active role in the current global financial crisis. GOI has recently announced a Rs 1 trillion stimulus package for the infrastructure sector, which would be routed through IIFCL. As a first step, in the current financial year, IIFCL would raise tax-free bonds of Rs 100 billion, guaranteed by GOI, to enable smooth flow of funds to the sector.

**THE WAY AHEAD**

As mentioned earlier, a key limitation to the growth of infrastructure investment in the current context would be the ability of the banking sector to provide financial resources in a sustainable manner to support the desired levels of investment in private infrastructure projects. For lenders requiring liquidity support, an active
refinance window through IIFCL on attractive terms could help increase the number of debt providers for infrastructure. The next step would be to create avenues to enable sell down of assets (that have moved to stable project operations), without recourse, to create headroom for lenders. Whether undertaken by IIFCL or in consortium with large banks, or whether re-packaged as long term securities and sold to other investors (possibly, high net worth individuals), this would result in deepening the market for infrastructure debt over the long term.

There is also clearly a need to enhance the role of insurance companies and pension funds in financing infrastructure. Specialised agencies like IDFC could provide the needed expertise and help to enable investment decisions. With the savings rate (percentage of the gross domestic savings as a percentage of the gross domestic product at current market prices) having grown from levels of a little over 20% in 1987–88 to 34.8% in 2006–07, it is important to channelise some of these into appropriate instruments. IIFCL could also play the role of a guarantor to passive investors such as pension funds or to retail investors for capital market instruments. This could be the crucial stepping stone to enable more effective intermediation and channelising of additional resources for infrastructure in India.

Cherian Thomas

**CASE STUDY 1: DEVELOPMENT OF THE FIRST SET OF ANNUITY PAYMENT-BASED PROJECTS**

**IDFC’s role:** IDFC, as financial adviser to NHAI, was given the mandate to conceptualise the annuity payment structure, prepare the bidding documents and concession agreement, generate investor interest through stakeholder workshops, and manage the bidding process for selection of the concessionaire for these projects. The process also involved development of the “private sector” financial model to evaluate the likely annuity quotes for a range return on equity values as well as the public sector model, benchmarked for public sector costs, to ascertain value for money to NHAI through the transaction.

**Broad framework:** The project is given out as a BOT concession for 17.5 years, 2.5 years being the implementation period and 15 years as the operations period. The concession agreement is a composite contract under which all risks pertaining to design, construction, operations and maintenance of the road are transferred to the private investor. In return, the investor would be paid a composite payment (annuity payment) in 30 equal semi-annual installments over the operations period. The payment commences only after the project is completed and so all stakeholders are incentivised to ensure completion of the project facility. The contract has a
built-in incentive for early completion in that the annuity payment obligation starts from the actual project completion date. The project requirements are spelt out, largely as output-based specifications in annexures to the contract—design, construction, O&M and handback requirements. The process of ensuring that these requirements are adhered to by the concessionaire is done through the appointment of an independent engineer, appointed and paid by both parties to the contract.

The annuity payment is a payment for performance, in that the payment commences only after the road is built. During the operations period, the payment is subject to the availability of the road and service quality. Objective measures for availability (lane kilometer hours over the annuity period) and riding quality (such as road roughness index, rutting and potholes, etc.) were developed for this purpose. Payment of annuity is linked to the road being available to users and appropriate formulae for deductions for non-availability or inadequate quality have been set out in the contract. NHAI would provide land for the project free of encumbrances and procure the preliminary environmental and related approvals for the project. Under the contract, NHAI retained the right to levy and collect toll from road users. Another unique feature of the contract is the termination compensation for non-business risks linked to discounted value of future cash flows.

Selection of concessionaire: A two-stage bidding process was used to select the concessionaire for the project. The first stage, qualification, used an objective set of criteria to assess the technical experience and financial capability of the bidder/bidding consortium. To widen the field, experience in other infrastructure and core sectors was also counted for qualification. The second stage involved submission of a technical proposal (evaluated for conformity with specifications) and a financial proposal which formed the basis for award of the project (containing a simple evaluation parameter: the annuity quote of the bidder).

Private sector financial model: A financial model for each project was developed incorporating typical private sector estimates of capital costs of the project, operating costs, periodic maintenance expenses and the cost of debt finance. The model was used to throw up the of annuity levels for a range of expected returns on equity (equity IRR) for the project.

Public sector financial model: The financial model developed using public sector benchmarks was used to compare the costs to NHAI under the conventional approach and under the annuity payment based BOT approach. For this the risks under each of the approaches were evaluated and the value of quantifiable transferred risks (primarily cost and time overrun) ascertained. Based on the above, the equivalent annuity for NHAI under the conventional approach was derived using discounted cash flow analysis.
Value for money (VfM) = cost under the conventional approach (CCA) – cost under the annuity approach (CAA)

**Bidding experience:** The first project offered to the private sector was the four-laning of a 65 km stretch of road between the towns of Panagarh and Palsit on National Highway No. 2 (Delhi–Kolkata link). This project attracted eight bidders: six international (from Singapore, Malaysia, UAE and the UK) and two leading Indian companies. Of these six qualified; however, only three bids were received for the project. The first round quote was high compared to estimates and the project saw two more rounds of bidding before the final award.

In the second phase, three new projects were offered for an aggregate length of 200 km. This project received very wide investor responses and saw a wide variation in quotes. Aggressive bidding by a particular consortium saw it emerging as the lowest bidder for all projects. Since the bidding rules restricted the award of a maximum of two projects to a consortium, only two projects were awarded to the successful bidder. An additional benchmark for inter se comparison between projects—lowest annuity quote as a percentage of base construction cost (L1/BCC)—was developed and the public sector financial model used to benchmark the quotes received.

In the third phase, three more projects for an additional 200 km were offered. The competition here moved to a narrow range with a slight increase in L1/BCC as compared to the second phase. The average of all quotes received was lower; implying that the market had by then a better understanding of the risks involved and the concession framework as a whole. All projects were awarded.

In the fourth phase, two more projects were offered. There was intense competition in a narrow range of annuity quotes. Both projects were awarded.

**What was achieved?** In less than 24 months, an elaborate framework and process for implementing projects was developed, starting from the annuity payment concept. The framework included an equitable concession contract, a transparent, objective bidding process and a framework for decision-making using benchmark private sector and public sector financial models. The resultant private sector confidence resulted in investment of around Rs 30 billion (US$750 million) in eight road projects. All these projects are currently operational and have all been completed before their scheduled completion dates.

**Key learnings:** The initial projects provided key inputs for better project preparation and highlighted the need to further refine the output based specifications set out in the contract. It threw up areas where the financial models were to be improved and brought out the need for NHAI to secure the annuity payment mechanism over time. All these learnings could be used to further improve the concession framework.
CASE STUDY 2: FINANCING OF AN ANNUITY PAYMENT-BASED PROJECT

Project details: Four-laning of a highway stretch of 60 km

Concession period: 17.5 years (including construction period)

Cost of project: Rs 3.20 billion

Financing scheme: The project was financed on the basis of debt-equity ratio of 3:1. Of this, senior debt was Rs 2.4 billion and Rs 800 million was in the form of equity and quasi-equity.

Debt terms: Tenor – 13 years door-to-door; interest rate = 12% per annum; to be reset after 3 years

Deal diagram:

Risk analysis and mitigation:

• Completion risk
  • Delay in acquiring and handing over land by NHAI: NHAI to provide land before commencement of the concession period
  • Time/cost overrun: mitigated by a fixed time-fixed price EPC Contract and limited sponsor response for overruns

• Operating risk: An O&M contract with appropriate penal provisions was executed with a leading road services company. The sponsor’s past experience in operating infrastructure projects was also critically evaluated.

• Revenue risk: The annuity payment is to be made by NHAI, a AAA-rated statutory body. In addition, a letter of credit to cover one annuity payment was provided by NHAI.
• Forcemajeure risks: Debt is fully protected in case of termination of contract due to political and indirect political risks. For non-political events, insurance cover would afford the needed protection.

**Refinancing**: The project sponsors have since raised Rs 3.75 billion through refinancing of project debt and securitisation of future receivables. The debt tenor was also increased to 14 years and interest rate reduced to 7.5–7.75% per annum, with limited resets at end of every 5 years. The sponsors have also provided recourse to lenders for events not covered under the concession contract. The refinancing on such competitive terms was possible due to strong support from NHAI, a well-crafted contract, decline in interest rates and strong ongoing involvement and support from the project sponsors.

**Key lessons**: Significant efforts in re-engineering have resulted in very competitive construction costs for the project as a result of which a very competitive bid was submitted. With risks appropriately analysed and allocated, the project sponsors were able to take advantage of a declining interest rate scenario. Innovation in financing (securitisation of annuity receivables) and financial engineering have significantly improved the project economics and equity returns for sponsors.

**CASE STUDY 3: Financing of a Direct Toll-Based Project**

**Background**: A project for four-laning of an existing stretch of national highway was bid out by NHAI with direct tolling rights to be conferred on the concessionaire under the concession agreement. The bidding parameter was the least positive grant from NHAI (or highest premium to NHAI) for the project.

**Bid details**: IDFC tied up with a mid-sized construction company (ABC Limited) with strong project implementation skills to bid for the project. All technical aspects of the bid were handled by ABC. IDFC led the financial analysis of the project and also contributed to the financial capability of the consortium enabling qualification. A firm EPC price was committed by ABC prior to bidding. IDFC committed the extent of debt possible for the project. The consortium of IDFC and ABC bid the least grant and won the project.

**Implementation arrangements**: A special purpose company (SPV) is being set up for implementing the project, IDFC and ABC being the initial shareholders. The EPC contract would be executed between ABC and the SPV. IDFC would syndicate the debt required for the project.

**Financing arrangements**: The requirement of funds of Rs 4.5 billion is expected to be financed by senior debt to the extent of 70–75%, subordinated debt of 5% and balance by way of equity. The senior debt would be partly subscribed by IDFC and the balance placed with local commercial banks. IDFC would also take up the
subordinated debt. It is expected that other lenders would be keen to participate in the project financing owing to the robustness of the projected traffic and cash flows for the project. The coupon rate on senior debt would be 4% over the prevailing rate for GOI securities of similar maturity.

**Security package:** The debt would be secured by a charge over the project revenues, project documents, performance bonds, accounts and insurances. The equity of the SPV would be fully pledged to the lenders. In addition sponsor guarantees would be provided. An escrow mechanism would trap all project revenues and cash flows with funded debt service accounts being a part of the escrow structure. In addition, there would be an intense process of review and monitoring of the project by the lending consortium.

### Projected cashflows

![Projected cashflows chart](chart)

**NOTES**

1. This paper was presented by the author at the UNESCAP Inter-regional Expert Group Meeting on Public Private Partnerships in Infrastructure Development held during February 17–19, 2009, at the United Nations Conference Centre, Bangkok, Thailand.

2. Both categories of projects—private infrastructure (where the government has no responsibility for the delivery of services or where the activity can be freely engaged in by the private sector) and PPP projects (where the government continues to assume ultimate responsibility for the service delivery, but does so through a private intermediary)—have been referred to as private infrastructure or private infrastructure projects since they broadly require the same types and characteristics of financing.

3. In the aftermath of the Gulf War of 1990 and the severe economic crisis that followed due to a very adverse balance of payments situation, India received a structural adjustment loan from the International Monetary Fund which prescribed conditions of economic liberalisation.
4. Notable among them are the states of Gujarat, Andhra Pradesh, Maharashtra, Karnataka, Madhya Pradesh, Punjab and Tamil Nadu
5. Gujarat, Andhra Pradesh and Punjab, among others
6. Telecom Regulatory Authority of India (TRAI)
7. From a level of 18.6 million in March 1998
8. Source: World Bank, PPIAF Database; telecom – US$43 billion; energy – US$33.9 billion; transport – US$18.9 billion; and the rest being urban services
9. The Planning Commission includes electricity, gas, telecommunications, roads, railways, airports, ports, storage, irrigation, water supply and sewerage in its classification of infrastructure
10. The Planning Commission has estimated the total investment in infrastructure at 5% of the GDP in the base year (2006–07) of the Eleventh Plan (“Projections of Investment in Infrastructure during the Eleventh Plan”, August 2008).
11. The projections expect to achieve a level of infrastructure investment to the extent of 9% of the GDP.
12. Engineering, procurement and construction, and operations and maintenance
13. The largest being Industrial Development Bank of India (IDBI), Industrial Credit and Investment Corporation of India (ICICI), Industrial Finance Corporation of India (IFCI) and Industrial Reconstruction Bank of India (IRBI), later renamed Industrial Investment Bank of India (IIBI). Some long-term project funding was also provided by the state-owned life insurance and general insurance companies and the Unit Trust of India
14. To finance a part of the cost of a toll bridge project implemented as a PPP project
15. Dr Rajiv B. Lall and Ritu Anand, “Infrastructure Financing”, Business Standard India, 2009
16. By forming several tiers of holding companies, but with sponsors controlling each of these through their primary holdings in the company at the top of the tier
17. Ministry of Finance (20%), Reserve Bank of India (15%) and IDBI (5%)
18. ICICI, State Bank of India, IFCI, Housing Development Finance Corporation and Unit Trust of India
20. Build, operate, transfer
23. Quick estimates
24. The case studies have been used in earlier articles by the author titled “The Future for the Road Sector”, which was published in a special issue on India titled Project Finance International: India Report 2007 dated February 2007, and in “Financing Road Projects in India”, published in Infrastructure Finance: The Road Ahead, a PFI Market Intelligence publication, edited by Rod Morrison and published in 2007 by the Thomson Financial Group, UK.
It is well known that India’s infrastructure investment needs are enormous. The Planning Commission has called for an estimated US$514 billion (in 2006–07 prices and at an exchange rate of Rs 40/US$) investment in 10 major physical infrastructure sectors during the Eleventh Five-Year Plan (2007–2012). Of this, it projects that the private sector’s share would be 30 per cent (or US$155 bn), up from 18 per cent during the Tenth Plan. Most (93 per cent) of the private investment is anticipated to be in five sectors—electricity, telecoms, roads, ports and rail—but private investment forms a significant share of the investment in all of the infrastructure sectors except irrigation and water supply and sanitation (see Table 44.1).

### Table 44.1: Projected investment in infrastructure during Eleventh Five-Year Plan

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Total (US$ mn)</th>
<th>Of which private (US$ mn)</th>
<th>Share of private in sector investment (%)</th>
<th>Sectoral distribution of private investment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (incl. NCE)</td>
<td>166631</td>
<td>46378</td>
<td>28</td>
<td>30</td>
</tr>
<tr>
<td>Roads and bridges</td>
<td>78538</td>
<td>26698</td>
<td>34</td>
<td>17</td>
</tr>
<tr>
<td>Telecommunications</td>
<td>64610</td>
<td>44422</td>
<td>69</td>
<td>29</td>
</tr>
<tr>
<td>Railways (incl. MRTS)</td>
<td>65452</td>
<td>12589</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Irrigation (incl. watershed)</td>
<td>63325</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Indeed, India has opted for a model that relies to a significant extent on the private sector in infrastructure development. It was recognized early on by the Government of India that the private sector would need to finance, build, operate and manage infrastructure facilities. In 1991, power generation was amongst the first few sectors to be opened up for private sector investment, with attractive incentives offered for setting up power plants and allowing 100 per cent FDI. After much trial and error, the policy with respect to private sector participation (PSP) has evolved over the years, not just for power, but also for other core infrastructure sectors, with tangible results: the private sector now is a serious player in India’s infrastructure development, providing both capital and efficiency gains.

Table 44.1: Projected investment in infrastructure during Eleventh Five-Year Plan (contd...)

<table>
<thead>
<tr>
<th>Sectors</th>
<th>Total (US$ mn)</th>
<th>Of which private (US$ mn)</th>
<th>Share of private in sector investment (%)</th>
<th>Sectoral distribution of private investment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply &amp; sanitation</td>
<td>35933</td>
<td>1355</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Ports</td>
<td>21999</td>
<td>13620</td>
<td>62</td>
<td>9</td>
</tr>
<tr>
<td>Airports</td>
<td>7742</td>
<td>5408</td>
<td>70</td>
<td>3</td>
</tr>
<tr>
<td>Storage</td>
<td>5595</td>
<td>2797</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Gas</td>
<td>4214</td>
<td>1632</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>514038</strong></td>
<td><strong>154898</strong></td>
<td><strong>30</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Eleventh Five-Year Plan, Planning Commission, GOI

Figure 44.1: Investment by private sector in infrastructure (US$ million)

Source: PPIAF database, World Bank
The year 2004 marked a watershed with a quantum jump in private investment in infrastructure (see Figure 44.1). Since then, private interest in infrastructure has gained momentum. In fact, the last five years account for almost three-quarters of the total private investment in infrastructure since 1990 (US$90 billion out of US$124 billion; PPIAF database). Private investment in infrastructure has risen to 2.5 per cent of GDP in 2007–08, a respectable share compared with the public sector infrastructure investment of 4.8 per cent of GDP (Planning Commission).

The private sector’s presence is visible in several key infrastructure sectors—in telecoms, ports, airports, power generation and roads (see Table 44.2). India’s telecom sector, which is one of the world’s fastest-growing cellular markets, is dominated by the private sector (in the fast-growing wireless segment) and boasts of tariffs amongst the lowest in the world. Private sector port terminals, which now account for the bulk of container traffic volume, have raised performance standards to world-class efficiency. In airports, the two largest airports—Mumbai and Delhi—have been privatized and the private sector has built greenfield airports in two other metros. The private sector has finally gained traction in the power sector, and will for the first time meet the target of installed capacity set for it in the five-year plan. Going forward it is likely to increase its share in power generation significantly as the current pipeline of projects suggests. And while road development by the private sector slowed down in the last few years, there are indications that it will substantially pick up. Indeed, India has the largest PPP-based national highway development programme (NHDP) in the world: over half the NHDP of 54,500 km is aimed to be on a PPP toll basis and another quarter on PPP annuity basis.

Table 44.2: Private participation in infrastructure

<table>
<thead>
<tr>
<th>Share of private sector in</th>
<th>Mar 09</th>
<th>Nov 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecom: wireless subscribers</td>
<td>85%</td>
<td>87%*</td>
</tr>
<tr>
<td>Telecom: wireline subscribers</td>
<td>12.83%</td>
<td>14.7%*</td>
</tr>
<tr>
<td>Power: total installed capacity (excluding captive)</td>
<td>15.5%</td>
<td>17.7%</td>
</tr>
<tr>
<td>Ports: container volume</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>Ports: container volume for federal (major) ports</td>
<td></td>
<td>85.8%</td>
</tr>
<tr>
<td>Airports: passenger traffic movement in private airports to total</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>Airports: cargo traffic movement in private airports to total</td>
<td>70%</td>
<td></td>
</tr>
<tr>
<td>Roads: length of NH built or under construction through PPP in NHDP (km)</td>
<td></td>
<td>7958</td>
</tr>
<tr>
<td>Roads: length of NH built or under construction as a percentage of total length built or under implementation under NHDP</td>
<td></td>
<td>43.4%</td>
</tr>
</tbody>
</table>

Sources: NHAI, Indian Ports Association, JNPT, IDFC-SSKI, CEA, TRAI
Clearly, the private sector has established that it is willing and able to deliver. Yet, there are several challenges in accelerating private investment and extending private sector involvement to other infrastructure sectors. These challenges include financing issues, coordination and implementation issues, and capacity of government to undertake PPP projects. Unless these key issues are addressed, amongst others, it is unlikely that India will meet its ambitious infrastructure development targets.

**FINANCIAL INTERMEDIATION**

Infrastructure financing presents a number of challenges. The large scale of investment and long gestation period require investors to be prepared for a long horizon for debt repayment and return on equity. But many financial institutions are limited in their ability to invest in very long-term illiquid assets. Moreover, infrastructure projects entail non-recourse or limited recourse financing, so market and commercial risks assume greater significance for lenders. This, in turn, requires specialized appraisal skills. Besides the usual project risks, infrastructure investment has other risks because of its public interest nature. These include political and regulatory risks. As a result, complex risk mitigation and allocation arrangements are needed amongst the various parties. Clearly, all this indicates the special nature of infrastructure financing, requiring a mature financial system and a sophisticated class of investors.

A mature financial system can respond to these challenges in various ways. It can bring a range of investors at various stages of the project. Investors with requisite skills and risk appetite are needed at the initial stage of the project, and once the project starts yielding a stable revenue stream, a different type of investor may come in, thus widening the pool of investors and reducing the overall financing cost of the project.

So far, India has been able to ramp up private investment in infrastructure largely due to commercial bank financing (notably public sector banks), both direct and indirect. But to what extent is this sustainable? It has led to a growing concentration of risks in the commercial banks’ balance sheets. These risks arise from the maturity mismatch created by financing long duration infrastructure projects from the essentially short-term nature of banks’ liabilities. Moreover, many banks are reaching exposure limits to infrastructure-related borrowers (because of large project size relative to bank capital). Of course, bank consolidation could ease this constraint somewhat (as many small banks do not have any infrastructure exposure). But it would not address the need for long-term finance. Moreover, the same issues apply to specialized non-bank finance companies (NBFCs) that lend to infrastructure.
They are reliant on commercial bank funding for their resources, in the absence of a well-developed bond market.

Pension funds and insurance companies, though well-suited to fund infrastructure because of their long-term liabilities, are still an insignificant source of funding infrastructure in India despite the growth in insurance penetration to around 4 per cent of GDP. The primary reasons are: pre-emption of insurance resources by the government, stringent investment guidelines for insurance companies that most infrastructure projects cannot meet, and overall risk aversion by the insurance companies themselves.

Equity financing is essential to support higher debt and in recent years there has been increased activity in both public markets and private equity (PE)—barring the temporary impact of the global financial and economic crisis. Since developers/promoters have a limited amount of capital, it is important to bring in financial investors so that the promoters’ risk capital can be recycled into other projects. However, rules for sell-down of equity have been quite stringent and act as a deterrent to the entry of more financial investors who would like greater flexibility in exit options. There are other issues as well, such as tax on sales of unlisted projects, and inadequate termination payments for government agency defaults in many concession agreements, which deter financial investors. The biggest constraint to the development of a strong domestic PE industry, however, is the very narrow base of domestic investors. Institutional investors, such as insurance companies and pension funds, to reiterate, have limited ability to invest in alternative asset classes as yet in India.

Several actions can be taken in the near term, such as improving tax and exit policies to make it easier for investors to exit from unlisted infrastructure projects, and enabling public sector banks to raise additional capital to avoid sector concentration risk. Some measures have already been taken or are being considered. For instance, concession agreements for highway projects now allow promoters holding the majority shareholding to fully divest two years after project completion.

Most importantly, though, securitization of their loan portfolio could enable banks and NBFCs to distribute their risk more widely as well as to ease their balance sheet constraint by enabling them to off-load infrastructure loans when the projects start yielding a revenue stream. Needless to say that proper regulation needs to be in place to avoid perverse incentives kicking in with the transfer of risks, as witnessed in the recent sub-prime mortgage crisis in the US.

Of course, securitization itself cannot take off without access to deep and liquid debt capital markets. A bond market is necessary to provide the mechanisms for greater liquidity and risk minimization. The corporate bond market in India is
relatively small and illiquid. Various committees set up by the government have
given recommendations on how to develop the bond market as well as to facilitate
the financing of infrastructure. Some initiatives have been taken by the government
and regulators, the most recent being to introduce repo-ability of corporate bonds,
but overall progress is slow.

Clearly, the development of a deep and liquid market for long-term corporate bonds,
with a wide array of investors and financial products, will take a long time.
Meanwhile, a refinancing facility, such as the Indian Infrastructure Finance Company
Limited (IIFCL), established by the government, could mitigate the asset-liability
maturity mismatches of banks and NBFCs engaged in infrastructure lending.
The IIFCL can borrow lower cost long-term resources using its sovereign rating
and on-lend to banks and NBFCs for infrastructure.

That should contribute to addressing one source of risk, the liquidity risk that banks
face. But it does not address the concentration of risks in banks and NBFCs.
A second catalytic role such an agency could, therefore, play is as an aggregator and
credit enhancer. It could purchase infrastructure loans from the loan originators
and repackage them into long-term securities backed by cash flows for sale to other
investors. Cautious investors such as insurance companies and pension funds in
India are more likely to buy such paper and the credit risk of infrastructure projects
could then be spread more evenly across the financial system. It should be
remembered that the now discredited Fannie Mae and Freddie Mac did play a vital
role in home ownership in the US when the ecosystem of sophisticated investors
and financial products did not exist. Similarly, what is needed in India today
is such an agency for intermediating infrastructure credit. A first step is being taken
with the IIFCL preparing guidelines for takeout financing. Under this scheme
the IIFCL would take over a loan from a bank after four or five years and fund it
over a longer term of 15 to 20 years. While it may be able to take a certain amount
of loans on its own books, it would be more effective if it could sell these loans to
long-term investors.

COORDINATION AND IMPLEMENTATION ISSUES

Infrastructure is unambiguously a national priority now, after years of neglect.
But while there is an overall vision, there is often inadequate detailed planning and
coordination. For instance, there may be a master plan for a city, but zonal
development plans and detailed project reports are either not prepared or are of
poor quality. This leads to infrastructure which is not aligned to the priorities or is
under-supplied. Additionally, ad hoc and uncoordinated infrastructure development
leads to costly and poor quality of infrastructure. For example, a road widening
project that is not coordinated with utilities (water, sewer, electricity) may result in the recently widened road being dug up repeatedly to provide these utilities later one by one. This is not only costly; it also reduces the quality of the infrastructure. Lack of adequate planning and coordination may also result in delays and under-use of infrastructure because the support facilities were not provided in a timely manner. There have been instances of port and airport development without concurrent road and rail connectivity. For example, the new Bangalore airport was ready, but could not start commercial operations for some time because there was no road connecting the airport to the city. And most recently, 3G spectrum auctions are being delayed because of inter-ministry differences.

Not only is there an issue of inter-sectoral or inter-ministerial coordination, but that of coordination between different levels of government. The political dimension exacerbates this issue. The interplay between a federal constitutional structure and a multi-party system, in which coalition governments at the Centre need to co-exist with opposition parties in various states, accentuates a culture of non-cooperation and confrontation. Some infrastructure sectors come under the jurisdiction of the central government, such as telecoms, railways, major ports, national highways, whereas some are under state governments, such as roads other than national highways, and some are in a concurrent list such as electricity. While incentives should be aligned in developing central infrastructure in state territory, often apathy of state governments, for example in giving clearances, can add to delays.

In fact, infrastructure development has repeatedly fallen short of targets. There are many reasons for this: delays in land acquisition, clearances from a multitude of authorities, unavailability of equipment, inadequate pipeline of projects and so on.

It is widely acknowledged—and recently corroborated through an official project review and CII survey of project developers—that land acquisition is the most important impediment to infrastructure project implementation. There are three particular risks relating to land from the infrastructure development perspective. First, there is usually limited flexibility in location. For instance, a thermal power plant should be built near coal reserves or near a port if it is using imported coal. Similarly, airports have to be close to cities. Second, contiguous plots of land need to be consolidated. The problem is that most of the land is in small fragmented holdings. Acquiring the land displaces numerous small landowners. So, unless all occupants of the land site agree to vacate the land, there can be endless delays in the entire development initiative. And often those displaced do not have the skills to survive without land. Third, the land to be acquired for infrastructure development may adversely affect the environment. While there is no simple way to resolve this
conflict, a decision has to be taken each time such a conflict appears in a relatively short period of time.

Moreover, the market for land is underdeveloped and distorted. The way in which land records are maintained makes it difficult to establish land titles, resulting in frequent disputes. As a consequence, the private sector often prefers the government to exercise its eminent domain powers in acquiring land on its behalf.

The problem is that too often the state has been invoking its powers of eminent domain to acquire land for projects, the benefits from which are not perceived to be fairly distributed. Under the Land Acquisition Act, 1894 the government can obtain land for public purpose at a fair compensation. Unfortunately, public purpose has been too liberally interpreted and compensation has been inadequate, and especially so when compared with market values of the land after change in land use (to non-agricultural uses) and development of infrastructure, the windfall gains of which are not shared with the original landowners.

The Amendment Bill to the Land Acquisition Act provides for a narrower definition of public purpose and the National Resettlement and Rehabilitation Policy provides for non-monetary compensation to the displaced, including the landless whose livelihood depends on the land, directly or indirectly. Enacting these into legislation should improve the situation. In any case, the government should use its eminent domain powers sparingly, regulatory distortions to land markets should be removed, working towards security of title should receive priority, the private sector should negotiate directly and transparently, schemes for sharing of land value gains should be adopted so that the displaced have a regular income source, and alternatives to land acquisition, such as land pooling and readjustment, should be used more extensively.

Another major source of delays is on account of the need for clearances from numerous agencies. Initiatives like the Ultra Mega Power Projects (UMPP) are a step in the right direction, wherein all inputs and clearances are tied up by a government agency through the formation of a special purpose vehicle and then the private sector is invited to bid. But not every project is conceived and developed as a UMPP.

Various options that have been used by other countries include single window clearances, a super-minister or apex body. India still needs to find an appropriate solution for expeditious and coordinated development of the infrastructure sector.

**GOVERNMENT CAPACITY**

The government record on implementing projects on its own has been poor—barring some notable exceptions such as the Delhi Metro. But bringing in the private sector
by way of PPP is not an easy substitute either. In fact, a key issue is weak government
capacity to design and execute PPP projects. It may not be a coincidence that most
of the private investment to date has been in greenfield projects in telecoms and
energy, comprising 80 per cent of the total private investment. Projects in these
sectors are mainly purely private, rather than PPP. To some extent, drawing the
private sector into these sectors with purely private projects is simpler, once the
policy and regulatory framework is reasonably in place and the private sector sees
attractive prospective returns. For instance, in power generation, it is up to the
private sector to decide on plant location, choice of fuel, plant size and enter into a
power purchase agreement (PPA) with a distribution utility or a trading company.

PPP concessions, which are prevalent mainly in the transport sector, account for
less than 15 per cent of total private investment. These PPP projects are inherently
more complex and require a great deal more effort and skill from public sector staff
than is needed for engineering procurement contracts (EPC). As concessions are
typically for 20 to 30 years, projections have to be made for this period from various
perspectives—development, construction, operation and maintenance, financing,
commercial and policy aspects. Risks have to be assessed and allocated amongst the
stakeholders. All this groundwork is necessary for the public sector to have a better
understanding and be able to deal with the private sector at various stages of the
project: designing the concession agreement, assessing the bid awards, monitoring
performance of the PPP contracts, and assessing the need for re-adjustments.

Building a project pipeline is difficult under these circumstances, especially in core
urban sectors, where the capacity is weakest.

At the national level, it has taken considerable time to develop a model concession
agreement for the roads sector and even then there have been a lot of issues the
government has had to address, as it aimed to find an appropriate balance between
regulating excessive private returns and altogether dampening private sector interest
in the highway programme. Ultimately, the government has accepted the
recommendations of a committee it had set up to remove roadblocks impeding the
NHDP. The recommendations include relaxing the cap on upside revenue potential,
rationaizing the eligibility requirements for bidding, relaxing the conflict of interest
clause, enabling early exit for the promoters, allowing the National Highways
Authority of India (NHAI) to award projects that receive single bids, and reducing
the lending risk by permitting lenders to create a charge on the escrow account.
It has also been recognized that NHAI has to strengthen its capacity to undertake
PPP projects.

Going forward, the role of the states and local bodies will be key to furthering the
development of infrastructure as much of the anticipated investment is in areas
under their jurisdiction. The capacity of urban local bodies (ULB) to structure and implement PPP projects needs to be strengthened, but the magnitude of the task is enormous given that India has over 3700 ULBs, of which 109 are municipal corporations for larger urban areas and over 1400 are municipal councils for smaller urban areas. Of course, not all ULBs can be expected to undertake PPPs but even the larger municipal corporations do not have adequate capacity for it. Under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), which is leveraging central government grants for urban reforms and projects in 65 cities, a total of 463 projects have been approved as of June 2009, of which only 65 are PPP projects. Moreover, it is not clear how many PPP projects are actually being implemented. Many ULBs will require technical assistance in structuring PPP projects. Unlike national highways, where efforts have been made by the NHAI to standardize project structures and documents for BOT projects, similar standardizations have not happened at the ULB level. Some states like Karnataka (IdecK), Kerala (KINFRA), Rajasthan (PDCOR), West Bengal (I-WIN) and Tamil Nadu (TNUDF), though, have formed entities through public–private partnerships in building capacities, assisting ULBs in project structuring and financing. There are also state-level agencies with similar mandates in some states. In Karnataka, the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC), assists urban agencies in the state in planning, financing and providing expertise to develop urban infrastructure. Smaller municipalities in the state have implemented projects on PPP basis with the help of KUIDFC.

The impact of these agencies in spearheading PPPs has been limited. This has been mainly due to two reasons (i) lack of empowerment of these agencies by the state to enable them to carry out the mandate with which they were set up and (ii) the funding from state government to these agencies as was originally envisaged to undertake a financing role did not come through in many cases. At one level it is important that states have dedicated entities (preferably with skills from public and private sectors) for providing technical support particularly to ULBs for structuring PPPs. What is important, though, is the need for empowering these entities to carry out their mandates.

CONCLUSION

The development of India’s infrastructure presents a huge task as well as a huge opportunity. The previous sections have raised some of the key issues that will need to be addressed for a major step-up in infrastructure development. But there are other challenges too. It is important to draw attention to two of them in particular. The first concerns the environment. Building good quality infrastructure is integral
to the development of a competitive Indian economy that is expected to play a larger role in the world economy. Also, building it rapidly with the least damage to the environment is important. How the huge growth in power generation, transportation and urbanization can be managed is therefore especially important. A second issue is the importance of transparent processes of bidding and procurement if PPP is to play a major role. Fairness and a level playing field must be firmly established and not perceived to be compromised at any stage.

There is no doubt that India’s infrastructure is a growth sector: it is clearly recognised as a national priority. The infrastructure will be built. The question is how well will the process be managed: how sustainable, transparent, and fair will it be?

Ritu Anand

NOTE

1. This paper was included by the World Economic Forum in its 2010 publication titled Positive Infrastructure—A Framework for Revitalizing the Global Economy.

REFERENCES


1. INTRODUCTION

Until 1990, the provider of capital and services for infrastructure in India was the government. With prospects of weak commercialization, low levels of public investment, rationing, shortage, and poor quality becoming evident, economic reforms were initiated in these sectors to encourage private sector participation (PSP). The aim of PSPs was to attract private capital and management skills in infrastructure provisioning and service delivery. Due to the monopolistic nature of infrastructure services, there were concerns that the transfer of rights to provide infrastructure services from public to private sector may result in either under-provisioning of services to some segments of society by the private sector or the private sector may charge higher prices well above the cost of providing such services.

At the same time, PSP would not materialize without enabling legal, policy and regulatory frameworks that address risks of administrative expropriation ex-post, i.e. after the private sector investment has come through. If the private sector perceives expropriation risk to be too high, they will either demand a very high risk premium or they would not invest at all.

Addressing these twin concerns required the government to move towards regulatory design where objectives to provide infrastructure services and protect consumer interests were achieved through economic regulation. Over time, economic regulation has been established in the different sectors, albeit in different forms.

In this context, the present paper reviews the economic regulatory regime in India at the level of infrastructure sector. While reviewing the economic regulatory regime, the following questions arise: What have been the key components of regulatory design for infrastructure sectors in India? How independent and accountable has
the regulation been in practice? To what extent has regulation brought about transparency in decision-making? To what extent have these attributes of regulation led to credible regulatory decisions and the dissociation of regulatory objectives from the discretions of the executive? Do they have the capacity and experience to perform their functions effectively? What are the means of participation of consumer groups in the regulatory process?

Against the above backdrop, this chapter has two objectives: first, to evaluate the economic regulatory regime for the infrastructure sectors in India, and second, to suggest a paradigm for effective economic regulation. In this context, the chapter also examines the conflict resolution mechanism in each sector.

The rest of the chapter is organized as follows: Section 2 discusses the need for economic regulation; Section 3 briefly describes the objectives and functions of economic regulation; Section 4 discusses the art of regulation; Section 5 presents and evaluates the regulatory regime for various infrastructure sectors; and Section 6, to conclude, presents a paradigm for effective economic regulation.

2. Need for Economic Regulation

Traditionally, infrastructure capital has been provided by the public sector. The economic justification for such public provision is that many infrastructure capital projects are public goods with defining features as non-excludable (meaning that by nature these goods cannot be withheld from a consumer or producer) and/or non-rival (meaning that consumption of these goods do not preclude consumption by another). The private provisioning of such non-rival goods would imply that the private sector would under-provide them because private decision-making would not fully reflect the entire benefit of an infrastructure project (Otto and Voss, 1995). Non-excludability would imply that the private sector would not be able to appropriate a competitive return for the services provided and may actually refrain from private provisioning (ibid). An additional rationale for public provisioning of infrastructure capital has to do with the social benefits associated with these projects (for example basic education or primary healthcare have external benefits beyond the individuals or firms immediately involved). Another oft provided justification for public provisioning of infrastructure services is that some of these services exhibit increasing returns to scale. Firms that provide these services wield excessive market power. These markets structures, if left unregulated to the private sector would lead to under-provisioning of services at too high a price. Two means of addressing these problems are through regulation and public provisioning. The source of capital for infrastructure goods that are strictly public-good in nature (since the price system fails in such cases) would have to come from the general
revenue of the government, though the provisioning of services could involve the private sector through public–private partnerships. In cases, where increasing returns to scale are possible, services can be priced, in a regulated environment, thus allowing for public or private ownership.

In practical terms, no infrastructure services fully satisfy the strict definition of public good. The role of the private sector in capital provisioning and service delivery can be ascertained in a variety of ways depending on the extent of recovery of cost of provisioning the services from consumers. The problem of private infrastructure is the commitment to a fair and stable set of rules governing the relationship between the government and private infrastructure providers (Gomez-Ibanez, 2003, Chapter 1). The usual concern of the private sector is that the government may renege on commitments to the private sector rather than vice versa (ibid). The private sector is vulnerable because of the large capital investment that is put in place upfront and the gestation period is very long. However, since the local infrastructure company enjoys near monopoly (which stems from durability and immobility of company’s and consumer’s investments), the government and consumers are also vulnerable to private sector opportunism. The government, acting on behalf of consumers, would want a commitment that the local infrastructure company will not take advantage of its position by raising prices well above cost or compromise on the quality of services. The expensive, durable and immobile nature of investment makes all parties (government, consumer and private companies) vulnerable to opportunism and desirous of stability and commitment (Gomez-Ibanez, 2003).

Infrastructure sectors have differing requirements for capital investment (and hence the sunk cost), varied monopolistic power and potential for revenue growth in the future (Table 45.1). The potential for increase in revenue (due to growth in demand) helps in accelerating recovery of incurred capital cost.

The features of the infrastructure sector define the regulatory regime that will be required. Telecom, for example, will have low need for regulation, the reasons being that the sector has witnessed a rapid rate of growth of technical progress and the externalities have been low. Externalities such as universal access can be addressed through mobile telephony and public pay-phones. The capital cost in telecom is much less sunk than other sectors as its life is typically determined by economic obsolescence rather than physical wear and tear. Low need for regulation does not eliminate the regulatory requirements completely as these are still required for access rules, pricing and quality but it is less demanding than other sectors (Stern, 2008).

On the other extreme are sectors like water supply and sanitation, railways, airports and ports, where the sunk costs are enormous and technical progress low. Since
these infrastructure sectors involve physical construction of structures with long lives, physical obsolescence is also a defining characteristic. Upkeep and maintenance of these structures requires capital investment during the life of the structure. The replacement cost of infrastructure assets is also very high. These sectors also have major externality issues and the potential for competition is very low. Given these features, the demand for a regulatory regime is high.

Table 45.1: Features of infrastructure sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Capital (sunk) cost</th>
<th>Demand growth</th>
<th>Growth in technical progress</th>
<th>Potential for competition</th>
<th>Externalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Natural gas</td>
<td>High</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Telecom</td>
<td>Medium</td>
<td>High</td>
<td>Very high</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Water and sewerage</td>
<td>Very high</td>
<td>Low</td>
<td>Low</td>
<td>Very low</td>
<td>Very high</td>
</tr>
<tr>
<td>Railways</td>
<td>Very high</td>
<td>Low</td>
<td>Very low</td>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td>Ports</td>
<td>Very high</td>
<td>Low</td>
<td>Very low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Airports</td>
<td>Very high</td>
<td>Low</td>
<td>Very low</td>
<td>Very low</td>
<td>High</td>
</tr>
<tr>
<td>Roads</td>
<td>Medium</td>
<td>Low</td>
<td>Very low</td>
<td>Very low</td>
<td>High</td>
</tr>
</tbody>
</table>

Source: Stern (2009); authors

3. Regulatory design: Substance and Governance of Economic Regulation

Principally, the key objective of economic regulation in infrastructure sectors is to ensure “continuous supply, over the long term, of specified infrastructure services of defined quality at the minimum necessary cost (and prices) to the population and industry of the country” (Stern, 2008). It is important to emphasize here that though consumer welfare is the primary concern of regulation, it does not narrowly focus on current consumers only but is concerned with future consumers as well. While setting “minimum necessary” cost and prices, the need for investors to earn a reasonable, risk-adjusted rate of return is mandatory to ensure a continuous supply of the service, and of good quality, over the long term (ibid). The investor’s rate of return, therefore, must cover the following over and above the operation costs: maintenance cost of the existing network, renewal and expansion investment, depreciation and reasonable risk-adjusted rate of return on capital.
Economic regulatory design comprises two principal components—regulatory governance and regulatory substance. Regulatory governance refers to all the mechanisms that a society uses to restrain the government’s discretionary moves and to solve conflicts between the private sector and regulators. Good regulatory governance implies that the risk of introducing substantial changes to the way the government views investment is minimum. Regulatory substance involves specific norms related to price regime, subsidies, quality of service standards, automatic and non-automatic cost pass-through mechanisms, competition policy, barriers to entry, investment or connection obligations, accounting system, network access conditions for new and existing customers, periodic reporting requirements, and social obligations. Regulatory substance determines the price risk for an investor. Institutional endowment constrains government’s choices on regulatory governance and substance, and is therefore an important determinant of regulatory effectiveness and credibility, as well as sector performance (Levy and Spiller, 1996). As discussed later, five mechanisms have existed for governance of regulation. Performance and regulatory design could vary across sectors even though most institutional endowments (legislative and executive institutions, nature of judicial system, informal norms) are common to all sectors (Abdala, 2001). The variance among sectors arises from the differences in administrative capabilities within government agencies and the influence that stakeholders can exercise in regulatory design. Unresolved conflicts among interest groups also has a profound bearing on the regulatory regime as disgruntled parties put pressure for contractual changes in their favour. The next section describes the regulatory design and governance mechanisms adopted in various infrastructure sectors in India. The experience with respect to regulatory mechanisms has also been reviewed.

4. Economic regulation of infrastructure in India

Types of regulation
The range of solutions to monopoly in provisioning of infrastructure capital and services fall on a continuum according to relative roles that market and politics play in determining infrastructure prices and service quality (see Figure 45.1). As one shifts from one extreme where prices and quality are determined through the market process to the other extreme where politics determines the price and quality of services, the basis for regulation shifts from contracts and courts to specialized regulatory institutions (Gomez-Ibanez, 2003).

The first block of regulatory provisioning (Figure 45.1) is basically self-regulation by governments as they provide infrastructure services and are responsible for price and quality aspects for their consumers whom they serve and on whose behalf they
regulate. A review of literature and international experience suggests that five models for implementing regulatory substance and governance (regulatory administration) have been used to achieve regulatory provisioning for the remaining three blocks of Figure 45.1. These are: regulation by the government, regulation by an independent regulatory agency (IRA), and regulation by contract (RoC); regulation by outsourcing regulatory functions (to expert panels or third parties); and regulation by a competition agency (see for example, Eberhard, 2007, Stern, 2009). The scope of regulation by these regulatory administrative mechanisms could range from discretionary regulation to concession contracts to private contracts. Regulation by government is typically associated with service provision by government-owned monopoly incumbents and does not have any of the key attributes of regulation to support private investment. Prior to the 1990s, this was the dominant model of infrastructure provisioning and regulation in India. Though still dominant, this model is increasingly complemented by other models as the role of the private sector in infrastructure capital and service provisioning is growing. In some sectors, such as telecom services, this model has become obsolete.

<table>
<thead>
<tr>
<th>Regulatory administration model</th>
<th>Examples of infrastructure sectors in India where used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-regulation by government</td>
<td>Water, sanitation services, solid waste management, railways, city and rural roads, ports</td>
</tr>
<tr>
<td>Discretionary regulation</td>
<td>Electricity generation and transmission</td>
</tr>
<tr>
<td>Concession contracts</td>
<td>Water, solid waste management, BRTS, metro, highways, ports, airport, electricity transmission</td>
</tr>
<tr>
<td>Private contracts</td>
<td>Telecom, electricity generation and distribution</td>
</tr>
</tbody>
</table>

**Figure 45.1: Continuum of infrastructure regulatory provision**

*Source: Authors*
The role of the IRA is substantial in case of discretionary regulation where regulators set price and quality standards for private infrastructure suppliers. This mechanism has also been used for ensuring competition in infrastructure provisioning. Another form of regulatory administration is RoC. There are two different operational definitions of this term (Bakovic, Tenenbaum and Woolf, 2003). The first definition is that it is regulation and regulatory administration without a regulator. The regulatory contract is totally self-contained and self-administered like a commercial contract. Any disputes arising over implementation are handled by a regular court, an administrative court or a special expert panel. This is an appealing concept because it seems to offer the possibility of putting regulation on autopilot mode and eliminates the need to create a new regulatory entity. A second definition is that regulation by contract is a detailed tariff-setting agreement administered by an independent regulator. Under this definition, the regulatory contract does not replace the regulator but substantially limits the regulator’s discretion. In particular, it forces the regulator to set tariffs based on specific formulas rather than just general principles.

In India, all four types of regulatory designs (shown in Figure 45.1) exist in infrastructure. Depending on the balance between politics and the market in determining price and service quality, current sectoral mapping in regulating infrastructure services is depicted in Figure 45.1.

In keeping with the requirements of infrastructure regulatory provisioning in India, three clear models of regulatory administration have emerged, viz., regulation by government, IRA and RoC. The IRA model is dominant in the power and telecom sectors while the RoC model has taken root in national highways and major ports (for building and operating new terminals at existing major ports). The RoC model in both these is the second variant described by Bakovic, Tenenbaum and Woolf (2003). In most sectors, such as water, ports and electricity, multiple regulatory administration arrangements can be seen. These multiple arrangements within a sector reflect the haphazard development of the regulatory system due to which different administrative structures continue to co-exist. These are either in response to ongoing reforms in, or the maturity of specific segments of, these sectors. For instance, in water supply and sanitation, private sector participation is largely regulated through concession agreements (example of RoC) but independent regulators (in Maharashtra, Arunachal Pradesh and Uttar Pradesh) have also emerged. The extent of regulation provisioning is largely discretionary regulation wherein price cap and quality standards are specified. In the electricity sector, IRAs continue to regulate the old thermal power generation plants on cost plus or normative bases. However, for new thermal power generation plants selling power on the basis of long-term agreements to distribution utilities, RoC has been adopted as the regulation administrative tool. The central regulator continues to play a role in tariff determination by establishing some norms that govern final tariff payment. An overview of the regulatory model in each sector is provided in Table 45.2.
Table 45.2: Regulatory design across key infrastructure sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Year of sectoral reform</th>
<th>Type of regulation administration</th>
<th>Year of creation of regulatory mechanism</th>
<th>Dispute resolution mechanism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecom</td>
<td>1994</td>
<td>IRA (Telecom Regulatory Authority of India)</td>
<td>1997</td>
<td>Special tribunal (Telecom Disputes Settlement and Appellate Tribunal)</td>
</tr>
<tr>
<td>Electricity</td>
<td>1991</td>
<td>IRA (Central Electricity Regulatory Commission at the federal level and State Electricity Regulatory Commissions at the state level); regulation by contract for new plants and transmission capacity set up by private sector</td>
<td>1996¹</td>
<td>Special tribunal (Appellate Tribunal for Electricity), regulator²</td>
</tr>
<tr>
<td>Gas</td>
<td></td>
<td>Regulation by government (Director General of Hydrocarbons), IRA (Petroleum and Natural Gas Regulatory Board)</td>
<td>2007</td>
<td>Special tribunal (Appellate Tribunal for Electricity),³ regulator⁴</td>
</tr>
<tr>
<td>Water and sanitation</td>
<td>1995</td>
<td>Regulation by government</td>
<td>Defined in contract</td>
<td></td>
</tr>
<tr>
<td>Urban services</td>
<td>1995</td>
<td>Regulation by government</td>
<td>Defined in contract</td>
<td></td>
</tr>
<tr>
<td>National highways</td>
<td>1996</td>
<td>Regulation by contract</td>
<td>2009</td>
<td>Defined in contract (conciliation, use of independent experts and arbitration)</td>
</tr>
<tr>
<td>Ports</td>
<td>Early/ mid-1990s</td>
<td>IRA (Tariff Authority for Major Ports) and regulation by contract for major ports; State Maritime Boards and regulation by contract for minor ports</td>
<td>1997⁵</td>
<td>Defined in contract (conciliation, use of independent experts and arbitration)</td>
</tr>
<tr>
<td>Airports</td>
<td>1997</td>
<td>IRA (Airports Economic Regulatory Authority of India) and regulation by contract for select airports</td>
<td>2009</td>
<td>Disputes mostly referred to an arbitrator nominated by Indian Railways or GOI</td>
</tr>
<tr>
<td>Railways</td>
<td></td>
<td>Regulation by government ⁷</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. For thermal power generation selling power on the basis of long-term agreements to distribution utilities.

2. The first regulatory commission was set up in 1996 in the state of Orissa as part of World Bank-supported power sector reforms in the state. Thereafter, other states set up regulators under their own sector reform laws. A nationwide legislation providing the legal framework for creation and functioning of electricity regulators at national and state level came into being in 1998. The Central Electricity Regulatory Commission (CERC) was set up under this law as were many other state level regulators. With the coming into force of the Electricity Act 2003 in June 2003, which consolidated the laws relating to all segments of the electricity industry and repealed various central legislations and overrode such provisions of state reform laws as were inconsistent with the provisions of the Act, regulators began to operate under this legislation.

3. The central regulator adjudicates upon disputes involving generating companies or transmission licensee in regard to matters of tariff and inter-state transmission of electricity. State regulators adjudicate upon disputes between the transmission and distribution licensees and generating companies falling within their domain. They can also refer disputes for arbitration.

4. GOI to appoint a Technical Member (Petroleum and Natural Gas) with experience and knowledge of petroleum and natural gas on the Tribunal.

5. The regulator adjudicates upon disputes between entities or between an entity and any other person on areas under its scope.

6. Model contracts were put in place prior to this but there were several problems and litigations with them. The final contracts were put in place in 2009.

7. In the few cases where Indian Railways has given concessions to private players, regulation by contract is the mode of regulation.

Source: Authors

Scope of regulation

A comparison of the powers of the different IRAs in the country throws up vast variation (see Table 45.3). At one end is the Petroleum and Natural Gas Regulatory Board (PNGRB) whose powers are limited to a single aspect of the natural gas value chain, viz. transportation, and do not cover determining prices of gas or even specifying the principles for the same. Then there is the Tariff Authority for Major Ports (TAMP) whose power is limited to levying of tariffs, and the individual Port Trusts exercise all regulatory functions except tariff setting. TAMP is not vested with the powers to set and enforce performance standards or regulate other aspects of the ports sector. Then there is the Aviation Economic Regulatory Authority (AERA) which has no powers to determine or enforce standards on quality, continuity and reliability of airport services; it can only “monitor” them. Finally, there are the Electricity Regulatory Commissions (ERCs) whose extensive powers cover almost all areas of the power sector. ERCs exercise control over all functions of the utilities. Differences can also be seen in the powers of regulators for information collection, monitoring and enforcement. While the TRAI and ERCs have the authority to monitor operator performance, only ERCs are empowered to suspend or terminate licences of operators and enforce remedies such as penalties for non-compliance with orders, directions or licence provisions.
Table 45.3: Regulatory substance across key infrastructure sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Scope of coverage</th>
<th>Promotion of competition</th>
<th>Tariff setting</th>
<th>Quality of Service</th>
<th>Information collection, monitoring and enforcement</th>
<th>Universal service obligation</th>
<th>Network access conditions for new and existing customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecom</td>
<td>Telecom, internet, cable TV</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Only information collection and monitoring; cannot suspend or terminate licences of operators and enforce penalties for non-compliance</td>
<td>Only ensure compliance</td>
<td>Yes</td>
</tr>
<tr>
<td>Electricity</td>
<td>Generation (long-term contracts), transmission, distribution, trading</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gas</td>
<td>Preservation, upkeep and storage of data and samples pertaining to petroleum exploration, drilling, production of reservoirs, etc. (DGH); refining, processing, storage, transportation, distribution and marketing of gas (PNGRB)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Only information collection and monitoring</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Water and sanitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban services</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National highways</td>
<td>National highways except those being developed by the Border Roads Organization</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>
Table 45.3: Regulatory substance across key infrastructure sectors (contd...)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Scope of coverage</th>
<th>Promotion of competition</th>
<th>Tariff setting</th>
<th>Quality of Service</th>
<th>Information collection, monitoring and enforcement</th>
<th>Universal service obligation</th>
<th>Network access conditions for new and existing customers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ports</td>
<td>Major Port Trusts and private operators located therein</td>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airports</td>
<td>Airports and aeronautical services at private and lease airports, and major airports(^2)</td>
<td></td>
<td>Yes</td>
<td>Only monitor service standards specified by GOI or an authorized entity</td>
<td>Only information collection and monitoring; cannot suspend or terminate licences of operators and enforce penalties for non-compliance</td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>

1. Universal service obligations laid down in licences
2. Defined as airports with traffic of more than 1.5 million passengers per annum; currently 12 in number

Source: Authors
Evolution of regulation

An examination of the evolution of regulatory frameworks in India suggests that regulatory designs in all infrastructure sectors have followed rather than preceded economic reforms, causing delays and multiplicity of regulatory administration even within a sector. Such delays have hurt the confidence of private sector participation (PSP) in these sectors.

For example, in the case of Bengaluru Airport, the concession agreements for the greenfield airport provides for the levy of a user development fee (UDF) to augment project revenues for the private sector. This fee is levied for providing passenger amenities, services and facilities. The Ministry of Civil Aviation (MoCA) has allowed the airports at Hyderabad and Bangalore to introduce a UDF of Rs 375 and Rs 260 respectively per departing domestic passenger and Rs 1000 and Rs 1070 respectively per departing international passenger. According to the Bengaluru International Airport Ltd (BIAL), the concession agreement signed with GOI permitted it to introduce UDF within three months of launching commercial operations. However, BIAL was not allowed to introduce UDF for more than seven months after starting commercial operations in May 2008 because the IRA for airports was not constituted. Moreover, the UDF allowed to be levied by MoCA was an ad hoc fee that was to be confirmed by AERA upon its constitution. At the same time, the proposal of the Mumbai airport operator to increase aeronautical charges by 10% was put on hold until the establishment of AERA. Clearly, regulation by contract has not been sufficient and regulatory uncertainty on key aspects such as aeronautical charges in the absence of an independent regulator has led to high levels of risk for private investors.

Similar examples can be seen in the road sector. Though RoC is the mode of regulation in this sector, the contractual framework (which has implications for regulatory substance and governance in this sector) applicable to national highway projects until 2008 varied significantly among projects awarded. In an attempt to standardize contractual arrangements, the GOI brought out model concession agreements (MCAs). These documents were, however, finalized only as late as November 2009. The Planning Commission (2008), in its paper on approach to regulation, observed that the absence of a regulator who could standardize concession agreements in the sector, has hampered the rapid and consistent development of the sector. It noted that there was an attempt to lead the transformation through incumbent government functionaries as lead agents which has led to flawed frameworks and the absence of a consistent or efficient reform processes.
In the case of the railways, the Indian Railways (IR) has expressed intent for PSP over the past many years. But the absence of an appropriate regulatory administrative set-up independent from the railway executive has meant that IR remains the policy maker, regulator and operator of the rail network, with no checks and balances on critical aspects such as open access to railway lines. The dedicated freight corridor which is now being set up on an EPF basis with funding from multilateral/bilateral institutions was initially envisaged as a PPP venture. However, open access to railway lines based on access charges could not be agreed upon and the public private partnership (PPP) approach had to be dropped.

Another important feature of regulatory administration is that the creation of IRAs has proceeded on a sectoral basis, where each line ministry or state government, often prompted by a multilateral funding agency, has constituted a regulator for a particular sector (Planning Commission, 2008). This sectoral approach has resulted in an uneven regulatory environment for infrastructure per se. A case in point is the dispute resolution mechanism in sectors where IRAs have been established. In the telecom sector, the IRA has no role in dispute resolution/adjudication which is vested in the Telecom Disputes Settlement and Appellate Tribunal (TDSAT). However, in the power sector, Electricity Regulatory Commissions (ERCs) continue to play a role in dispute resolution even in the presence of the Appellate Tribunal for Electricity. More importantly, the long-term objective of regulation—whether the aim is to perpetuate the regulator’s role or to eventually withdraw and let market forces take over—remains unclear (Bhasin 2006).

The establishment of newer IRAs has not drawn from the experiences, lessons and good practices of IRAs already existing in the country. The working of the PNGRB is an example. Despite substantial experience with IRAs in the country, the non-empowerment and limited scope of regulation of PNGRB has delayed the development of the gas sector. This issue has been elaborated later in the paper. Finally, as mentioned earlier, the powers given to IRAs in different sectors have differed.

5. Review of Regulatory Governance

Having outlined the regulatory framework across different sectors, this section reviews experience with regulation of infrastructure sectors. Keeping with the regulatory design components identified, the regulatory framework is reviewed on two aspects: governance and substance. The main aspects on which governance has been analyzed are administrative efficacy which delivers regulatory substance and ensures governance, its independence, capacity, and transparency and accountability; and the aspects on which substance have been analyzed are the functional scope of regulations. Credibility in regulation is built in the eyes of consumers and private investors only if regulation is effective in its purpose and stable over time and for this credibility of administration or regulation is paramount.
Independence of regulation

Independence of regulators from the executive and from political pressure is a critical prerequisite for effective regulation. This issue assumes greater importance in India because the government is an operator of infrastructure services in almost all sectors. For private participation, investors need to be assured of a level playing field with government-owned operators. The general perception in India is that the regulators are still a part of the policy makers. This is on account of three reasons: the profile of regulators, the powers of the government to intervene in the regulatory process, and the dual role of government as policy maker and operator.

Profile of regulators

As far as the profile of regulators is concerned, the appointments to regulatory bodies have been inadequate so far. Instead of multidisciplinary talent, the regulatory bodies seem to predominantly have bureaucrats (current or retired), government employees on deputation, or technical personnel drawn from public utilities. Almost every post of chairman and member of regulatory bodies is manned by a former or existing government official. Thus, the postulated arm’s length relationship of the regulators with the government might not exist in practice.

The main reason for this can be found in the selection process laid down in the legislations establishing these regulators. In the case of ERCs and AERA, the selection process involves the establishment of statutory selection committees and a time-bound selection process to recommend a panel of two names for a vacancy. Though there is scope for appointment of industry experts or private sector experts on these committees, in practice this has rarely happened. Bureaucrats dominate the committee. On the other hand, in the case of TRAI and TAMP, there is no formal procedure for the selection of regulators and the GOI retains absolute powers to this end. Thus, the procedure for appointment of regulators is highly ambiguous and non-transparent, making it susceptible to political patronage or capture. Then, the regulator also becomes a vehicle to legitimize rather than to challenge interest-group politics (Rao and Gupta). Given that most regulators were previously working for the government or the utility which they are supposed to regulate in their new role, their independence and orientation for regulation becomes questionable. This has been a particularly contentious issue in case of the TRAI. Jain (2011) discusses the role of TRAI and the recommendations provided by it on various aspects related to the development of the telecom sector. He points out that at every controversial stage in the sector, TRAI has given recommendations that have suited the government and helped the government pursue its agenda.
These problems are compounded by the fact that there are long delays in filling up positions, with many positions for regulators lying vacant for substantially long periods of time, giving the impression of “behind-the-scene” processes for appointing regulators. Further, the general experience has been that the rules governing the appointment and selection of regulators are not publicized. No sector has seen any noticeable selection/consideration/application of strong non-governmental candidates.

The underpinning of regulatory independence has affected the commercial operations of various sectors. There exist examples in the electricity sector where regulators have allowed tariffs that are much lower than permissible because they are not independent in their decision-making from the government concerned. They have resorted to the creation of “regulated assets” thereby postponing the acceptance of a sizeable amount of legitimate and proven expenditures by utilities to prevent tariffs from rising, for electoral or other reasons.

This by no means implies that all former or existing government officials should be debarred from appointments to IRAs. On the contrary, it implies that there is a need to develop appropriate conventions requiring that regulators are appointed on a fair and transparent basis with a view to ensuring that the regulatory system remains insulated from interference and capture. Regulators must at the very least be selected through a committee which is not dominated by the “government” but includes representations from the industry at large and eminent academia. It needs to be noted that selection committees, even where they exist, are not independent in the true sense because most of these committees tend to be headed by the Chief Secretary of the state or the cabinet secretary of the GOI or a similar official, as the case may be. The selection process should require a recorded, public justification of member recommendations or rejections.

The independence of regulators is an issue not just for IRAs but also for regulators or administrators of contracts. In the case of national highways, this regulator is the National Highways Authority of India (NHAI) which also builds national highways. Until recently, the chairman of NHAI was nominated by the GOI from among serving civil servants. Further, the tenure of Chairman was not fixed and the chairman could be removed by the GOI at will. In the four years preceding 2010, the chairman of NHAI was changed five times. Following the recommendation of an inter-ministerial committee, the GOI has now instituted a search committee for the purpose of shortlisting candidates for appointment of the chairman. It has also ensured continuity of the chairman by giving a minimum tenure of three years, further extendable by two years.
Government intervention in the regulatory process

The government can intervene in the regulatory process to undermine the effectiveness of regulators in two ways: exploitation or misuse of the right to issue policy directives and flagrant flouting of procedure and law.

Exploitation or misuse of policy directives

Policy directives to guide regulatory function are often necessary, partly to plug loopholes and clarify ambiguities in the law, but also to ensure effective and consistent application of the law across states (Rao and Gupta, 2006). Governments have often misused the power to issue these directives to issue non-policy directives. Several examples of such misuse can be found in the initial years of regulation by SERCs. A survey by Prayas Energy Group (2003) documents the extent of government interference in the regulatory process through policy directions relating to tariffs as well as subsidy to agriculture and domestic consumers. These directives undermined not only the effectiveness of the regulatory process but also one of the stated goals of introducing regulation in the sector.

With legislative reforms in the sector, the powers of the government to give policy directions have been curtailed. ERCs are now only to be guided by these directives. They are no longer bound by them. However, issuance of policy directives to SERCs has continued. In 2009, the State Government of Maharashtra stepped in twice with policy directives to prevent tariff hikes. The directives were applicable for the private player servicing parts of the city of Mumbai and the state government-owned distribution entity. The latter, by virtue of its licence serves all areas of the state except the city of Mumbai. Another example of the misuse of policy directives can be found in Delhi in 2010 during the tariff determination process for the power distribution utilities for FY 2010–11 (see Box 45.1).

Though ERCs have been sort of ring-fenced from policy directives of appropriate governments, the avenues for misuse of powers of policy directions remain open. The central and state governments are empowered to direct power generators to operate in accordance with their directions in extraordinary circumstances. State governments in Karnataka and Tamil Nadu did not want independent power producers (IPPs) or captive power plants (CPPs) located in these states to sell power outside the state. Consequently, the utilities in these states refused open access to these plants to send the electricity out to another state despite the legislative framework in the sector mandating access to transmission and distribution lines to all generators, distributors and buyers of power as long as capacity was available in these lines. The respective SERCs went along with this denial of open access and took no steps to correct the situation.
Box 45.1: Regulation of private players—lessons from Delhi

The Delhi Electricity Regulatory Commission (DERC), after following the proper regulatory procedure for tariff determination, approved the Tariff Orders for the three power distribution companies (discoms) in Delhi, viz., BRPL, NDPL and BYPL, on 28–29 April 2010. On 1 May 2010, the discoms made representations before the Government of the National Capital Territory of Delhi (GNCTD) on the issue of severe cash flow constraints affecting their ability to purchase power in FY 2010–11. The basis of these representations by the discoms was their impression that the DERC may ignore the revenue gap for FY 2009–10 in determining tariffs for FY 2010–11, which would impact the liquidity of the discoms. Revenue gap is the difference between the expenses incurred by discoms and the revenues garnered from prevailing tariff levels to meet these expenses. The discoms pointed out that non-recovery of expenses would lead to recourse to additional debt to finance operations and further affect the financial position of discoms.

On 4 May 2010, the GNCTD issued a directive to DERC to give statutory advice on the concerns raised by the discoms. The GNCTD further issued a policy directive to DERC for not issuing the tariff order till the statutory advice given by DERC to GNCTD was thoroughly examined by the GNCTD and the GNCTD gave DERC the go-ahead for issuing the orders. There are two interesting points to note here. First, the GNCTD is a joint venture partner in the discoms with a shareholding of 49%. Second, the DERC had on 30 April 2010, already informed the GNCTD that the concerns of discoms regarding purchase of power were being met in the tariff determination process and that Rs 1775 crore was being provided to them for bilateral purchases of power even though no such claims were made in their Tariff Petitions and an additional amount of Rs 1200 crore of surplus at existing tariff was also being left in their hands to deal with uncertainties.

DERC sought the advice of the Solicitor General of India (SGI) on the matter of the policy directive issued by GNCTD. The SGI advised that the direction was ultra vires and void and the Tariff Orders must be issued. However, the members of DERC did not accept the advice and took the position that as long as the policy direction was in force, DERC could not issue the Tariff Orders. In the meantime, a PIL was filed in the Delhi High Court on the non-issuance of Tariff Order. During the proceedings related to the PIL, it emerged that DERC had proposed reducing retail tariffs by as much as 20% for some consumer slabs, as against the 50%–60% tariff hike proposed by the discoms in their petitions for tariff determination submitted to DERC. The same was also reported widely in the media.

Correspondence between DERC, GNCTD and the discoms, as available from the DERC’s website, indicates that the DERC examined the issues raised by the discoms before the GNCTD and found that the factual position was entirely different from the position so presented by the discoms to the GNCTD. In fact, the discoms had
incorrectly represented their financial ratios to the GNCTD. DERC relied on reports of credit rating agencies and loan sanction letters of banks to show that the financial position of the discoms was healthy and the financial parameters of the discoms were well above the lenders’ covenants with no covenants having been breached. In fact, there was evidence that one of the discoms had not even fully utilized bank limits sanctioned to it.

The correspondence further revealed that contrary to the claims made by the discoms, DERC was quite liberal in allowing the expenses likely to be incurred in procuring power during FY 2010–11. Besides considering the power availability from future stations in accordance with the status given by the Central Electricity Authority, the agency responsible for monitoring the status of generating stations in the country, DERC allowed higher per unit costs for new as well as existing generating stations than what was asked for by the discoms. Finally, it emerged that though the discoms had accused DERC of not allowing the recovery of legitimate expenses during FY 2009–10, the discoms themselves had not demanded a tariff hike on the basis of actual expenses incurred during FY 2009–10 as the financial year FY 2009–10 was not over at the time of filing of tariff petitions by the discoms before DERC. Since the financial year was not over, the audited accounts for FY 2009–10 were also not available.

During FY 2010–11, while the hearings in the High Court were in progress, the Chairman of DERC completed his tenure. The position continues to be vacant as of 1 February 2010, as the GNCTD has not appointed a chairman.

The above experience in the case of Delhi brings out three important points. First, governments continue to misuse the power of policy directives and interfere in the working of IRAs. Second, important positions such as those of chairmen of IRAs are not filled in time hampering the workings of IRAs. The problem is more pronounced once an IRA gets into direct confrontation with the government concerned. In the case of DERC, there is widespread speculation of “behind-the-scene” processes for the appointment of the next chairman; the belief being that the government would like to appoint a “favourable” chairman to sort out the above mess. Third and most important, in a case where the private sector is involved, the government has used its powers to prevent a proposed tariff reduction. This is in contrast to cases where the public sector is involved in service provisioning and governments have used their powers to prevent tariff hikes. This episode also points towards an unhealthy nexus between the private sector and the government in Delhi.

Source: Authors

In the case of the other IRAs, the TRAI, AERA and PNGRB are bound by directions issued by the GOI on questions of policy under the garb of public interest, with the GOI being the final arbiter as to whether a question is one of policy or not. In the case of TAMP, the GOI even has the power to supersede the decisions of TAMP
regarding tariff fixation. These conditions imply that the GOI can at any time undermine the regulator’s powers and functioning.

Under regulation by contract, the experience has been that the government has stepped in and changed the scope of conditions of contracts. In the case of national highways, the administrator of contracts is the GOI-owned NHAI. There are evidences of NHAI amending contracts post award by altering designs, routes and alignments. The demand for additional payments by concessionaires due to such changes has led to disputes. It is estimated that as of April 2010, as much as Rs 9860 crore involving 1240 cases was locked up in various disputes between NHAI and road developers and contractors, including those over additional payments demanded by concessioners.

Flouting of procedure and law

In the initial years of regulation, governments themselves altered regulatory decisions or undermined regulatory functions by taking necessary action. For example, in the electricity sector, state governments often unilaterally altered SEB tariffs or rolled back regulatory tariff orders, sometimes through legislation. In the telecom sector, there is evidence of the Department of Telecommunications (DoT) having revised tariffs from fixed lines to mobile phones after the realization that the government owned Mahanagar Telephone Nigam Limited had erred in staying out of the mobile telephony market when the market was opened to PSP (Uppal 2006). Examples of such interference exist in the electricity sector as well. In some cases like Tamil Nadu, the tariffs determined by the TNERC in 2003 were rolled back to 2001 levels by the government in 2006, after which no ARR has been filed by the TNEB (Pandey and Morris 2009). More recent evidence of government interference in the working of IRAs can be found in Maharashtra (as mentioned earlier) and Delhi (see Box 45.1).

An interesting point to note is that direct interference by the government in the working of the IRAs has declined over the years. But indirect interference through the regulated government-owned entities continues. These entities also flout the orders of IRAs. In the electricity sector, it is common for the government-owned utilities to not file tariff determination petitions to SERCs or to delay them and to not comply with the directives of the ERCs. There are also instances of state-owned utilities filing for tariff petitions forgoing returns on capital thereby willing to undermine their financial viability just to keep tariffs low, presumably because the state so wished (Pandey and Morris 2009). The role of the regulator and its powers in such cases is not clear (Pandey and Morris 2009). Penalties imposed by IRAs on these entities are ineffective because the management of these companies has very different objectives and increasing profits is not one of them (Singh 2006).
Non-separation of government’s policy making and operation functions

Two related issues here are the separation of the policy making function of the government from the operation of infrastructure services, and the interaction between the regulator and the government-owned entity. The former has not been affected in India in the true sense. The telecom sector provides an example in this case. In the telecom sector, the policy making and licensing powers vest with the GOI (through the line ministry Department of Telecommunications) which continues to be involved with service provision through two entities: Bharat Sanchar Nigam Limited (BSNL) and Mahanagar Telephone Nigam Limited (MTNL). It has used these powers to the benefit of BSNL and MTNL. Several examples can be found to this end. Uppal (2006) observes that BSNL operates an integrated service for the whole country while its competitors, viz. the private players, are licensed for each region and service separately. Further, in contrast to the substantial licence fees paid by the private players, BSNL has to pay no licence fees. Uppal further observes that though fixed and mobile access providers may provide services in a state of choice, they may not interconnect across service areas. Thus, even if they hold licences for contiguous areas, they must reach their consumers in other areas only by connecting to long-distance service providers, amongst which BSNL is the most ubiquitous and largest (Uppal 2006).

Another example of the GOI favouring the government telecom service providers, BSNL and MTNL, can be found in the auction of 3G spectrum and provision of related services. Despite the guidelines for auction of 3G spectrum being issued in August 2008, the auction was delayed for various reasons. It was finally initiated at the end of FY 2009–10. Spectrum allocation being the domain of the GOI, it granted 3G spectrum to BSNL and MTNL in each of their circles without their participation in the auction process. The only requirement for these entities was to match the highest bid received in the auction. Given that some telecom circles could accommodate only one or two players on account of limited availability of 3G spectrum in these circles, the possibility of a private player being present in these circles was either nil or substantially reduced. At the time of initiating the auction, BSNL and MTNL had either launched 3G services in some areas or were undertaking trials for the same, thereby having a clear head start over their private sector rivals, tilting the playing field in their favour.

Uppal (2006) points out that the conflicts arising from the GOI’s role in policy making, licensing and operations have been exacerbated by the fact that TRAI reports to DoT. Making matters worse, TRAI has staff from the DoT at virtually all levels. He observes that in its initial seven years, TRAI has always had a member on its board who was on deputation from DoT or BSNL. Though the situation has changed, even now the practice of appointing current or retired bureaucrats to regulatory bodies continues.
Another dimension of the government’s policy-making functions and continued ownership of regulated entities is the support given to regulators to enforce orders and directives. This is most visible in the electricity sector in India where most of the regulated entities are state-owned and controlled. Pandey and Morris (2009) note that these entities are seen as instrumentality of the state government’s political agenda. Therefore providing enforcement support to an independent regulator creates contradictions.

It is clear that the conflict of interest arises from the government being the policy maker as well as regulated entity, and manning the regulatory body has either led to anti-competitive practices or reduced the effectiveness of IRAs in enforcing their orders. The Planning Commission (2008) has observed that since incumbent ministries also happen to be players, they should refrain from doubling up as umpires that would cause private investment to either shy away or seek a risk premium on this account.

**Institutional capacity**

The legitimacy and efficacy of independent regulation depends to a great extent on competent and credible decision making. Such decision making is a function of strong professional regulatory competence. Economic regulation requires a thorough understanding of regulatory fundamentals and regulatory mechanisms. It also requires good access to data and a thorough understanding of the operations, investments, and costs of utilities. Regulators, therefore, need internal expertise and capacity to carry out the mandate. They need a range of skills—economic, legal, financial, accounting, engineering and management—to carry out their activities.

However, IRAs in the country are often understaffed or find it difficult to attract quality HR. As an illustration, SERCs typically have 20–30 total staff while the US and UK regulators have hundreds (Rao and Gupta 2006). There is a significant difference between the staff strength of SERCs. A report (2008) by the Forum of Regulators (FOR) showed that staff strength for SERCs varies from 11 to 84 amongst 15 SERCs studied. The percentage share of professional staff out of the total staff strength in these SERCs was low at 28% and is highly inadequate. In some SERCs, the number was as low as 1 and 2. Moreover, around 41% of the posts meant for professionals were vacant.

Most IRAs are staffed with personnel on deputation from government-owned utilities or department and retirees from government. Officers on deputation go back to serving their parent cadres, i.e., the government-owned departments or agencies to which they belong upon completion of their tenure at the regulatory
body. It also means that knowledge that has been built up over the years is lost when the officer moves out of the regulatory body. Dealing with new staff or with staff with little knowledge of the issues at hand can be a constraint. There have been no major efforts in the direction of building capability for regulations in terms of training and exposure to regulatory economics, advances in financial markets and corporate finance, changing accounting standards, advancement in technologies in the sector and in businesses and developments in law (Pandey and Morris 2009). Some ERCs have, therefore, engaged consultants on relatively long tenor bases to overcome the shortage of regular staff, to meet the demands of a specialized knowledge base and to provide continuity on regulatory matters.

The capability of contract administrators, who essentially assume the role of regulators, is also an important issue under RoC. The preparedness and ability of the regulator of national highways to handle and manage contracts has been under scrutiny. Over the years, the development of national highways has seen a shift from EPC to PPP based contracts. Consequently, NHAI has moved from being a road builder to an asset manager. Managing PPP assets and administering contracts require not only specific types of skills but also dedicated personnel. However, NHAI does not have a PPP unit or a legal unit. It lacks clear, consistent contract management practices, including a model for streamlining decision making (World Bank 2010). The GOI has initiated measures for the institutional restructuring and capacity building of NHAI which would make it a multi-disciplinary professional body with high-quality financing management and contract management expertise.

Capability is also an issue in the case of the railways where PPPs are dealt with either by the PPP cell or departments best placed to deal with the activity/service where PPP has been invited. At the zonal level, PPP contracts are often dealt with by heads of the zones and officers who do not have the right skills to regulate these contracts.

**Transparency**

Transparency requires that regulators have clearly defined, published procedures under which they take and announce decisions and their justifications. It can be judged by aspects such as stakeholder consultation in the process of developing new regulatory methodologies and standards, public hearings where stakeholders can make submissions and inputs into important regulatory decisions; written public explanations of regulatory decisions; prescheduled independent regulatory reviews and impact assessments; accountability through appeal mechanisms; publishing regulatory contracts and regulatory methodologies; and open access to information.
The experience varies from sector to sector. In the electricity and telecom sectors, regulation has led to transparency in decision making. The IRAs in these provide an opportunity to the stakeholders to provide their views on issues being dealt with by the regulator and provide reasons for their decisions. Further, a lot of information that was not previously available has now become available. However, the working of PNGRB has been criticized for want of transparency. Sreenivas and Sant (2009) note that the PNGRB does not proactively publish many different kinds of information. They observe that though the PNGRB has awarded licences for city gas distribution (CGD), little information is available on the PNGRB website about the winning bidders for the different CGD licences issued, bid details such as the network tariff, compression charge, etc. They also express concerns about the public availability of the model bid document used to invite bids for CGD licences. They observe that the bid document available on the website of PNGRB was different from the one used in practice in certain bids, thus increasing concerns over transparency and casting doubts about the validity of other information on the website.

Transparency is also a matter of concern where the government is a regulator or administrator of contracts. Till the GOI standardized contractual documents for national highway projects, contracts differed from project to project and little was known about the process of development and finalization of contracts, their scope or terms and conditions. In the rail sector, the IR lays down the framework for PPPs often specifying even the cap on the return on equity. However, the manner of determination of such norms remains ad hoc, with IR neither holding any stakeholder consultations for their determination nor providing any explanation for them. Even in the telecom sector, where the government retains the power to issue licences, thereby playing a role in regulation, the procedures for licensing remain opaque to scrutiny.

**Functional scope of regulation**

A consistent and coherent regulatory framework can only be developed by allowing regulators sufficient scope to develop their sectors (Planning Commission 2008). The functional scope of regulation, as shown in Table 45.2, indicates that except ERCs, regulators are not sufficiently equipped. Even TRAI, which has vast powers, has no powers to enforce its orders. Rao and Gupta (2006) note that TRAI, in the past, has faced regulation enforceability problems with BSNL regarding interconnection. Similarly, it has been able to do little when private players have consistently defaulted on their network roll-out obligations despite financial penalties. They also observe that TRAI has not been able to enforce quality of service standards on telecom operators as it cannot levy penalties for deficiency of service.
The functional scope of regulation has been a concern in the ports sector as well. Given its limited powers and inadequately defined roles and functions, TAMP has faced significant challenges in discharging its primary responsibility of ensuring fair prices and a level playing field for all users and service providers at major ports. Jain (2005) points out that for instance, although terminal handling charges by private operators may constitute a significant proportion of the total cost of moving cargo through the ports, there is no explicit provision in the legislative framework empowering TAMP to regulate tariffs for terminal handling charged by private operators.

In the gas sector, the effectiveness of regulation has suffered because PNGRB is authorized to regulate only the transportation segment or pipelines. It has no role in determining the price of gas, a power that vests with the GOI. The GOI’s approach to pricing of gas has been inadequate and has led to several complications in the sector. At present, there exists a multiplicity of natural gas prices and the pricing principle followed in the gas sector lacks clarity. Gas prices differ from source to source, with the gas produced earlier by ONGC and marketed by Gas Authority of India Limited (GAIL) being regulated through the administered price mechanism (APM); the gas produced by Panna Mukta Tapti (PMT) joint venture of the ONGC fixed as per the decision of the GOI at around US$4.30 per million btu; and the gas being discovered under NELP allowed to be priced through “arms-length” negotiations. The price for gas flowing out of some fields in the K–G D-6 block has also been fixed at US$4.30 per million btu but the price of gas expected from the remaining blocks over the next few years remains uncertain.

Effective regulation by PNGRB has also suffered on account of statutory and legal hurdles relating to its powers. Though the PNGRB was established in October 2007, a particular section of the PNGRB Act that gives PNGRB the powers to authorize entities that can lay, build, operate pipelines or city gas networks or expand their network was notified only in July 2010. The Delhi High Court had in response to two petitions filed before it ruled in January 2010 that PNGRB lacked the required authorization to authorize CGD activities in the country.

Since many existing entities such as IGL had been authorized by the GOI prior to PNGRB being set up, the lack of clarity about their status led to conflicts between the PNGRB and the entities (Sreenivas and Sant 2009) and subsequently between the PNGRB and GOI (through the line ministry, the Ministry of Petroleum and Natural Gas) (PNGRB 2008 a, b). There have also been conflicts between PNGRB and the GOI (through the line ministry, the Ministry of Petroleum and Natural Gas) in the pipeline segment about who could authorize nine trunk pipelines that
had been approved by the MoPNG just before PNGRB was set up. In addition, confusion also prevailed about some entities involved in natural gas transmission and distribution based on authorizations received from state governments before PNGRB came into existence (Sreenivas and Sant 2009).

Even where PNGRB has the powers, it has not exercised them adequately. Kacker (2009) notes that though the marketing and pricing of petroleum products, including transportation fuels, namely, motor spirit (MS) and high-speed diesel (HSD) is free from government control and marketing entities are free to price their products, the GOI still fixes the prices of MS and HSD. However, the PNGRB has not taken action on this. He points out to a judgment of the Appellate Tribunal for Electricity which establishes that the government, therefore, cannot fix prices of these products and the PNGRB Act specifically provides that it is only the entities which can fix the price and not the government. Further, if the prices are to be fixed by the government as a sovereign, then it has to be declared as a public policy after observing formalities as provided under the Constitution.

6. **IMPACT OF REGULATION**

When reviewing the impact of regulation on the different sectors with regard to the objectives of such regulation, a few points have to be borne in mind. Policy making is the prerogative of the government. Then in sectors such as telecom, the government also retains the powers of licensing. Further, the government undertakes to provide services through entities owned by it and these entities do not always operate on a commercial philosophy. At the same time, technology can play an important role in driving regulatory outcomes. Finally, regulation can be as effective as the powers and independence given to it. In such a scenario, it would be difficult to delineate the impact made solely by regulation. Nevertheless, an attempt is being made to provide an overview of the impact of regulation in different sectors.

In the ports sector, TAMP has had only a limited impact on major ports since its powers are confined to tariff. In the telecom sector, regulation has facilitated a movement away from monopoly to a highly competitive sector as well as technological developments. This has helped lower tariffs (see Figures 45.2 and 45.3) and increase teledensity from 1.3% in 1995–96 to 52.74% in 2009–10. However, doubts have been expressed over the veracity of this growth. There are concerns that telecom operators are inflating subscriber numbers for the purpose of garnering spectrum. Fuelling these concerns are the reports that there are discrepancies in the revenues reported by some telecom players to their shareholders and to the TRAI. This has raised questions over TRAI’s ability.
Figure 45.2: Reduction in fixed line telecom tariffs in India

Source: TRAI (2007)

Figure 45.3: PSP in mobile services—reduction of mobile telecom tariffs and increase in mobile teledensity with sectoral reforms

Source: TRAI (2007)
In the electricity sector, the SERCs have been largely unsuccessful on the issue of tariff fixation. Tariffs do not reflect the cost of supply and have not been rationalized. There is still a high level of cross-subsidization in tariffs for different consumer categories. Aggregate technical and commercial (AT&C) losses have reduced but they still remain high at 28%. Financial losses have mounted, doubling between 2005–06 and 2008–09, and are expected to reach Rs 68000 crore at the end of FY 2010–11 (Figure 45.4). Third party access to the distribution network remains ineffective.

In the case of national highways, regulation by contract was largely ineffective during the initial years because of issues such as non-standardized contracts and issues related to the independence and institutional capacity of the regulator of these contracts. This is visible from the slow progress in the award of contracts during these years (see Figure 45.4). This is not to say that regulation has been solely responsible for this. Issues such as land acquisition were an impediment as the NHAI had to provide land at the time of awarding contracts. That contracts have become more effective now is evident from the increase in project award activity proxied through the length of roads (in km) awarded (see Figure 45.5).
7. **Future of Regulation Design and Administration: Paradigm for India**

**Suggested regulatory models for India**

From a theoretical standpoint, more market-oriented and contractual arrangements are preferable, at least where practical. From this perspective, private contracts are better than concession contracts which are better than discretionary regulation. Private contracts provide for clearer protection against opportunism of consumers or investors, as the two parties negotiate in their own best interests and as long as contracts are complete.

Whatever be the contract, it will work better when the prospects for writing complete or relatively complete contracts are strong. The completeness of contract depends on the ability to predict or anticipate the needs of consumers and investors relatively accurately. Contractual approaches also rely on the integrity of the legal system used to enforce commercial contracts. Therefore, for RoC to work, there is need for a strong and effective dispute resolution framework. Moreover, the contractual approach is practical only when the transaction cost of negotiating and enforcing contracts with individual consumers (or government acting on behalf of consumers) is reasonable. Where the risks (such as of renegotiation) perceived in contractual arrangements are high or contracts are likely to be incomplete, discretionary regulation is a better option. Discretionary regulation does not require writing of a
complete contract but requires IRAs to enforce them. The problem arises when IRAs lack capacity both on the technical front and also become prone to regulatory capture (arising out of political interference).

The experience in India with the regulatory administration of the infrastructure sector illustrates the importance of and difficulty in, selecting an appropriate regulatory design. There are numerous examples of concession contracts that have failed or have seen inordinate delays in implementation even after the bidder was selected through a competitive process. There are also examples where the contractual arrangements were renegotiated midway (such as the concession agreement for the Delhi airport). The experience with IRA has also been mixed, as discussed in the previous section. In the light of this experience, we suggest the future course of regulation in infrastructure.

Different infrastructure sectors are at different stages of the maturity curve. Inherent sectoral features as described in Table 45.1 also have an implication on the regulatory design and administration that may be appropriate for the sector. Sectors that have huge sunk cost, low technical progress, and low levels of competition would require heavy regulation compared to others (Table 45.4).

Table 45.4: Regulatory strategy for infrastructure sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Type of regulation</th>
<th>Regulatory administrative setup</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>Concession contract/ private contract</td>
<td>RoC, IRA</td>
</tr>
<tr>
<td>Telecom</td>
<td>Private contract</td>
<td>RoC, IRA/competition commission</td>
</tr>
<tr>
<td>Water and sanitation</td>
<td>Discretion regulation, concession contracts</td>
<td>IRA, RoC</td>
</tr>
<tr>
<td>Railways</td>
<td>Discretion regulation, concession contracts</td>
<td>IRA, RoC</td>
</tr>
<tr>
<td>Ports</td>
<td>Concession contracts</td>
<td>RoC</td>
</tr>
<tr>
<td>Airports</td>
<td>Concession contracts</td>
<td>RoC</td>
</tr>
<tr>
<td>Roads</td>
<td>Concession contracts</td>
<td>RoC</td>
</tr>
</tbody>
</table>

Source: Authors

Telecom services, where it is possible to write complete contracts between consumers and investors, can be regulated through private contracts. Regulation by contract is, therefore, the suggested administrative set-up for regulation. But there may still be issues arising from the desire to increase monopolistic powers by operators (for example existing incumbent resisting interconnection with new operators) or cartelization by operators since there is a cap on the number of operators who can
operate in a particular circle which may require regulation. From this perspective, an IRA would play a role in maintaining competition. However, this IRA could also be the Competition Commission of India.

Private contracts may not be possible for roads, which by their nature have one consumer—the government, who acts on behalf of the people. In this sector, full cost recovery of investment for the private sector may not be possible except in some roads which can be tolled. It is very unlikely that some consumers can be deemed access to roads. Further, the potential for technical progress is limited and the issues in delivery of infrastructure that may arise, such as land acquisition and right of way, are also very standard. Given these circumstances, it is perfectly possible to write complete concession contracts. Administration of regulation in this case is through RoC (contract between private sector and government, in this case). Ports and airports too, could be regulated using concession contracts.

In these sectors, contracts can be well defined by including detailed provisions for a return on and of investment, specifications with respect to quality of service, tariffs and a mechanism for their adjustment over time or in consideration of other exogenous variables affecting the service provider’s cost of service (e.g., inflation). Further, contracts can be used as a means to prevent abuse of dominance by providing a suitable detailed framework regulating the exercise of rights by the concessionaire. A well-structured concession agreement would also prevent the concessionaire from indulging in anti-competitive practices. These contracts would be subject to administration by the concessioning public sector agencies, but enforcement would be left to the legal system under the dispute resolution framework specified in these contracts. The operative effect is that the concessioning agency has a monitoring function with respect to the contract’s implementation, but its regulatory discretion, if not altogether precluded, is greatly restricted.

In sectors such as railways, power and gas, where the move towards competitive markets is not instantaneous and where the sector passes through phases of limited competition, but the framework of a competitive environment has been laid and the rules of the market are reasonably defined, regulation can take the form of both RoC and IRA. The IRA would need to ensure a level playing field and contain the behaviour of the incumbent monopoly in these sectors since the incumbent monopoly and the new entrants compete for the provision of services. The incumbent has a certain amount of dominance given that it has access to a significant customer base and it has facilities, which if made available to competitors, will enhance market development. Thus, there would be a need to ensure that new entrants have access to these networks, which usually belong to the monopolist, at prices that do not distort competition. Thus, regulatory
oversight by an IRA would be required for track, pipe and wires networks. In all other scenarios, contracts can be made water-tight and provide certainty to the private sector. Areas such as power distribution would also need to be regulated by an IRA because there are issues of universal access and the extent and cost of new connections in the future is unknown.

Experience with unbundling in the water and sanitation sector suggests that distribution of water or collection and transportation of solid waste for existing settlements can happen through contract concessions. Even the private sector involvement in upstream water projects such as treatment and transmission of water can regulated through RoC. The problem, however, arises when the question of universal access comes into the picture for connecting habitats that are not part of the project today and will require incurring cost in the future. The future capital investment in this case is uncertain. The implication on future capital cost on tariff would also be uncertain. Another problem with the water and sanitation sectors is that these are responsibilities of local governments, whose capacities in implementation of contracts are questionable. Due to these reasons, an independent regulatory authority is the best suited regulatory administration model for this sector.

**Need for super-regulators**

Another aspect that merits discussion is the need for a super-regulator for sectors that are inter-linked. So far, the regulatory bodies that have been established are primarily industry-specific. Considering the sectoral characteristics, administrative reasons, and the lack of experience in dealing with independent regulatory frameworks, this was perhaps a pragmatic step to start with. However, with the opening up of different sectors, gradual dominance of market forces, and the increasingly close inter-linkages between the different sectors (which have an important bearing not only on prices but also on the effective delivery of services), there is a need to re-examine the current framework of sector-specific regulators and explore the need for a super regulator to oversee such sectors. This could be best illustrated by considering the power, petroleum and gas, and coal sectors. Coal and gas are major feedstocks for power generation. Their prices would have a significant bearing on electricity prices. In fact, the availability of coal and gas has been a major concern for power producers as has been the quality of coal. The possibility of having a super regulator in the form of a single energy regulator at the central level therefore merits consideration. The GOI has announced the intention to establish a coal regulator. Instead of establishing a new IRA, it may be worth deliberating on having a common regulator for electricity and coal at the central level.
It is possible that the creation of a super-regulator would reduce the risk of “capture” as it provides a check against the development of close proximity between the regulator and any particular sector or private player. Further, there would be greater independence from sectoral ministries and thus there would be fewer chances of “potential capture” by the government.

A word of caution is necessary here. Theoretically, one of the main arguments cited in favour of a multi-sector regulator is that such regulators can help overcome the shortage of resources that is common across IRAs and that this type of structural organization enables one set of professional staff to oversee a variety of sectors. There is no doubt that though infrastructure sectors have unique features, a number of issues of primary concern are often the same. These include issues related to managing the introduction of competition in the traditionally monopolistic environment, pricing, decisions related to investment such as valuation of capital, principles of network access, etc. Therefore, professional staff such as those pertaining to law or economics could be pooled to deal with such issues across industries. This would facilitate cross-sectoral learning and greater consistency in approaches to regulatory processes across related as well as different sectors. However, depending on the sectoral coverage of the super-regulator, there would be issues such as spectrum management in telecommunications or technology that may not be transferable between industries and would necessitate specialized resources. Further, with an increase in the industry coverage under regulation, a super-regulator would need more staff in terms of numbers.

**Role of the Competition Commission of India**

As markets become fully competitive in different sectors, the intensity of regulation would decline. With easy conditions of entry and exit, and open access to networks, market threats and opportunities would provide sufficient constraints on the behaviour of service providers. Demand would be responsive to supply cost. Information transparency empowers consumers to make inter-company comparisons or measure performance over time and thus put pressure on companies to improve performance. Adequate standards exist for Quality of Supply and Service (QoSS) along with reliable systems for monitoring and enforcing them. Therefore, regulators need not be involved in detailed price controls or choice of technology. Under such a scenario where competition emerges as a reliable and effective means of regulation, protection of consumer interest, and driving user charges towards marginal costs, the Competition Commission of India could play a bigger role than sector-specific IRAs.
The CCI could also provide oversight in the monitoring of contracts. The manner in which contracts are implemented can result in competition issues that can include abuse of a dominant position or anti-competitive agreements on the basis of the rights vested under the concession agreement. The CCI can, in such situations, examine the manner in which the contract is being implemented.

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NOTE

1. For maintaining or increasing supplies of petroleum, petroleum products or natural gas or for securing their equitable distribution and ensuring adequate availability

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