Energy, Infrastructure and Communications

11 CHAPTER

One of the major requirements for sustainable and inclusive economic growth is an extensive and efficient infrastructure network. It is critical for the effective functioning of the economy and industry. The key to global competitiveness of the Indian economy lies in building a high class infrastructure. To accelerate the pace of infrastructure development and reduce the infrastructure deficit, the Government has initiated a host of projects and schemes to upgrade physical infrastructure in all crucial sectors. Despite several challenges, the positive results of the Government's initiatives are showing in some sectors. However, required capacity addition in a time-bound manner needs focused attention in other sectors.

11.2 The Planning Commission in its Mid-Term Appraisal of the Eleventh Five Year Plan has taken stock of total investment in infrastructure (electricity, roads and bridges, ports, airports, telecommunications, railways, irrigation, water supply and sanitation, storage, and oil and gas pipelines) during the first two years (2007-08 and 2008-09) of the Plan. It has revised the estimates of total investment in infrastructure during the Eleventh Plan period based on the revised data available during the first two years of the Eleventh Plan and it is now estimated that it would be ₹ 20,54,205 crore, which is comparable with the initial investment planned. The contribution of the private sector during the first two years was 34.32 per cent and 33.74 per cent respectively, higher than the targeted 30 per cent. The investment in infrastructure has reached 7.18 per cent of the gross domestic product (GDP) in 2008-09 and this is expected to increase to 8.37 per cent in the terminal year of the Plan. Total investment in infrastructure during the Eleventh Plan is, therefore, likely to increase by 2.47 percentage points of the GDP as compared to the Tenth Plan. During the first three years (2007-08 to 2009-10) actual expenditure in the ten infrastructure sectors (including investment in gas pipelines along with oil) is about ₹ 10,65,828 crore as against the target of ₹ 9,81,119 crore.

OVERVIEW OF PERFORMANCE

11.3 While the overall investment in infrastructure seems on target, the targets in some sectors have not been achieved. During 2007-08 to 2009-10, capacity addition has been lower than the target in power, roads (National Highways Development Project [NHDP]), new railway lines, and doubling of railway lines. The sub-sectors where achievements have been above or close to target are telecommunications, villages electrified under the Rajiv Gandhi Grameen Vidyutikaran Yojana(RGGVY), railway lines electrification, railway gauge conversion, and new and renewal of roads construction under the Pradhan Mantri Gram Sadak Yojana(PMGSY).

11.4 The Department of Programme Implementation monitors the progress in Central-sector projects costing ₹ 150 crore and above on a monthly basis. The progress report of October 2010 indicates that projects such as roads, power, railways, petroleum, telecom, coal, and steel constitute about 92 per cent of the total 559 monitored projects and overtime project delays have been creeping up. As on October 2010, out of the 559 projects, 14 are ahead of schedule, 117 are on

schedule, and 293 are delayed. Of the balance projects, no dates have been fixed for commissioning. In the road transport and highways sector, 51 projects have reported delay in the range of 1 to 36 months. In the power sector, 20 projects have reported delays in the range of 1to18 months over the completion schedule earlier targeted. In the petroleum sector, 16 projects have reported delays in the range of 1 to16 months.

11.5 There has been a steady decline in the time and cost overruns of Central-sector projects costing ₹ 150 crore and above and this can be attributed to closer monitoring and system improvements by the Ministries concerned. An examination of cost overruns in the last twenty years as against originally approved costs shows that the former declined from 61.6 per cent in March 1991 to 12.06 per cent in March 2008. There is, however, an upward trend from March 2008 as cost overruns reached 14.72 per cent in March 2010 and further climbed to 20.7 per cent in October 2010. The rise is partly due to exclusion of projects costing less than ₹ 150 crore from the monitoring system as these had lower cost overruns compared to the bigger projects. The increase is also partly dueto steep rise in prices of steel and cement in 2006-07.

11.6 During April-November 2010, the performance of core industries and infrastructure services has been mixed. The switching capacity addition and cellphone connections in the telecommunications

Table 11.1 : Growth in core industries and infrastructure services (in per cent)

Sl. No.	Sector	2006-07	2007-08	2008-09	2009-10	2010-11 (April-Nov.)
1	**Power**	7.3	6.3	2.5	6.8	4.6
2	**Coal**	5.9	6.0	8.2	8.0	0.6
3	**Finished Steel**	12.2	6.8	13.2	3.2	6.7
4	**Railway Revenue Earning**					
	Freight Traffic	9.2	9.0	4.9	6.6	3.3
5	**Cargo Handled at Major Ports**	9.5	12.0	2.2	5.7	0.8
6	**Telecommunications:**					
	a) Addition in Switching Capacity	-23.0	-25.4	101.0	-3.6	39.7
	b) Telephone Connections	-19.6	83.7		-	-
	c) Cellphone Connections	85.4	38.3	80.9	47.3	27.1
7	**Fertilizers**	3.3	-8.6	-2.6	13.2	0.0
8	**Cement**	9.4	7.8	7.6	10.1	4.1
9	**Petroleum:**					
	a) Crude Oil	5.6	0.4	-1.8	0.5	11.5
	b) Refinery	12.6	6.5	3.0	-0.4	0.8
	c) Natural Gas	-1.4	2.1	1.4	44.8	19.8
10	**Civil Aviation:**					
	a) Export Cargo Handled	3.6	7.5	3.4	10.4	17.7
	b) Import Cargo Handled	19.4	19.7	-5.7	7.9	26.1
	c) Passengers Handled at International Terminals	12.1	11.9	3.8	5.7	12.7
	d) Passengers Handled at DomesticTerminals	34.0	20.6	-12.1	14.5	15.9
11	**Roads:***					
	Upgradation of Highways					
	i) NHAI	-12.5	164.6	30.9	21.4	-32.2
	ii) NH(O) & BRDB	-10.5	12.5	17.3	4.0	-0.2

Notes: * Includes widening to four lanes and two lanes and strengthening of existing weak pavement only. NHAI—National Highways Authority of India. BRDB- Border Road Development Board.

Source: Ministry of Statistics and Programme Implementation (MOSPI).

sector have increased by 39.7 per cent and 27 per cent respectively. Crude oil production has increased by 11.5 per cent and natural gas production by 19.8 per cent. The civil aviation sector has also performed comparatively better than the previous year both in terms of cargo and passengers handled. The power and cement sectors have grown at comparatively lower rates. Coal-sector growth has been very low at 0.6 per cent as compared to the previous year's 8 per cent. Lower coal-sector output has impacted thermal power generation this year. Fertilizer production has also not seen any rise as against the previous year's 13.2 per cent growth (Table 11.1).

POWER

Generation

11.7 Electricity generation by power utilities during 2010-11 has been targeted to go up by 7.7 per cent to 830.757 billion KWh. The growth in power generation during April-December 2010 was about 4.5 per cent as compared to about 6.17 per cent during April-December 2009, with nuclear, hydro, and thermal power generation registering growth of 33 per cent, 8 per cent and 3 per cent respectively (Table 11.2). Good monsoon and improved availability of water moderated demand as well as supply of power. On the one hand the agricultural requirement of power reduced; on the other hand, there were some developments adversely affecting growth in thermal generation. Some thermal units had to be put under reserve shut down. Scheduling of generation from costlier liquid fuel and gas based plants was also affected. Commissioning of stabilization of some of the new thermal power stations, unscheduled/ extended planned maintenance of some of the thermal units, shortage of domestic /imported coal also affected the thermal generation.

11.8 In the thermal category, growth in generation from coal, lignite and gas-based stations was of the order of 2.77 per cent, 4.75 per cent and 6.71 per cent respectively. The overall plant load factor (PLF), a measure of efficency, of thermal power stations during April-December 2010, though less than that achieved during April-December 2009, exceeded the target of 71.35 per cent for the first three quarters of the current financial year (Table 11.3).

Table 11.3 : Thermal power generation during April-December 2010

Components	Generation (Billion KWh)	Growth (%)	PLF (in per cent) Apr.-Dec. 2009	Apr.-Dec. 2010
Coal	387.912	2.77	76.46	73.23
Lignite	18.808	4.75	74.40	70.68
Gas Turbine	75.139	6.71	66.03	66.03
Multi-fuel	0	0	-	0
Diesel	2.072	(-)30.62	-	-
Thermal Total	483.932	3.03	76.17	72.86

Source: Ministry of Power.

11.9 The sector-wise and region-wise break-up of the PLF from 2007-08 to 2010-11 (April-December) shows the continuity and change over time as well as regional variation (Table.11.4). Out of the total installed generation capacity in the country, about 11 per cent is based on gas or liquid fuel (excluding diesel). The commencement of production of gas from D-6 fields of the KG (Krishna-Godavari) basin since April 2009 has improved gas availability for electricity generation.

Table 11.2 : Power Generation by Utilities (Billion KWh)

Category	2008-09	2009-10	April-December		Growth (per cent)
			2009-10	2010-11	
Power Generation	723.8	771.551	571.573	597.290	4.50
Hydroelectric*	113.0	106.680	83.360	90.145	8.14
Thermal	590.0	640.876	469.694	483.932	3.03
Nuclear	14.8	18.636	13.408	17.849	33.12
Bhutan Import	5.9	5.358	5.111	5.364	4.96

Note: *Excludes generation from hydro stations up to 25 MW.

Source: Ministry of Power;

Box 11.1 : Power Sector Reforms

Taking Stock : Electricity reform in India started in the early 1990s, prompted by the rising losses of State Electricity Boards (SEBs) and their inability to meet demand. It followed worldwide reforms that began in the United Kingdom, Norway, Canada, and the USA and were later adopted in Latin America as well. In developed countries, sweeping reforms focused on restructuring vertically integrated cost-of-service monopolies and introducing wholesale competition, while developing countries focused on their need to accelerate power generation investment. In India, reforms have made major progress in the following areas:

- entry by private independent power producers (IPP); corporatization of state-owned enterprises; unbundling of generation, transmission, and distribution (T&D)
- a national enabling legislation (Electricity Act 2003); independent power regulation at national level (CERC) and in States
- bulk transmission improvements (for example Powergrid), with wholesale electricity markets emerging in inter-State trading and merchant power sales (as an alternative to long-term power purchase agreements in cost-of-supply memorandums of understanding [MOUs]with States) and spot and futures markets
- Some, limited, private entry into distribution (for example Orissa, Delhi,), and splitting up of some State electricity distribution companies into discoms (distribution companies); and
- Central incentives (APDRP, accelerated power development, and reform programme) to support the implementation of electricity reform in States including accelerated metering and reducing high unaccounted-for T&D losses.

A composite reform index (although it does not assess quality), ranks India among the top reformers worldwide---comparable to Latin America (for example Chile, Brazil), better than East Asia (for example China, Indonesia, Thailand) and a step behind the most advanced (for example France, the UK, some US states). Among States in India itself, there remain significant variations. The highest ranked include most of the larger states, i.e. Andhra Pradesh, Gujarat, Haryana, Madhya Pradesh, Maharashtra, and West Bengal (as evident in their utilization of APDRP incentives), apart from Orissa and Delhi, two States with private distribution (with mixed impacts). With expected lags and some temporary reversals, outcomes are now beginning to emerge : accelerated power generation investments and competition; switch to tariff-based awards for new power projects; more efficient fuel sourcing (offshore natural gas, imported coal); rapid development of a national grid (with four out of five regions synchronized and the fifth--southern--interconnected), with greater reliability; and increased wheeling of electricity generated with emergence of a national bulk market with open access to States and wholesale trading.

Future Directions : Nevertheless, reform remains incomplete. And performance lags behind accelerating demand, especially given the massive future investment requirements and the critical role of the power sector in sustaining growth:

- economic growth and higher incomes are fuelling rapid demand growth (6 per cent a year) and rising unmet demand (peak deficits of 12-13 per cent);
- unreliable services are hampering agriculture and industry and penalizing households with large welfare losses; progress on connecting rural households and habitations as yet unconnected to grid-based electricity supply is also slow;
- very high unmetered and unaccounted-for sales (35 per cent), among the highest in the world, is draining public revenues, forcing larger price increase requirements, and causing massive losses (combined annual losses of the SEBs are about 1 per cent of the GDP);
- electricity tariffs don't match economic values (extensive subsidies, cross-subsidies) because of political economy reasons, hampering efficient use of scarce public resource (for example excessive mining of ground-water) and deterring efficient supply;
- competition in many critical segments of the industry, especially distribution, is inadequate or incomplete and remains under threat (including peak price escalation), while existing monopolies of State-owned distribution continue to underperform (unmetered sales, leakages, outages, lack of transparency in financial accounts and performance management).

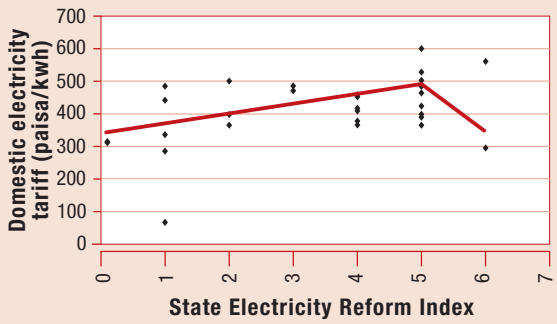
Reforms are now essential in three directions:

(1) **Strengthening Regulation :** Worldwide, and in India, electricity reform is technically challenging and politically constrained. The States have a crucial role in implementing further reform and the Centre in setting out a broader framework. Political economy conflicts are often complicated, with multiple actors and interests:SEBs, generation, transmission and distribution companies, wholesale and retail actors, and a variety of consumers--the farm sector, urban households, and industry. In this setting, and given substantial 'natural' monopolies in parts of the chain, the strong role of independent regulators is crucial: to balance these interests, promote competition, and enhance the working of the market. Worldwide evidence suggests that electricity reform works only in the presence of strong, independent regulators, insulated from political and commercial pressures. For example, regulators will need to ensure adequate competition and act on uncompetitive behaviour in wholesale trade, including capping wholesale tariffs and investigating competition.

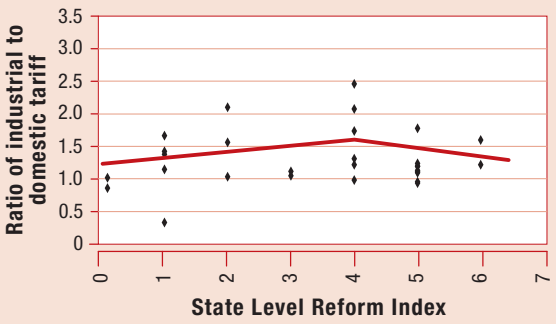
(2) **Improving Distribution and Opening Bulk Supply to Competition :** The next step is to introduce competition and open access at bulk level. Most power distribution is still the monopoly of SEBs, with mounting losses and poor services. Three different models of restructuring are possible, with States adopting whichever model works best and setting-up surrogate competition amongst these modes: (a) public private partnership (PPP) mode with open access. Long-term concessions granted to private distribution companies, incorporating high investment requirements, performance standards, tariffs subject to regulation, and permitting bulk consumers open access to networks (similar to telecom). (b) Distribution franchisee mode. Competitive bidding to select franchisee operators, where ownership of assets remains with state discoms and licencee supplies bulk electricity to franchisee at predetermined prices, franchisee retains predefined portion of revenues and pays discoms annual rate bids, T&D losses are monetized and borne by discoms with incentives to lower them and tariffs remain the same as in larger licensing area. (c) Performance-based State electricity discoms. With management independence and overhaul, and strict commercial performance standards, some stronger state discoms could potentially provide competitive services, with bulk consumers again permitted open access to networks.

(3) **Revising Tariffs to More Economic Levels :** The previous two steps will not be enough without a strong political economy decision by all States to revise electricity tariffs to economic levels and reduce subsidies and cross-subsidies. India currently has some of the lowest and most uneconomic average electricity tariffs in the world--8 cents/kwh at retail level, compared to about 12-15 cents/kwh in countries much better-endowed with coal or gas energy (Canada, South Africa, the USA), and 19-20 cents/kwh elsewhere (much of Europe, developing countries). The current tariffs levels are unsustainable, cannot elicit needed investments, drain resources, and are not targeted at the poor. Instead, lifeline metering and supply measures with explicit subsidies that are more carefully targeted are possible. Consumers prefer reliable supplies over subsidized and unreliable supplies. The evidence in India itself clearly suggests that better performing States have more economic pricing (till they reach a threshold level) and lower cross-price subsidies and distortions in tariffs (with industrial supply price ratio to domestic tariffs rationalized). Better tariff setting thus goes hand-in-hand with better performance.

State level electricity reform and domestic tariffs, 2008



State level electricity reform and ratio of industrial to domestic tariffs, 2008



Source: Economic Division, Department of Economic Affairs (DEA), estimates.

Bibliography: (1) Gajendra Haldea, 2010. Infrastructure at Cross-roads; (2) Rahul Tongia, 2003. The Political Economy of Indian Power Sector Reforms, Working Paper No. 4, Stanford. (3) Himachal Power Engineers' Association, 2008. Power Sector Reforms: Reorganisation & Restructuring of SEBs, Issues, Concerns and Some Suggestions. (4) Keya Ghosh, 2009. Electricity Reforms in West Bengal, CUTs Calcutta Resource Centre.

Power deficit

11.10 The deficit in power supply in terms of peak availability and total energy availability rose steadily from 2003-04 to 2007-08, a period of high growth in peak demand and total energy requirement. Despite modest growth in electricity generation, the peak deficit came down significantly in 2008-09 on account of a slowdown in growth of peak demand. During April-December 2010, the peak and total energy deficits came down to 10.2 per cent and 8.8 per cent respectively from 12.6 per cent and 9.8 per cent during the corresponding period in the previous year, mainly due to growth of availability of power exceeding the growth in its requirement.

Capacity addition

11.11 The Eleventh Plan envisaged capacity addition of 78,700 MW in the power sector, of which 19.9 per cent was hydro, 75.8 per cent thermal, and the rest nuclear power. This has been revised to 62,374 MW now comprising 8237MW hydro, 50,757 MW thermal, and 3380 MW nuclear power.

Table 11.4 : PLF of Thermal Power Stations

(per cent)

Category	2007-08	2008-09	2009-10 (Apr.-Dec.)	2010-11 (Apr.-Dec.)
i) State Sector	71.9	71.20	69.80	63.91
ii) Central Sector	86.7	84.30	83.63	83.14
iii) Private Sector	90.8	91.04	84.43	79.68
REGIONS				
Northern	81.4	81.79	81.88	76.73
Western	80.3	79.45	77.77	72.72
Southern	84.9	83.30	82.64	76.98
Eastern	69.6	64.66	62.94	65.70
North-Eastern	20.4	47.62	0	0
All India	**78.6**	**77.27**	**76.17**	**72.86**

Source: Ministry of Power.

Capacity addition of 32,032 MW has been achieved till 31 December 2010 and projects with a capacity of 30,725 MW are under construction for commissioning during the remaining period of Eleventh Plan.

11.12 Against the revised target of 12,039 MW, capacity addition of 9,263 MW was achieved during 2007-08. On account of revision in the definition of commissioning of thermal projects, the capacity addition target for the year 2008-09 was revised to 7,530 MW, against which a capacity of 3,454 MW was added. The capacity addition target for the year 2009-10 was 14,507 MW, against which a capacity of 9585 MW was added up to 31 March 2010. In the current fiscal, 9730.5 MW has been added till 31 December 2010 which is higher than the highest ever capacity addition of 9585 MW in a single year, i.e 2009-10 (Table11.5).

11.13 The main reasons for underachievement of capacity addition targets were delayed and non-sequential supply of material by suppliers, shortage of skilled manpower for construction and commissioning of projects, contractual disputes between project authorities, contractors and their sub-vendors, delay in readiness of balance of plants by the executing agencies, design problems in CFBC boilers, and shortage of fuel.

Ultra Mega Power Projects (UMPPs) Initiative

11.14 The Ministry of Power had launched an initiative for development of coal-based super critical UMPPs each of about 4000 MW capacity under Case II bidding route. Four UMPPs, i.e Sasan in Madhya Pradesh, Mundra in Gujarat, Krishnapatnam in Andhra Pradesh, and Tilaiya in Jharkhand have already been transferred to the identified developers and are at different stages of implementation. Two units of 800 MW each of the Mundra UMPP are expected to be commissioned in the Eleventh Five Year Plan.

Development of hydropower

11.15 As per the reassessment study carried out by the Central Electricity Authority(CEA), the identified hydroelectric potential of the country (having installed capacity above 25 MW) is 1,45,320 MW. As of now, 172 schemes with installed capacity of 37,367 MW are under operation, 46 (installed capacity 13,785 MW) are under construction, 31 (installed capacity 16,087 MW) have been approved by the CEA, detailed project reports (DPRs) of 44 (installed capacity 15,441 MW) have been prepared and are under various stages of examination, and 108 schemes (installed capacity 41,945 MW) are under survey and investigation. The hydro capacity addition of 15,627 MW planned for the Eleventh Five Year Plan has been revised to 8237 MW in the Mid-Term Appraisal (MTA) of the Eleventh Plan. Of this, 3,921 MW has been added till 31December 2010.

11.16 The main reasons for slow development of hydro-power include difficult and inaccessible potential sites, difficulties in land acquisition, rehabilitation, environmental and forest-related

Table 11.5 : Capacity Addition Target (original) and Achievement during April – December 2010 (MW)

Sector	Thermal		Hydro		Nuclear		Total	
	Target	Actual	Target	Actual	Target	Actual	Target	Actual
Central	5,890	2,115	529	120	1220	0	7,639	2,235
State	6,012	2,331	5,97.5	178	0	0	6,609.5	2,509
Private	5,891	4,794.50	2,19.5	192	0	0	6,110.50	4,986.50
Total	17,793	9,240.50	1,346	490	1,220	0	20,359	9,730.50

Source: Ministry of Power.

issues, inter-State issues, geological surprises, and contractual issues. A multi-pronged strategy has been adopted to harness the hydro potential resources in the country. Some of the policy measures and initiatives taken by the Government are finalization of an investor-friendly New Hydro Policy 2008 and the liberal National Rehabilitation and Resettlement Policy, 50,000 MW Hydroelectric Initiative, and Mega Power Project Policy. The salient features of the New Hydro Policy 2008 are a level playing field for private hydro projects; exemption from tariff-based competitive bidding up to January 2011 to private hydro projects; private developers to have the facility of merchant sale of up to 40 per cent of saleable energy; an additional 1 per cent free power over and above 12 per cent to be earmarked for a Local Area Development Fund; each project-affected family (PAF) to get free 100 units of electricity every month for a period of 10 years after commissioning of the project; and project authorities to bear the 10 per cent of the State contribution under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) for electrification of the affected area.

Transmission, Trading, Access, and Exchange

National Grid

11.17 An integrated power transmission grid helps even out supply-demand mismatches. The existing inter-regional transmission capacity of about 22,400 MW connects the northern, western, eastern, and north-eastern regions in synchronous mode operating at the same frequency and the southern region in asynchronous mode. This has enabled inter-regional energy exchanges of about 38,000 million units in financial year 2010-11 (till November 2010), thus contributing to greater utilization of generation capacity and an improved power supply position. Proposals are under way to have synchronous integration of the southern region with the rest.

Open access

11.18 The regulations on open access in inter-State transmission and on inter-State trading are issued by the Central Electricity Regulatory Commission (CERC). The responsibility for introduction of open access at distribution level rests with the State Electricity Regulatory Commissions (SERCs).

11.19 Open access in inter-State transmission is fully operational. During financial year 2009-10, the total number of transactions under open access at inter-State level was 18,128. The Central Transmission Unit (CTU) has received 225 applications from private developers for long- term open access amounting to 1,62,898 MW. At State level, as per information available with the Forum of Regulators Secretariat, 24 SERCs have notified terms and conditions of open access regulations, 20 have determined cross-subsidy surcharge, 25 have allowed open access up to 1 MW, 22 have determined transmission charges, and 18 have determined wheeling charges. In addition, the Power System Operation Corporation Limited (POSOCO), has been operationalized by the Government of India with effect from 1 October 2010 to manage load dispatch functions earlier being managed by the CTU, i.e. the power grid.

Trading of Electricity

11.20 Power trading helps in resource optimization by facilitating the disposal of surplus power with distribution utilities and in meeting the short-term demand. The Central and State Electricity Regulatory Commissions have powers to grant inter-State and intra-State trading licences respectively. The CERC has so far granted 47 inter-State trading licences, of which 38 were in existence as on 31 December 2010. Details of electricity trading by licensed inter-State traders, in terms of volume, price, and margin are given in Table 11.6.

Power Exchange

11.21 The CERC has issued power market regulations that focus on the creation of an overall power market structure, the role of power exchange traders, and also provide for market oversight and surveillance. The two power exchanges, namely the Indian Energy Exchange Ltd. (IEX), New Delhi, and Power Exchange India Ltd. (PXIL), Mumbai, already in operation from 27June 2008 and 22 October 2008 respectively have been deemed to be registered under these regulations. The price of electricity traded through the exchanges was high during the initial months of the current financial year but it showed a declining trend over the year. The weighted average price of power traded through the IEX in the months of November and December 2010 was ₹ 1.99 per kWh and ₹ 2.36 per kWh respectively. In addition to transactions in the day ahead market (collective transactions), power exchanges have been undertaking transactions in the term ahead market (i.e. transactions through intra-day contracts,

Table 11.6 : Electricity trading

Period	Volume of electricity traded (MUs)	Weighted average purchase price (₹/kWh)	Weighted average sale price (₹/kWh)	Trading margin (₹/kWh)
2005-06	14,188.8	3.14	3.23	0.09
2006-07	15,022.74	4.47	4.51	0.04
2007-08	20,964.77	4.48	4.52	0.04
2008-09	21,916.92	7.25	7.29	0.04
2009-10	26,819.15	5.22	5.26	0.04
2010-11				
(upto 31st Oct, 2010)	18,150.04	5.12 *	5.17 *	0.05

Source : Ministry of Power.

Note:* The prices have come down during the months of November and December 2010.

day ahead contingency contracts, and weekly contracts) since September 2009. The volume of electricity transacted in the term ahead market of the two power exchanges, i.e. IEX and PXIL, during April-October 2010 has been 486.47 MUs and 656.71 MUs respectively.

Promotion of Green Power

11.22 The CERC has amended the Terms and Conditions for Tariff Determination from Renewable Energy Sources Regulations 2010 for increasing the visibility of the generic tariff determined for solar photo voltaic (PV) and solar thermal projects. The capital cost and other norms applicable for the year 2010-11 shall also apply for solar PV projects during the year 2011-12; for solar thermal projects during the years 2011-12 and 2012-13, if the power purchase agreements in respect of the solar PV and solar thermal projects are signed on or before 31 March 2011; and the entire capacity covered by the power purchase agreements is commissioned on or before 31 March 2012 in respect of solar PV projects and on or before 31 March 2013 in respect of solar thermal projects.

11.23 The CERC has also notified Terms and Conditions for the recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation Regulations 2010 on 18 January 2010 as well as their first amendment on 1 October 2010. These Regulations assume special importance in fulfillment of the mandate to promote renewable sources of energy and development of a market in electricity. The Renewable Energy Certificate (REC) framework is expected to give a push to renewable energy capacity addition in the country.

11.24 The REC is a market-based instrument to promote renewable energy and facilitate renewable purchase obligations (RPOs). It can make the renewable electricity market stable and predictable by maximizing the benefits of renewable generation while reducing costs. It could also be used by those States that do not have substantial renewable energy resources to meet their RPOs. The CERC and SERCs created the necessary regulatory and institutional framework and rolled out the scheme from November 2010. The REC mechanism sets the way forward for encouraging competition and eventually mainstreaming renewable energy.

Aggregate Technical and Commercial (AT&C) losses and Restructured APDRP

11.25 The focus of the Re-structured Accelerated Power Development Reforms Programme (R-APDRP) is on actual, demonstrable performance in terms of reduction in AT&C losses. Projects under the scheme will be taken up in two parts in urban areas--towns and cities with population of more than 30,000(10,000 in case of special category States).

11.26 Part-A of the Scheme shall include projects for the establishment of baseline data and Information Technology (IT) applications for energy accounting/ auditing and IT-based consumer service centres. Preparation of baseline data for the project area covering consumer indexing, GIS (geographic information system) mapping, metering of distribution transformers and feeders, and automatic data logging for all distribution transformers and feeders and SCADA(supervisory control and data acquisition) / DMS (distribution management system) system is only for big cities. It would include asset mapping of the entire distribution network at and below 11 kV transformers and adoption of IT applications for meter reading, billing

and collection, energy accounting and auditing, redressal of consumer grievances, and establishment of IT-enabled consumer service centres. The baseline data will be verified by an independent agency appointed by the Ministry of Power.

11.27 Part B of the scheme will include regular distribution strengthening projects. These include renovation, modernization and strengthening of 11 kV-level substations, transformers/transformer centres, re-conductoring of lines at 11kv and below level, load bifurcation, load balancing, high voltage distribution system (HVDS), and installation of capacitor banks and mobile service centres. In exceptional cases, where the sub-transmission system is weak, strengthening at 33 kV- or 66 kV-level may also be considered.

Rural Electrification

11.28 Under the RGGVY, 87,791 villages have been electrified and connections released to 135.31 lakh below poverty line(BPL) households up to 30 November 2010. Under the Tenth Five Year Plan, 235 projects covering 68,763 villages and 83.10 lakh BPL connections were sanctioned at a cost of ₹ 9,732.90 crore. In Phase I of the Eleventh Plan period, 338 projects have been sanctioned for implementation at a cost of ₹ 16,620.61 crore for electrification of 49,736 villages and release of connections to 163.34 lakh BPL households. Till 30 November 2010, 333 projects have been awarded and franchisees are in place in 1,10,567 villages in 16 States.

Energy Conservation and efficiency

11.29 Several measures have been taken by the Ministry of Power and Bureau of Energy Efficiency (BEE) to promote energy conservation and its efficient use targeting 5 per cent reduction in demand during Eleventh Plan through schemes being implemented by BEE. The Ministry of Power has also launched an awareness programme which includes giving incentives for efficiency and conservation efforts by way of National Energy Conservation Awards, painting, debate and essay competitions for schoolchildren, and creating general awareness through the media on the need for energy conservation.

11.30 The National Mission for Enhanced Energy Efficiency (NMEEE) is one of the eight missions under the National Action Plan on Climate Change. It has been approved and will soon be implemented. The objective of the Mission is to achieve growth with ecological sustainability by devising cost-effective strategies for end-use demand-side management. The Ministry of Power and BEE have been entrusted with the tasks of preparing the implementation plan for the NMEEE and upscaling the efforts to create and sustain a market for energy efficiency and unlock investment of around ₹ 74,000 crore. The Mission, by 2014-15, is likely to achieve about 23 million tonnes oil-equivalent of fuel savings in coal, gas, and petroleum products, along with an expected avoided capacity addition of over 19,000 MW. The carbon dioxide emission reduction is estimated to be 98.55 million tonnes annually.

Petroleum

Oil and gas production

11.31 Efficient and reliable energy supplies are a precondition for accelerated growth of the Indian economy. While the energy needs of the country, especially oil and gas, are going to increase at a rapid rate in the coming decades, the indigenous energy resources are limited. Oil and gas constitute around 45 per cent of total energy consumption. At the same time, the dependence on imports of petroleum and petroleum products continues to be around 80 per cent of total oil consumption in the country.

11.32 During the current financial year (2010-11), production of crude oil is estimated at 37.96 million metric tonne (MMT), which is about 12.67 per cent higher than the crude oil production of 33.69 MMT during 2009-10. The projected production for natural gas, including coal bed methane (CBM), for 2010-11 is 53.59 billion cubic metres (BCM) which is 12.80 per cent higher than the production of 47.51 BCM in 2009-10. The increase in natural gas production is primarily from the KG deepwater block.

Exploration of Domestic Oil and Gas

11.33 India has an estimated sedimentary area of 3.14 million sq. km, comprising 26 sedimentary basins. Prior to the adoption of the New Exploration Licensing Policy (NELP), only 11 per cent of India's sedimentary basin was under exploration. Since operationalization of the NELP in 1999, the Government of India has awarded 47.3 per cent of it for exploration. So far 87 oil and gas discoveries have been made by private/joint venture (JV) companies in 26 blocks and more than 640 MMT of oil-equivalent hydrocarbon reserves have been

added. As on 1 October 2010, investment made by Indian and foreign companies was of the order of US $ 14.8 billion, of which, US $ 7.5 billion was in hydrocarbon exploration and US$ 7.3 billion in development of discoveries.

Offering of NELP Blocks under NELP IX

11.34 The ninth round of NELP (NELPIX) was launched on 15 October 2010 and 34 exploration blocks including 8 deepwater, 7 shallow water, 11 on-land, and 8 Type-S on-land were offered. On-land blocks are spread over six States, namely Assam(2), Gujarat(11), Madhya Pradesh(2), Rajasthan(2), Tripura(1), and Uttar Pradesh(1).

Domestic Exploration of Other Gaseous Fuel

Coal Bed Methane (CBM)

11.35 CBM is found embedded in coal seams. The CBM policy has provided a level playing field for exploration and commercial exploitation of CBM by national and international companies since the 2000. Total CBM resources in 26 blocks awarded so far are estimated at 1374 BCM. In the fourth round, the Government of India has awarded 7 CBM blocks in the States of Assam, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, and Tamil Nadu and signed 33 contracts. Commercial production of CBM in India has now become a reality with current CBM gas production at about one lakh cu. mper day. The CBM gas produced in the country is being utilized by nearby industries in and around Raniganj block in West Bengal.

Underground Coal Gasification (UCG)

11.36 The Oil and Natural Gas Commission (ONGC) has entered into an Agreement of Collaboration (AOC-MOU) with the National Mining Research Centre-Skochinsky Institute of Mining (NMRC-SIM) in Russia. In the selected Vastan mine block, seismic survey was carried out and 18 boreholes drilled for detailed UCG site characterization. Based on geological, hydrological, and geo-mechanical data analysis, Vastan in Gujarat and Hodu Sindri in Rajasthan have been found suitable for UCG stations. Pilot production of UCG at Vastan by the ONGC is expected to commence by the end of the Eleventh Five Year Plan period.

Gas Hydrate

11.37 Gas hydrate is at research and development (R&D) stage world over. A cooperation programme between the Directorate General of Hydrocarbons (DGH) and U S Geological Survey (USGS), USA for exchange of scientific knowledge and technical personnel in the field of gas hydrate and research energy is in progress. An MOU was recently signed in the area of marine gas hydrate research and technology development between the Leibniz Institute of Marine Sciences, Germany, and DGH for research on methane production from gas hydrate by carbon dioxide sequestration.

Shale Gas

11.38 Shale gas is being explored as an important new source of energy in the country. India has several shale formations which seem to hold shale gas. The shale gas formations are spread over several sedimentary basins such as Cambay, Gondwana, and KG on land and Cauvery river. The DGH has initiated steps to identify prospective areas for shale gas exploration and acquisition of additional geo-scientific data. An MOU has been signed with the USA during the visit of President Obama to India in November 2010 for cooperation in the field of shale gas assessment and development.

Gas production from KG-D6 Basin

11.39 Gas production from KG-D6 began on 1 April 2009. The current gas production from the KG-D6 field is about 53 MMSCMD, of which about 45 MMSCMD is being produced from D1 and D3 fields and about 8 MMSCMD from MA field. The approved Field Development Plan of D1 and D3 envisages gas production to the tune of 80 MMSCMD from the third year of commercial production, i.e. with effect from 2012-13.

Crude Oil Production from Rajasthan

11.40 Crude oil production by the Rajasthan Cairn Energy India Pvt. Ltd has started in block RJ-ON-90/1 with effect from 29 August 2009 at the initial production rate of 3500 barrels per day. Current crude oil production from this block is about 1,25,000 bopd. The Government has designated Indian Oil Corporation Limited (IOC), Mangalore Refinery and Petrochemicals Ltd (MRPL), and Hindustan Petroleum Corporation Ltd (HPCL) for lifting part of the crude oil production from this block after ascertaining the capacity of receiving refineries of the nominees. The oil production from this block during 2009-10 was about 0.447 MMT and during 2010-11, up to 30 November 2010 about 3.12 MMT.

Development of Marginal Fields

11.41 Concerted efforts have been made to put new and marginal fields in production through in-house resources as well as through service contracts. The ONGC has an inventory of 165 marginal fields and 131 have either been monetized or are under various stages of development through in-house efforts. So far, 10 fields have been awarded on service contract.

Equity Oil and Gas from Abroad

11.42 In view of unfavourable demand-supply balance of hydrocarbons in India, acquiring equity oil and gas assets overseas is one of the important components of enhancing energy security. The Government is encouraging national oil companies to aggressively pursue equity oil and gas opportunities overseas. Apart from ONGC Videsh Limited (OVL) (40 projects in 15 countries), the other oil public-sector undertakings (PSUs), namely Indian Oil Corporation Limited (IOCL) (9 projects in 6 countries), Oil India Limited (IOL) (12 projects in 8 countries), Bharat Petroleum Corporation Limited (BPCL) (12 projects in 7 countries), GAIL (India) Limited (4 projects in 2 countries), and Hindustan Petroleum Corporation Limited (HPCL) (2 projects in 2 countries), have acquired overseas exploration acreages. The total investment by oil PSUs (OVL, OIL, GAIL, IOCL, BPCL, and HPCL) overseas is more than US$ 13 billion (₹ 59,000 crore). OVL produced about 8.87 MMTOE oil and oil-equivalent gas in 2009-10 from its overseas assets in Sudan, Vietnam, Venezuela, Russia, Syria, Colombia, and Brazil. The latest acquisition in May 2010 by OVL (along with OIL and IOCL) is 11 per cent participating interest of Carabobo-1 project in the hydrocarbon-rich Orinoco belt of Venezuela, with proposed investment of US$ 1.3 billion. The projected production is 400,000 bopd and the first oil is expected in 2013.

Import of Liquefied Natural Gas(LNG)

11.43 Petronet LNG Limited (PLL), promoted by ONGC, GAIL, IOCL, and BPCL, was formed to import LNG and set up an LNG regasification plant at Dahej. PLL signed a contract with RasGas, Qatar, in July 1999 for import of 7.5 million metric tonnes per annum (mmtpa) LNG for a period of 25 years. As per the contract, supply of 5 mmtpa commenced in 2004 and of the balance 2.5 mmtpa in January 2010. In addition to these term contracts, LNG is also being sourced from the spot market by PLL and Hazira LNG Private Ltd. (HLPL). During 2009-10, about 8.91 mmtpa LNG was imported. This is equivalent to about 31 million standard cubic metre per day (mmscmd) of regasified LNG (RLNG). During April-November 2010, 4.91 mmtpa of LNG has been imported.

11.44 As part of the concerted efforts to augment the country's supply of LNG, PLL has tied up 1.44 mmtpa for its Kochi LNG terminal from Exxon Mobil from its share in the Gorgon project, Australia, for 20 years . The sale and purchase agreement (SPA) for it was executed in August 2009. In addition, GAIL and PLL are exploring the possibility of import of LNG from various potential suppliers.

11.45 In order to handle increased LNG imports, additional infrastructure is being created in the country. Capacity at PLL's Dahej LNG terminal has been expanded to 10 mmtpa in July 2009. Dabhol LNG terminal is expected to be commissioned this year. The terminal will, however, become fully operational only after completion of breakwater facilities in 2012. PLL is setting up an LNG terminal at Kochi which is planned to be commissioned in 2011-12.

Refining Capacity

11.46 There had been increase in domestic refinery capacity by 19.46 per cent in 2009-10 to reach 177.97 MMT from 148.97 MMT in 2008-09 and it is further expected to reach 185.40 MMT by 1 April 2011 and 238.96 MMT by the end of 2011-12. Refinery production (crude throughput) during 2009-10 was160.03 MMT (excluding Jamnagar Refinery under special economic zone [SEZ]by Reliance Industry Ltd) showing an increase of 16 per cent over 2008-09. During April-November 2010 it was 106.53 MMT.

Pipeline Network and City Gas Distribution Network

11.47 There has been substantial increase in the pipeline network in the country with current figures of 28 product pipelines of 11,037 km length and 67.2 MMT capacity. There are also 17 crude pipelines of 7,425 km and additional LPG pipelines of over 2,000 km. With increased availability of gas in the country the city gas distribution network has been enlarged to cover compressed natural gas (CNG) in 19 cities supplying gas for domestic consumers, public transport, and commercial/industrial entities. In Vision-2015, provision of pressurized natural gas

(PNG) to more than 200 cities across the country is envisaged.

Rajiv Gandhi Gramin LPG Vitaran Yojana (RGGLVY)

11.48 The 'Vision-2015' adopted for the liquefied petroleum gas (LPG) sector, inter-alia, focuses on raising the population coverage of LPG in rural areas and areas where coverage is low. The RGGLVY for small-size LPG distribution agencies was launched on 16 October 2009. This scheme targets coverage of 75 per cent of the population by 2015 by release of 5.5 crore new LPG connections. Oil marketing companies (OMCs) have issued advertisements to set up 2329 LPG distributors in 22 States, namely Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Manipur, Mizoram, Meghalaya, Nagaland, Orissa, Rajasthan, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, and Pondicherry. Out of this, 75 LPG distributors have already been commissioned. Selection for the rest of the locations is in progress as per policy. The price of administered pricing mechanism (APM) gas produced by ONGC and OIL has been increased from June 2010 to the level of US$ 4.2/mmbtu, less royalty, which is equal to the price of gas produced by NELP operators.

Free LPG Connections to BPL Rural Households

11.49 A proposal for providing one-time financial assistance to BPL households for acquiring new LPG connections is under consideration of the Government. Under the proposed scheme, the Government and Oil Marketing Companies would provide one-time assistance of ₹ 1400 for acquiring a new LPG connection to a BPL family. The scheme would cover all eligible households in the BPL list of the State Government/Union Territory. About 32-40 lakh new LPG connections are to be released annually under this scheme.

11.50 The annual financial implication of the scheme is estimated to be ₹ 490 crore. The proposed budgetary support has been restricted to the extent of 50 per cent of the total funds required. The remaining 50 per cent would be partly drawn from the Corporate Social Responsibility Funds (CSRFs) of the six major oil companies, namely ONGC, IOCL, BPCL, HPCL, OIL, and GAIL and partly borne by the three oil marketing companies (OMCs) namely IOCL, HPCL, and BPCL in the ratio of LPG connections released to BPL households by each company. It is expected that the OMCs will incur ₹ 6.00 crore during the current financial year.

Special Efforts for Energy Conservation

11.51 The Petroleum Conservation Research Association (PCRA) is a national government agency engaged in promoting energy efficiency in various sectors of the economy. It has been providing services leading to improvement in energy utilization in the industrial, transport, agriculture and domestic sectors of the economy. The PCRA conducts a number of activities leading to energy conservation through a mix of direct and indirect services to various sectors of the economy. During 2010-11, a total of 3420 field activities were carried out up to November 2010 against 5122 activities during 2009-10.

Coal

11.52 More than 90 per cent of the coal production in India is of non-coking coal. The production of raw coal during April to November 2010 was 319.80 million tonne (MT), against 317.79 MT in the same period of the previous year. Coking coal production during this period was 28.72 MT against 25.64 MT during the same period last year, registering a growth of 12.01 per cent. The growth rate in the production of raw coal increased from 5.85 per cent during 2006-07 to 7.98 per cent in 2009-10, due to enhanced production by all the stakeholders, especially captive blocks and large PSUs like Coal India Ltd. (CIL) and Singareni Collieries Company Ltd. (SCCL). The lower growth in production during the current year is primarily due to environmental restrictions, particularly application of the comprehensive environmental pollution index (CEPI), non-availability of forestry clearance against some of the projects, poor law and order situation in the States of Jharkhand and Orissa, and excessive rainfall in the western parts of the Country. During 2009-10 the import and export of coal was about 67.744 MT and 2.171 MT respectively.

11.53 Under the scheme of e-auction, CIL and SCCL have been carrying out e-auction of coal. During 2009-10, CIL sold 56.28 MT and SCCL 1.29 MT of coal through e-auction. During April-December 2010 CIL has offered 37.73MT and sold 32.36MT of coal through e-auction, with an increase of 81 per cent in the notified price. Similarly SCCL has also offered 1.95MT and sold 1.66MT of coal

through e-auction, with a 48 per cent increase on notified price up to December 2010.

11.54 The Government has formed a special purpose vehicle (SPV), namely International Coal Venture Limited (ICVL), comprising leading PSUs including CIL for securing metallurgical coal and thermal coal assets overseas. Aspects like the functioning of ICVL and strength of personnel are being finalized. The Empowered Committee of Secretaries constituted for considering ICVL's proposals for acquiring coal properties abroad will also consider CIL's proposals for investing in coal assets abroad which are worth more than ₹ 1,000 crore.

11.55 For increasing the output of washed coking and non-coking coal, CIL has envisaged setting up of 20 new coal washeries for an ultimate raw coal throughput capacity of 111.10 MT per annum with an estimated capital investment of about ₹ 2,500 crore. These include seven coking coal washeries and 13 non-coking coal washeries.

11.56 For increasing production from underground mines, initiatives like identification of high-capacity underground mines for development with latest technology, restarting mining in abandoned mines forming JVs with reputed mining companies, introduction of continuous miners and power supported long wall (PSLW) as a mass production technology in more mines, introduction of high wall mining, and upgradation of equipment size are being taken.

11.57 As of now, 216 coal blocks with geological reserves of about 50 billion tonnes have been allocated to public/private companies. Out of these, 10 blocks have been de-allocated and out of the de-allocated blocks, 2 reallocated to eligible companies. At present, there are thus 208 coal blocks allocated to various public/private companies, of which, (a) 96 with geological reserves of about 27,941.94 MT have been allotted to the government companies, (b) 100 with geological reserves of about 17,269.01 MT to private companies, and (c) 12 with geological reserve of about 4,846.26 MT allotted for ultra mega power projects (UMPPs)/ tariff power projects based on bidding. Out of the total allocated blocks, 26 (14 private and 12 public) have commenced production. The production from these coal blocks for the year 2009-10 was 35.31 MT and was 23.90MT (provisional) during April-November 2010-11.

RAILWAYS

Rationalization of railway freight rates and passenger fares

11.58 Freight structure has been rationalized by the Indian railways. There has been continuous thrust on bringing in transparency and simplification while introducing measures to make rail tariff more competitive so as to attract additional traffic. A dynamic pricing policy has been introduced in recent years, wherein tariff measures are modulated in response to the market scenario for better management of regional and seasonal skew in demand with the objective of maximizing revenues through optimal utilization of transport capacities. Iron ore for export has also been brought under the ambit of the dynamic pricing policy. An inflation concession of ₹ 100 per wagon is being granted on foodgrains for domestic use and kerosene oil.

11.59 To increase revenue from the freight business, a slew of freight incentive schemes have been launched. Based on the feedback of the Railways and customers, these schemes are made more attractive for better utilization of railway assets in traditional empty flow directions, encouraging freight forwarders, incremental traffic in lean season, loading of bagged consignment in open wagons, etc.

Freight performance of the Indian railways

11.60 Freight loading on Indian Railways in the period April-November, 2010 was 593.43 MT as compared to 574.40 MT in April-November 2009—an increase of 3.31 per cent. (Table 11.7) This was short of the proportionate target of 605.11 MT by 11.68 MT. The low growth was primarily on account of negative growth in iron ore. Iron ore loading has been primarily affected in the current year due to the restrictions imposed by the State Governments of Orissa and Karnataka. Frequent bandhs by Naxalites adversely affected loading, particularly in the Bailadila sector on East Coast Railway.

Upgradation of passenger amenities

11.61 Indian Railways has decided to add 206 more railway stations to the existing list of 378 Adarsh Stations. Railways will develop Adarsh Stations with basic facilities such as drinking water, adequate

Table 11.7 : Performance of Indian Railways.

Particulars	2008-09*	2009-10*(P)	(April – November) 2009-10 (P)	2010-11(P)	Change (per cent) 2009-10	2010-11
1. Total Revenue-earning Freight Traffic (MT)	833.39	887.79	574.4	593.43	6.53	3.31
i) Coal	369.63	396.15	252.77	270.38	7.17	6.97
ii) Raw Materials for Steel Plants(except iron ore)	10.85	11.6	7.77	8.33	6.91	7.21
iii) Pig Iron & Finished Steel-						
i) from Steel Plants	21.96	24.17	15.56	16.01	10.06	2.89
ii) from Other Points	6.62	7.68	4.53	4.57	16.01	0.88
iii) Total	28.58	31.85	20.09	20.58	11.44	2.44
iv) Iron Ore						
i) for Export	45.75	43.64	30.07	17.22	-4.61	-42.73
ii) for Steel Plants	42.9	44.33	29.74	28.73	3.33	-3.4
iii) for Other Domestic Users	41.93	44.77	28.74	30.58	6.77	6.4
iv) Total	130.58	132.74	88.55	76.53	1.65	-13.57
v) Cement	86.24	93.15	59.62	63.11	8.01	5.85
vi) Foodgrains	35.51	38.69	22.74	26.2	8.96	15.22
vii) Fertilizers	41.35	43.68	30.2	33.17	5.63	9.83
viii) POL	38.08	38.88	26.19	26.43	2.1	0.92
ix) Container Service-						
i) Domestic Containers	7.05	9.63	5.5	6.66	36.6	21.09
ii) EXIM Containers	23.29	25.32	17.06	17.68	8.72	3.63
iii) Total	30.34	34.95	22.56	24.34	15.19	7.89
x) Balance (other goods)	62.23	66.1	43.91	44.36	6.22	1.02
2. Net tonne kilometres (billion)	551.45	600.55	378.38	393.11	8.9	3.89
3. Net tonne km/Wagon/Day (BG) **	8687	9270	8929	9086	6.71	1.76
4. Passenger Traffic Org. (million) E	6920.4	7245.8	4939.7	5235.84	4.7	6
5. Passenger kilometres (billion)	838	903.5	616	653	7.82	6.01

Notes: * Excluding Konkan Railway loading, E – Excluding Metro Kolkata,
**** calculated in terms of 8 wheelers, P= provisional**
Source: Ministry of Railways.

toilets, catering services, waiting rooms, and dormitories especially for lady passengers. Work has started at various stations.

11.62 The computerized passenger reservation system (PRS) of Indian Railways is the largest passenger reservation network in the world, available at 2,222 locations with more than 8,074 terminals. On an average 4.28 crore passengers per month are booked through the PRS with an average earning of ₹ 1,722.01 crore per month. Indian Railways has tied up with India Post for providing the PRS facility through post offices and is functional at 112 such post offices.

11.63 The computerized unreserved ticketing system(UTS), initiated to provide a fast, flexible, and secure method of issuing unreserved tickets, enables passengers to get unreserved tickets up to three days in advance from any counter and any station to any station in a defined cluster. Computerized UTS is available at 4,468 locations with approximately 8,080 counters provided till end of November 2010. Automatic ticket vending machines have been installed at 375 locations.

11.64 The freight operations information system (FOIS) gives an account of all demands, number of loads/rakes/trains and their pipeline, freight locos,

stock at aggregate level, etc. FOIS phase I (rake management system--RMS) module, implemented at 243 locations, covers all major yards/ lobbies and control offices in divisions and zones. FOIS phase II (terminal management system— TMS) has been commissioned at 678 locations.

11.65 RailTel was set up for creating optical fibre cable (OFC)-based communication infrastructure for modernizing the communications system for train control, operation, and safety and to generate revenue through commercial exploitation of surplus capacity. RailTel has set up an OFC network of 39,000 route km (RKM) of which 27,982 is of high bandwidth capacity. Till date 234 important stations and about 3,575 other stations have been connected to the OFC network. RailTel has also set up a country-wide Next Generation Network and it has been put to use to carry railway voice traffic.

Rail safety

11.66 Safety is the prime concern of Indian Railways and all possible steps are undertaken on a continuing basis to prevent accidents. As a result, the number of consequential train accidents including cases of trespassing at unmanned level crossings came down from 415 in 2001-02 to 165 in 2009-10. During 2010-11 (April to November) also, a similar declining trend has been observed as the number of consequential train accidents including cases of trespassing at unmanned level crossings came down from 106 to 93 in comparison to the corresponding period of the preceding year. Accidents per million train kilometres, an important index of rail safety, also came down from 0.55 in 2001-02 to 0.17 in 2009-10. This is expected to fall further during 2010-11.

Initiatives taken during April-November 2010 to modernize and improve signalling system

11.67 In order to increase efficiency and enhance safety in train operations, electrical/electronic interlocking along with multi-aspect colour light signalling system replaced the outdated mechanical/ multi cabin system at 227 stations. To improve reliability and visibility of signals, outdated filament-type signals have been replaced with long life, highly durable light emitting diode (LED) signals at 506 stations. A centralized online monitoring/diagnostic system with the provision of data loggers has been introduced in Indian Railways for predictive maintenance and intensive supervision of the signalling system and 337 stations have been provided with data loggers. Automatic block signalling to improve line capacity has been provided on 77 RKM.

Investment in capacity

11.68 During the Eleventh Five Year Plan period, electrification of 3,500 RKM was planned with an outlay of ₹ 3,000 crore. In the Mid-Term review of the Eleventh Plan, a revised target of 4,500 RKM has been approved. In all 2,416 RKM has been electrified in the first three years of the Eleventh Plan and 1,000 RKM and 1,084 RKM targeted for electrification during 2010-11 and 2011-12 respectively. During April-November 2010, 216 RKM has been electrified. An additional requirement of ₹ 1,000 crore was projected in the Mid-Term Review while increasing the target from 3,500 to 4,500 RKM.

Infrastructure improvement

11.69 To optimize the operational expenditure by obtaining electricity at economical tariffs, Indian Railways has planned to set up its own captive thermal power plants. To avail of electric power supply at economical rates, Railways, in partnership with the National Thermal Power Corporation (NTPC), is setting up a 1000 MW Thermal Power Plant at Nabi Nagar. The power supply from this plant is likely to be available during 2012. Railways is planning to set up a coal-based thermal power plant at Adra in Purulia district of West Bengal. An MoU has been signed between the NTPC and Railways to set up the proposed plant by a JV between the NTPC and Railways.

11.70 A greenfield electric loco manufacturing unit is being set up at Madhepura, Bihar, to manufacture 12,000 hp locomotives on the basis of a long-term procurement-cum-maintenance contract through PPP on build, own, and operate (BOO) basis, by selecting a JV partner through international competitive bidding (ICB). The cost of the project is ₹ 1,293 crore and equity contribution of Indian Railways and its JV partner will be in the ratio of 26:74. The Cabinet has approved setting up of a greenfield rail coach factory at Kanchrapara, West Bengal to manufacture and supply 500 railcars per annum over a period of 10 years.

Dedicated Freight Corridor project (DFC)

11.71 The DFC project envisaging a Western DFC (1534 km) from Mumbai to Rewari/TKD to cater largely to the container transport requirement and

an Eastern DFC (1839 km) from Ludhiana to Dankuni largely to serve coal and steel traffic is being implemented by the Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL). The base project cost is estimated at about ₹ 50,761 crore (excluding escalation, contingencies, taxes/duties, and interest during construction). The project is being funded through a debt to equity ratio of 2:1 with major debt expected from bilateral/multilateral funding agencies like the Japan International Cooperative Agency and World Bank. Along the Western DFC alignment, the Delhi-Mumbai industrial corridor is also coming up. Considering the need for DFCs on other important routes, a preliminary engineering cum traffic survey (PETS) is being undertaken on the following routes---north-south (Delhi to Chennai), east-west (Kolkata to Mumbai), east-south (Kharagpur to Vijayawada), and south (Goa to Chennai)

ROADS

National Highways Development Project (NHDP)

11.72 About 25 per cent of the total length of National Highways (NHs) is single lane / intermediate lane, about 52 per cent is two lane standard, and the balance 23 per cent is four lane standard or more. In 2010-11, the achievement under various phases of the NHDP up to November 2010 has been about 1,007 km and projects have been awarded for a total length of about 3,780 km. The status of the NHDP as in November 2010 is shown in Table 11.8.

11.73 Steps taken to expedite the progress of the NHDP include regular monitoring of contracts and progress reviews, appointment of senior officials by State Governments as nodal officers for resolving problems associated with implementation of the NHDP, setting up of a Committee of Secretaries under the Cabinet Secretary to address inter-ministerial and Centre-State issues such as land acquisition, utility shifting, environment approvals and clearances of railway over-bridges (ROBs), simplification of the procedure of issue of land acquisition (LA) notifications, and posting of a Railways officer to the (NHAI) to coordinate with the Ministry of Railways in expediting the construction of ROBs. The NHAI has also set up Regional Offices headed by Chief General Managers for close monitoring of projects. So far 14 Regional Offices have been set up.

Revised strategy for implementation of NHDP

11.74 The NHAI formulated Work Plans (Work Plans I and II) for awarding of about 12,000 km each during the years 2009-10 and 2010-11. These plans lay down a specific time frame for various activities and are being monitored very closely at various levels. Under Work Plan I so far 73 projects of 6,426 km length have been awarded and bids for a further nine are at various stages. Under Work Plan II, one

Table 11.8 : NHDP Projects as on November 2010

Sl. No.	NHDP components	Total Length km)	Completed 4/6 Lane (km)	Under implementation		Balance for Award of Civil Work (km)
				Length (km)	No. of Contracts	
1	GQ	5,846	5,809	37	10	-
2	NS-EW	7,142	5385	1,332	106	425
3	Port Connectivity	380	291	83	6	6
4	Other NHs	1,383	926	437	7	20
5	SARDP-NE	388	-	112	2	276
6	NHDP Phase III	12,109	1922	5,207	73	4,980
7	NHDP Phase IV	20,000	-	486	4	19,514
8	NHDP Phase V	6,500	407	1,893	16	4,200
9	NHDP Phase VI	1,000	-	-	-	1,000
10	NHDP Phase VII	700	-	41	2	659
	Total	**55,448**	**14,740**	**9,628**	**226**	**31,080**

Notes: GQ—Golden Quadrilateral connecting Delhi, Mumbai, Chennai, and Kolkata; NS-EW—north-south and east-west corridor; SARDP-NE—Special Accelerated Road Development Programme in the North-eastern Region.

Source : Ministry of Road Transport and Highways (MoRT&H).

project of 170 km length was awarded and bids for five more projects are under various stages of process.

11.75 A committee under the Chairmanship of Shri B. K. Chaturvedi, Member Planning Commission, submitted a report containing the recommendations on the urgent issues for key changes in the implementation framework and modified financing plan of the NHDP. The Government considered and accepted the recommendations contained in the report of the Committee in November 2009 with the proviso that the financing plan from 2010-11onwards would be considered by the Empowered Group of Ministers (EGoM) for further action.

11.76 The EGoM has since given the in-principle approval for Work Plan II for 2010-11 for award of projects covering a length of about 12,000 km and also has approved additional budgetary support for the SARDP-NE and J&K projects. The EGoM has also approved the Work Plan for 2010-11 onwards with the stipulation that of the total NH length to be developed, broadly 60 per cent would be taken up on build, operate, and transfer (BOT) (Toll) basis, 25 per cent on BOT (Annuity) basis, and the remaining 15 per cent on engineering procurement contract (EPC) basis.

11.77 The NHAI is setting up 192 special land acquisition units (SLAUs) in various States for expediting the LA process, which is identified as a major bottleneck in the implementation of the projects, and 122 such units have already been set up. Besides, Chief Ministers have been requested to set up High Level Coordination Committees under Chief Secretaries to sort out issues involving coordination between departments. Most States have constituted these High Level Coordination Committees.

11.78 To expedite the progress of the NHDP, the MoRT&H has taken up implementation of about 4700 km under NHDP IV through State Public Works Departments (PWDs)/Corporations. It consists of implementation of about 1800 km under NHDP IVA (approved by the Government in July 2008) and about 2900 km under NHDPIVB (yet to be approved by the Government). Of the 1800 km under NHDPIVA taken up through State PWDs / Corporation, one project of 108 km has been awarded up to November 2010 and another of 670 km is at an advanced stage of award. Advance action has also been taken for project preparation work for about 2900 km under NHDP IVB.

Financing of the NHDP

11.79 A part of the fuel cess imposed on petrol and diesel is allocated to the NHAI to fund the implementation of the NHDP. The NHAI, whenever required, leverages the said cess flow to borrow additional funds from the debt market. Till date such borrowings have been limited to funds raised through 54 EC (capital gains exemption) bonds and the short-term overdraft facility.

11.80 The Government of India has also taken loans for financing various projects under the NHDP from the World Bank (US$ 1965 million), Asian Development Bank(ADB) (US$ 1605 million), and Japan Bank for International Cooperation (32,060 million yen) which are passed on to the NHAI partly in the form of grants and partly as loan. The NHAI had also availed a direct loan of US $ 149.78 million from the ADB for the Surat Manor Expressway Project (Table 11.9)

Table 11.9 : Financial Structure of NHAI

(₹ crore)

Year	Cess Fund	External Assistance		Borrow-ings 54-EC Bonds	Budge tary Support
		Grant	Loan		
2005-06	3269.70	2350.00	600.00	1289.00	802.00
2006-07	6407.45	1582.50	395.50	1500.00	570.67
2007-08	6541.06	1776.00	444.00	305.18	559.00
2008-09	6972.47	1515.00	378.80	1630.74	159.00
2009-10	7404.70	272.00	68.00	1153.63	200.00

Source: Department of Road Transport & Highways.

SARDP-NE

11.81 The SARDP-NE aims at improving road connectivity to State capitals, district headquarters, and remote places of the north-east region. It envisages two / four laning of about 4798 km of NHs and two laning / improvement of about 5343 km of State roads. This will ensure connectivity of 88 district headquarters in the north-eastern States to two- lane NHs / two-lane State roads. The programme has been divided into Phases 'A' and 'B' and the Arunachal Pradesh Package of Roads & Highways.

11.82 With the approval of the Cabinet Committee on infrastructure (CCI) on 8 April 2010 for transfer/ addition of 1503 km roads to Phase 'A' of the SARDP-

NE, Phase 'A' now consists of improvement of 4099 km of roads consisting of 2041 km of NHs and 2058 km of State roads at an estimated cost of ₹ 21,769 crore. Out of the 4099 km, the Border Roads Organization (BRO) and State PWDs have been assigned the development of 3213 km. The remaining length of 886 km will be built by the NHAI, Ministry / Arunachal Pradesh PWD, and BRO after investment approval is received from the CCI. Out of the 3213 km, projects covering a length of 2219 km have been approved till December 2010 and work is in different stages of progress. Phase 'B' has now been modified to cover two laning of 1285 km of NHs. Further approval for preparation of DPRs for two laning / improvement of 2438 km of State roads has also been given. Till December 2010, a DPR was prepared for 450 km.

11.83 The Arunachal Package covering a 2319 km stretch of road was approved by the Government as part of the SARDP-NE on 9 January 2009. Of this, 776 km has been approved for execution on BOT (annuity) basis and the remaining for tendering on EPC basis. Two projects under BOT (annuity) for 58 km length have been awarded and the award for the remaining two covering 718 km is under process. For other stretches to be taken up on EPC basis, estimates have been sanctioned/ DPR is under process.

Initiatives for development of the entire NH network to minimum acceptable two-lane standard

11.84 Keeping in view the targets stipulated in the Eleventh Plan for accelerated efforts to bring the NH network up to a minimum two-lane standard within the next 10 years (i.e. by the end of the Twelfth Plan) and also for removing existing deficiencies, the Ministry has proposed a World Bank loan as well as budgetary allocations to reach this goal by December 2014. DPR consultants have been engaged for preparation of a DPR for about 3800 km proposed to be developed under World Bank Assistance. The MoRT&H has also initiated action for improvement of the remaining 2500 km of single / intermediate lane NHs through budgetary resources. In order to make a visible impact, the work would be taken up for upgradation on corridor concept. Therefore, corridors would include strengthening (in adjoining reaches) in addition to widening to two lane/ two lane with paved shoulder standards in order to have better facility in long continuous stretches.

11.85 In general, the larger stretches costing more than ₹ 150 crore have been taken up with loan assistance from the World Bank under the National Highways Interconnectivity Improvement Programme (NHIIP). DPR consultants have been engaged for preparation of a DPR for about 3800 km. The smaller stretches costing less than ₹ 150 crore have been taken up through budgetary support. In this category, a 2200 km length (51 projects) with an estimated cost of ₹ 5800 crore has been taken up. Provision of these projects has been made in the Annual Plan 2010-11 and Demands for Grants 2010-11. DPRs are prepared by State PWDs and the estimates are directly submitted by them to the Ministry for sanction.

Development of Roads in Left Wing Extremism (LWE)-affected areas

11.86 The project covering 1126 km of NHs and 4351 km of State roads in LWE-affected areas is spread over 34 district in eight States, namely Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, and Uttar Pradesh. An allocation of ₹ 1000 crore has been made for the project from the gross budgetary support (GBS) under the Annual Plan for 2010-11. As against the total target till December 2010, projects for a total length of 4897 km at an estimated cost of ₹ 5998 crore have been sanctioned / processed till November 2010. Of these, projects for a length of 3012 km at an estimated cost of ₹ 3537 crore have been awarded till November 2010 and an expenditure of ₹ 256 crore incurred.

Construction of rural roads under the Pradhan Mantri Gram Sadak Yojna (PMGSY)

11.87 The PMGSY was launched to provide single all-weather connectivity to eligible unconnected habitations having population of 500 persons and above in plain areas and 250 persons and above in hill States, the tribal (Schedule-V) areas, desert (as identified in the Desert Development Programme) areas, and LWE-affected districts as identified by the Ministry of Home Affairs.

11.88 Under the programme, up to November 2010 about 4.19 lakh km roads to benefit 1,07,974

Box 11.2 : Auction for an efficient, cost effective and transparent system of award of PPP projects for National Highways Development

Highways are a critically important infrastructure for an emerging nation. And the design of appropriate contracts is the critical instrument for meeting the challenge of highways. What are these challenges? To put it in one sentence, the objective or the challenge is to maximize the difference between:

(a) the additional welfare that our citizens get from having more and better roads and,

(b) the present value of the cost of building (henceforth, building should be taken to mean building or renovating) those roads.

The broad principles above translate into these following general rules.

(1) We have to have a cut off rule to decide which projects are worthwhile and which not.

(2) Between two identical roads if one can be done at a lower cost, we should choose the one with the lower cost, subject to that being viable in the sense of (1), above.

(3) All costs do not take the form of brick and mortar. A build up of fiscal deficit is also a form of cost. This may be difficult to reduce to the equivalent of brick and mortar cost but must not be omitted for that reason.

Some of the problems can be overcome if projects are awarded on the basis of a transparent and hands-off auction system. The heart of an efficient, cost effective and transparent system of PPP partnership whereby the Government gives out the task of developing new highways to the private sector is the system of auction. Auctions work best when the product is being sold lock, stock and barrel to a bidder. Hence, systems such as BOT (toll) and annuitized BOT (toll) are better suited to being given out through competitive auction than the BOT (annuity). In the case of BOT (toll) and annuitized BOT (toll) the developer basically gets to own the road for the next 20 years. Hence, this comes close to a lock, stock and barrel sale.

Auctions are, however, highly specialized objects and their detailed good design require specialist input. The details of the auction should therefore be worked out with inputs from specialists. No attempt should be made to apportion in advance different groups of bidders to different projects. All private bidders willing to bid, subject to their meeting the qualification requirement, should have the right to bid.

The current practice in the case of BOT (toll), is to allow for a viability gap funding (VGF) of up to 40% of the project cost. However, it has been seen that some developers make so much profit at the start of the project because of the 40% VGF that they do not, after that, take adequate interest in maintaining the highways. And, knowing this, they will not even have the incentive to build the road properly in the first place. To make good-quality road building incentive compatible with the developer's interest and at the same time serve the national interest it is recommended that we allow for up to 10% VGF upfront. Then for any VGF over and above 10% and limited to a maximum of 40%, the balance should be converted into an annuity to be paid in equal installments each year for the next 20 years. Unlike under the BOT (annuity) system, the toll will still be managed and collected by the private developer who wins the bid and therefore the incentives are aligned.

Given that the developer would continue to receive "annuitized" payments from the Government it will be in the interest of the developer to maintain the road as he is obligated to do to the Government. Further, since the developer will be collecting toll, he or she will have a direct interest in maintaining the road. And since he himself will be maintaining the road, by the argument of backward induction it follows that the developer will have an interest in building good-quality roads, for which the maintenance cost is not excessive.

Source: Report on Methodology for PPP (Public Private Partnership) project for National Highways Development under the chairmanship of Dr. Kaushik Basu, Chief Economic Adviser.

habitations have been cleared with an estimated cost of ₹ 1,18,298 crore. A sum of ₹ 75,404 crore has been released to the States/UTs and about ₹ 74,345 crore has been spent. So far, 2,98,809.72 km road length has been completed and new connectivity has been provided to over 73,651 habitations. Work on a road length of about 1,20,181 km is in full swing.

11.89 Rural roads has been identified as one of the six components of Bharat Nirman and has the goal to provide all-weather road connectivity to all villages with a population of 1000 (500 in the case of hilly or tribal areas). In effect, Bharat Nirman proposes to provide new connectivity to a total of 54,648 habitations. This would involve construction of 1,46,184 km of rural roads. In addition to new connectivity, Bharat Nirman envisages upgradation/ renewal of 1,94,130 km of existing rural roads. Under the rural roads component of Bharat Nirman, 38,144 habitations have been provided all-weather road connectivity up to November 2010 and projects for connecting 15,426 habitations are at different stages. During 2010-11, up to November 2010 over 24,411 km all-weather road has been completed under the

programme. New connectivity has been provided to nearly 3271 habitations with an expenditure of ₹ 8705 crore.

CIVIL AVIATION

11. 90 The Civil Aviation Sector witnessed a strong recovery during 2010 from the adverse impact of the recent global financial crisis. The scheduled domestic passenger traffic at 51.53 million clocked a growth rate of 19 per cent during January-December 2010 as compared to 43.3 million during the corresponding period in 2009. Domestic cargo transported by air increased from 3.4 million tonnes in 2009 to 4.7 million tonnes in 2010 registering a growth rate of 30 per cent. At present 12 scheduled airlines are operational (10 passenger and 2 cargo). The total number of aircraft in their fleet has risen by one to 419 at the end of December 2010. The non-scheduled operators as on December 2010 have 360 air-craft in their fleet.

11.91 The civil aviation sector in India has resumed a higher trajectory of growth after emerging from adverse impact of global financial crisis. India's air traffic has grown by about 18 per cent per year since 2004. The potential for higher levels of growth in the future is also very high. Industry forecasts suggest that India will be the fastest growing civil aviation market in the world by 2020 with about 420 million passengers being handled by the Indian airport system as against 140 million in 2010. Such growth prospects pose a number of challenges on many fronts.

11.92 Keeping in view the pace of developments in this area and to draw upon expertise available outside the system to address issues that are predominantly economic in content, the Civil Aviation Economic Advisory Council (CAEAC) has been set up under the Chairmanship of the Secretary, Civil Aviation, with experts drawn from different sub-segments of the industry and from other related fields. The CAEAC met once in December 2010 and once in January 2011 and is scheduled to meet periodically at regular intervals and advise the Ministry in charting out a framework of analysis for addressing issues facing the sector that are predominantly economic in content.

11.93 In pursuance of the decision taken in the first meeting of the CAEAC, a Working Group on Regulatory Framework to protect consumer interests including disclosure of passenger tariffs and conditions of service by domestic airlines has been set up on 20 December 2010 with the mandate to recommend measures to enhance transparency and disclosure and to suggest improvements in the system of monitoring. Another Working Group on Air Cargo/Express Service Industry has been set up on 17 January 2011 to look into issues of long-term significance for the industry and advise the Ministry on policy initiatives required in this regard.

Protection of interest of Air Travellers

11.94 In order to ensure appropriate protection for air travellers in the event of flight disruptions, i.e. cancellations and delays without due notice to passengers, airlines have been directed to provide compensation in addition to the refunding of ticket prices for the inconvenience caused. Additionally, airlines have been mandated to compensate passengers with confirmed bookings who are denied boarding against their will in addition to refund of air ticket in accordance with the Civil Aviation Requirements dated 6 August 2010. The Tariff Monitoring Unit set up in the DGCA continues to monitor the passenger fares offered by scheduled domestic Airlines to ensure that the competition in the market is fair.

Air India Ltd

11.95 With effect from November 2010, the name of the Company has been changed from National Aviation Company of India Ltd to Air India Ltd. In view of its critical financial position, it was decided that Air India would come up with a revised business plan along with a financial restructuring plan, after consultation with professional financial/management consultants, indicating the operational measures as also financial restructuring measures required to improve the financials of the company. Air India has reported that a number of measures were taken for cost reduction and improved revenue generation as a result of which it is confident of turning around its performance during the next 18 to 24 months subject to other factors remaining favourable. With a view to addressing the debt-equity ratio, ₹ 800 crore was infused as equity into the company in 2009-10 and ₹ 1200 crore in 2010-11. This would give the company flexibility in its financial restructuring.

Airport development

11.96 As part of the restructuring and modernization of metro airports, Delhi and Mumbai airports are being restructured and modernized PPPs. Phase-1 of the development work of the Indira Gandhi International Airport (IGIA), Delhi, has already been completed with the operationalization of Termial-3 at an

estimated cost of ₹ 12,857 crore. Development work at Chhatrapati Shivaji International Airport (CSIA), Mumbai, will be completed by 31 December 2012 with an estimated cost of ₹ 9802 crore. Similarly, the Airport Authority of India (AAI) has undertaken development work at Kolkata and Chennai airports with an estimated cost of ₹ 1942 crore and ₹ 1808 crore respectively, subsequently revised to ₹ 2325 crore and ₹ 2015 crore respectively. The revision in cost is under consideration. As per the revised schedule, the Kolkata project is to be completed by October 2011 and the Chennai project by May 2011 (domestic terminal) and July 2011 (international terminal).

Modernization of non-metro airports

11.97 The Committee on Infrastructure(COI) in its 12th meeting held on 8 June 2006 had approved the modernization of 35 non-metro airports.Of these 35, the cost of development work on 30 is less than ₹ 150 crore. The development work on 11 such projects has already been completed and on 19 is either at planning stage or in progress. The cost of development work on the remaining five projects, is more than ₹ 150 crore. The work on one such project, namely Thiruvananthapuram, has been completed and work is in progress on the remaining four.

GAGAN Project:

11.98 Implementation of the GPS-aided GEO-augmented Navigation (GAGAN) project over Indian Airspace for seamless navigation of civil aircraft is in progress.. The total cost of the project is ₹ 774 crore, out of which ₹ 148 crore has been spent on the GAGAN-Technology Demonstration System (TDS) Phase with the AAI's contributing ₹ 108 crore and the Indian Space Research Organization (ISRO) ₹ 40 crore. An amount of ₹ 626 crore has been earmarked for GAGAN-Final Operational Phase (FOP) out of which the AAI is required to contribute ₹ 496 crore and ISRO the balance.

Corporatization of Air Traffic Control (ATC)services

11.99 The Government had constituted a committee headed by Shri Naresh Chandra, former Cabinet Secretary, to suggest a road map for the civil aviation sector in India. The committee had recommended that keeping in view the efficiency required in many functional areas and international trends, ATC services should be hived off from the current jurisdiction of the AAI and a separate corporate entity constituted. The process of corporatization of ATC services has already been set in motion. This is one of the major developments in the area of infrastructure for the aviation sector in the country.

Outstanding Issues

11.100 Indian carriers operate in an exceptionally high-cost environment. The single largest element contributing to airline costs is aviation turbine fuel (ATF) which accounts for 40 per cent of the operating cost of Indian carriers, as against a figure of only 20 per cent for international carriers. ATF in India is priced, on an average, almost 60 per cent higher than internationally. The widening differential in ATF prices and its huge negative impact on airline balance sheets are eroding its competitiveness. In the back-drop of higher oil-crude prices, there is severe risk of dampening of passenger market growth by quickly making air travel out of reach for a significant portion of the market, which was fuelling its growth. The losses being registered by Indian carriers may result in reduced connectivity thereby affecting growth in this sector.

TELECOMMUNICATIONS

Growth

11.101 The opening of the sector has not only led to rapid growth but also helped a great deal towards maximization of consumer benefits as tariff have been falling across the board. From only 76.54 million telephone subscribers in 2004, the number increased to 764.77 million at the end of November 2010. Wireless telephone connections have contributed to this growth as their number rose from 35.62 million in March 2004 to 729.58 million at the end of November 2010. The wire-line has shown a decline from 40.92 million in 2004 to 35.19 million in November 2010(Table 11.10).

Table 11. 10 : Growth of telephone connections

(in millions)

	March 2008	March 2009	March 2010	Nov. 2010
Wireline	39.41	37.96	36.96	35.19
Wireless	261.08	391.76	584.32	729.58
Gross Total	300.49	429.73	621.28	764.77
Annual Growth (%)	46	43	45	19

Source: Department of Telecommunications.

Teledensity

11.102 With increasing private-sector participation, the share of the private sector in total telephone connections has increased to 84.5 per cent in November 2010 from a meager 5 per cent in 1999. Teledensity, an important indicator or telecom penetration, rose from 7.02 per cent in March 2004 to 64.34 per cent in November 2010. Thus there has been continuous improvement in the overall teledensity of the country. Rural teledensity which was above 1.57 per cent in March 2004 has increased to 30.18 per cent at the end of November 2010. Urban teledensity has increased from 20.74 per cent in March 2004 to 143.95 per cent at the end of November 2010.

11.103 With the penetration of mobile services and flourishing of private service providers, rural telephone connections have gone up from 12.3 million in March 2004 to 250.94 million in November 2010. The share of rural telephones in total telephones has steadily increased from around 16 per cent in 2004 to 32.81 per cent as on 30 November 2010. During 2009-10, the growth rate of rural telephones was 62.6 per cent as against 37.32 per cent for urban telephones. The private sector has contributed crucially to the growth of rural telephones by providing about 84.5 per cent of telephones as in November 2010.

Internet / Broadband

11.104 With supportive policies, broadband subscribers grew from 8.77 million as in March 2010 to about 10.71 million up to November 2010. A target of 20 million by 2010 has been set. in broadband policy. The auction of BWA spectrum has been successfully conducted. Newer Access technologies like Broad Band Wireless Access (BWA) can significantly transform the character of internet/broadband scenario in India. This will encourage further expansion of wireless service with a vision of providing 'Broadband for all'.

New horizons for further growth

11.105 Third-generation (3G) telecom services: The explosive growth of the telecom industry in India is being followed by the urge to move towards better technology and the next level of service delivery. While the last five years have been transformational for Indian telecom industry, the next few years look even more exciting. One of the key new frontiers is 3G technology. The auction of 3G/WBA spectrum has been successfully conducted. This will encourage further expansion of wireless services

11.106 Mobile number portability (MNP): MNP allows any subscriber to change his service provider without changing his mobile phone number. The much-awaited MNP was launched on 25 November 2010 in Haryana and is now available to more than 700 million subscribers across the country from 20January, 2011.

11.107 Manufacturing: Indian telecom industry manufactures a complete range of wireline telecom equipment using state-of-the-art technology. Considering the growth of wireless, there are excellent opportunities for domestic and foreign investors in manufacturing sector. Presently most of the wireless core equipment is being imported and there is great potential to manufacture these items in the country. The last five years saw many renowned telecom companies setting up their manufacturing bases in India. The production of telecom equipments in value terms increased from ₹ 48,800 crore during 2008-09 to ₹ 51,000 crore during 2009-10. The worth of telecom equipment including customer premises equipment (CPE) produced during 2010-11 is expected to be about ₹ 53,500 crore . There are favourable factors such as policy moves taken by the Government, incentives offered, large talent pool in R&D, and low labour cost which can provide an impetus to the industry. Exports of telecom equipment have also increased from ₹ 11,000 crore in 2008-09 to ₹ 13,500 crore during 2009-10 and are expected to increase to ₹ 14,000 crore in 2010-11.

Activities under Universal Service Obligation Fund (USOF)

11.108 The USOF continues to be used to subsidize the development of the telecom sector in rural areas. Support is provided from the USOF for operation and maintenance of village public telephones (VPT) in revenue villages identified as per Census 2001. There are still about 62,443 uncovered villages which would also be provided with VPT facility with subsidy support from the USOF. Agreements were signed with Bharati Sanchar Nigam Limited (BSNL) whereby 40,101 villages have been covered under VPTs. As on 31December 2010, 61,985 VPTs have been provided by BSNL. In order to provide broadband connectivity to rural areas under the purview of the USOF, out of a total of 8,88,832 wireline broadband connections, 2,32,852 have been provided till 30 November 2010.

POST

11.109 India Post has the largest postal network in the world with 1,54,979 post offices across the length and breadth of the country. As on 31 March 2010, out of this total, 1, 39,182 were in rural areas and 15,797 in urban areas. On an average each post office serves 7176 people and covers an area of approximately 21.21 sq. km. India Post has so far introduced 1082 franchisee outlets to cater to the demand for postal services where it is not possible to open departmental post offices.

Project Arrow

11.110 The Department has launched Project Arrow, to lay the foundation for a comprehensive, long-term transformation of India Post. Project Arrow aims at comprehensive improvement of the core post office operations as well as the ambience in which postal transactions are undertaken. The response of the general public and the staff of the Department to the initiative have been overwhelmingly positive and Project Arrow offices have shown significant increase in revenue earnings. The initiative 'Project Arrow--Transforming India Post' has also won the Prime Minister's award for Excellence in Public Administration for the year 2008-09. So far 1530 post offices have been covered under this project.

Mail Operations

11.111 The Mail Network Optimization Project has been launched to optimize the existing mail network of Department of Posts and streamline core mail operations. It also seeks to bring in greater standardization and improvement in the operational processes relating to mail processing, transmission, and delivery. The Department has undertaken a project to set up Automated Mail Processing Centres (AMPCs) in Delhi, Mumbai, Kolkata, Chennai, Bangalore, and Hyderabad with a view to automating mail sorting. This automated sorting of mail, which would help the Department increase productivity at post offices in these cities.

11.112 The Department of Posts has inducted a dedicated cargo aircraft for carriage of mail, parcels, and logistics in the north-east region in order to bring in consistency in mail transmission. The India Post aircraft operates on the Kolkata-Guwahati-Imphal-Agartala-Kolkata route on a regular basis. This initiative has provided a vital communication link for the north-east region with the rest of the country and helped the Department resolve the problems associated with mail transmission to and from this region.

Computerization and Networking of Post Offices

11.113 Under the Plan project of computerization and networking of post offices, the Department of Posts has supplied computer hardware, peripherals, and power back-up equipment to 14,324 post offices till date in the Eleventh Plan period Upgraded computer hardware, namely servers, desktops and peripherals, and power back-up equipment like UPSs and gensets have been supplied to 1939 post offices computerized during earlier five year plans. Wide Area Network (WAN) connects1308 sites/ locations including all head post offices, administrative offices, major speed post centres and accounts offices. Broadband facilities have been provided to 10,530 offices. The IT Modernization Project Phase II of India Post under the Eleventh Plan envisages computerization of all the non-computerized post offices in the country (Departmental single-handed post offices) and all extra-departmental post offices phased over the financial years 2010-11 and 2011-12.

Banking and insurance services

11.114 India Post is pursuing the objective of financial inclusion through its 1,39,182 post offices in rural areas and 15,797 post offices in urban areas. The total number of post office savings bank accounts has increased from 14.23 crore in 2003-04 to 24.10 crore in 2009-10 The outstanding balance in them in 2009-10 was ₹ 5,83,789 crore. India Post has already computerized its savings bank operations in 11,000 post offices. The post offices also provide insurance services to the Government and semi-Government employees and the rural populace under the banner of Postal Life Insurance (PLI) and Rural Postal Life Insurance (RPLI). The number of RPLIs has increased from 26.66 lakh in 2003-04 to 70 lakh in 2008-09 and more than 99 lakh in 2009-10. There were more than 44 lakh PLI policies as on 31March 2010.

Leveraging of the postal network

11.115 The Department of Posts has been given the responsibility of disbursing wages to Mahatma Gandhi National Employment Guarantee Scheme (MGNREGS) beneficiaries through post office savings bank accounts. Starting with Andhra Pradesh postal circle in 2006, the payment of wages

under the MGNREGS is currently operational in 19 postal circles comprising 26 States and 5 UTs. The scheme is operational through 96,895 post offices. Nearly 4.67 crore NREGS accounts have been opened up to October 2010 and the amount disbursed in this financial year (April-October 2010) amounts to more than ₹ 7113 crore.

11 .116 The Department of Posts in collaboration with the National Bank for Agriculture and rural Development (NABARD) provides micro-credit facility to self-help groups (SHGs) through identified post offices on agency basis. The corpus fund for implementation of this project is given by NABARD. The pilot is in operation in five districts involving seven divisions of Tamil Nadu circle. So for, 1207 SHGs have been provided more than ₹ 3.29 crore in loan.

11.117 The Department has designated 4707 Central Assistant Public Information Officers (CAPIOs) at least one in each tehsil across the country. Officers in charge of the computerized customer care centres have been identified to act as CAPIOs for the Department and to receive Right to Information (RTI) requests and appeals on behalf of other Central public authorities who have agreed to avail of this facility in post offices in pursuance of Section 5 (2) and 19 of the RTI Act 2005. The designated CAPIO at a post office receives RTI requests and appeals for forwarding to the Central Public Information Officer or senior officer specified under sub-section (1) of section 19 of the RTI Act 2005 or the Central Information Commission (CIC), as the case may be.

International Operations of India Post

11.118 India Post has also launched a premium express service called WorldNet Express in a unique collaboration with Duetsche Post, the national postal carrier of Germany. This service enables customers to despatch express parcels to over 200 countries and has advanced features like tracking of parcels through internet, telephone, and SMS. This service is also supported by a 24-hour telephone help line.

URBAN INFRASTRUCTURE

11.119 In 2001, just 27.8 per cent of India's total population lived in urban areas. Yet, in absolute terms, with about 285 million persons living in urban areas, India has the second largest urban population in the world. It is expected that the urban population will rise to constitute 38 per cent of total population by 2026.

11.120 Urbanization has increased the demand for urban services. In this context, improving the urban infrastructure covering basic civic services like drinking water supply, sewerage, solid waste management, and urban transport assumes great significance. Municipal institutions responsible for providing these civic services are facing acute shortage of capacity and resources.

11.121 The Eleventh Five Year Plan had estimated the total fund requirement for implementation of the target for urban water supply, sewerage and sanitation , drainage, and solid waste management to be ₹ 129,237 crore and that for urban transport to be ₹ 132,590 crore. According to estimates based on the City Development Plans(CDPs) prepared by the States under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched in 2005-06, the requirements for both urban infrastructure services and urban transport were estimated to be as high as ₹ 8,00,000 crore.

JNNURM

11.122 The JNNURM was launched in 2005-06 to encourage cities to initiate steps to bring about improvement in existing civic service levels in a sustainable manner in Mission mode over a seven-year Mission period. The components under the Sub-Mission Urban Infrastructure and Governance (UIG) include urban renewal, water supply (including desalination plants), sanitation and sewerage, solid waste management, urban transport, development of heritage areas, and preservation of water bodies. The allocation for the JNNURM (UIG) was increased from ₹ 25,500 crore to ₹ 31,500 crore in February 2009. On 3 December 2010, the Mission has completed five years.

11.123 All the selected 65 cities under the UIG component of the JNNURM have prepared comprehensive CDPs, charting out their long-term vision and goals in urban governance and development. These plans also include investment plans, with a focus on provision of city-wide urban infrastructure services such as water supply, sanitation, drainage, and provision of basic services to the urban poor.

11.124 With the launching of the JNNURM, the reform of urban local bodies (ULBs) has begun.

Memorandums of Agreement (MoAs) in respect of the reforms agenda to be undertaken by States and cities has been negotiated and signed with 65 Mission cities and six ULBs falling under urban agglomeration of cities. There is now better appreciation at State level of the importance of developing and sustaining infrastructure through appropriate user charges. Further, States and ULBs have started meeting timelines committed for implementation of the reforms under the MoAs.

11.125 The JNNURM is a reforms-driven programme. As against commitments to achieve reforms by the fifth year in accordance with their respective MoAs, 29 out of 29 States/UTs have repealed the Urban Land Ceilings Act, 21 out of 29 have constituted District Planning Committees, 15 out of 15 have rationalized stamp duties to 5 per cent, and 17 out of 26 States have transferred / integrated water supply and sanitation functions. Also 42 out of 62 ULBs have shifted to double-entry-based accounting system.

11.126 A Community Participation Fund (CPF) was established on 4 June 2007 with an initial corpus of ₹ 100 crore with the provision of an additional ₹ 90 crore for the remaining years of the Mission period. So far 45 proposals have been approved under the CPF.

11.127 For 2010-11 ₹ 6556.12 crore has been provided for the UIG. A total number of 526 projects, as on 31December 2010, have been sanctioned at an approved cost totalling ₹ 60,215.44 crore for 62 cities out of the listed 65 Mission cities across 31 States/UTs. Additional Central Assistance (ACA) admissible for these projects is ₹ 27,878.44 crore. As on 31December 2010, ₹ 12,978.93 crore has been released as ACA to various States and UTs for the projects, financing of buses, CPF and e-Governance projects approved under the JNNURM and also for reimbursement cost of CDPs and DPRs.

11.128 While sanctioning projects under the JNNURM, highest priority has been accorded to sectors that directly benefit the common man and the urban poor, namely water supply, sanitation, and storm water drainage. Cumulatively, more than 95 per cent of the seven-year ACA allocation of ₹ 31,500 crore under the UIG Sub-Mission has already been committed. During 2010-11, up to 31 December 2010, 10 projects have been approved with project cost of ₹ 2706.99 crore. The ACA admissible for these projects is ₹ 996.52 crore of which ₹ 557.46 crore has been released.

E-Governance

11.129 A Mission mode project on e-Governance in municipalities was conceptualized as part of the Eleventh Five Year Plan for making urban Governance more efficient and effective. It was decided subsequently that initially the e-Governance project would be a part of the JNNURM for 35 cities with population of over 10 lakh and a new Centrally sponsored scheme (CSS) for other cities and towns would be taken up after watching the implementation under the JNNURM. Accordingly, the guidelines for the National Mission Mode Project (NMMP) on e-Governance in municipalities was prepared and circulated to the States/ULBs for submission of DPRs The DPRs with State-level solutions from Jharkhand and Uttar Pradesh have already been approved. This is in addition to seven DPRs already approved for Nagpur, Vijayawada, Cochin, Pimpri-Chinchwad, Navi Mumbai, Ulhasnagar, and Chennai. The DPR for Jharkhand covers e-Governance in Dhanbad ULB and the Uttar Pradesh DPR covers e-Governance in Kanpur ULB.

Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT)

11.130 The UIDSSMT is a sub-component of the JNNURM for development of infrastructure facilities in all towns and cities other than the 65 Mission cities. For obtaining assistance under the UIDSSMT, States and ULBsneed to sign MoAs committing to implement reforms. From its inception in December 2005 till December 2010 as many as 764 projects across 641 towns and cities at a cost of ₹ 12,928.93 crore were sanctioned under the UIDSSMT, comprising inter alia 418 water supply projects, 96 sewerage projects, 65 storm water drainage projects, 56 solid waste management projects, and 108 road projects. So far, the committed ACA under the UIDSSMT for approved projects is ₹ 10,435.93 crore, against which ₹ 7110.29 crore has been released till 31 December 2010.

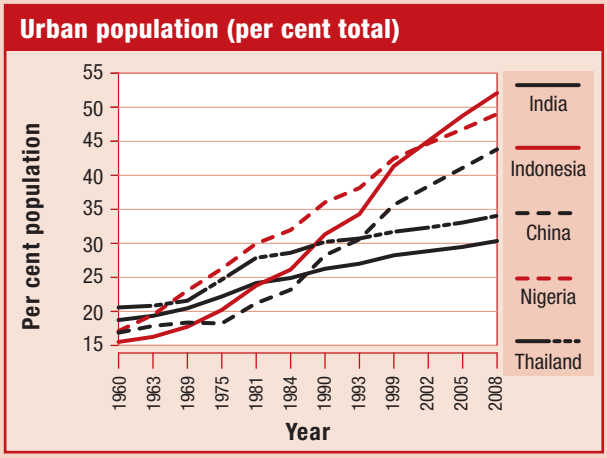
Other Urban Infrastructure Schemes and initiatives in Urban Governance

11.131 Under the pilot scheme for Urban Infrastructure Development in Satellite Towns around Seven Mega-Cities (UIDSST), i.e. Mumbai, Kolkata, Delhi, Chennai, Hyderabad, Bangalore, and Ahmedabad, a total of six projects worth ₹ 234.08 crore were sanctioned for Pilkhuwa, Vasai-

Box 11.3 : Cities and Growth, Land Markets and Urban Development

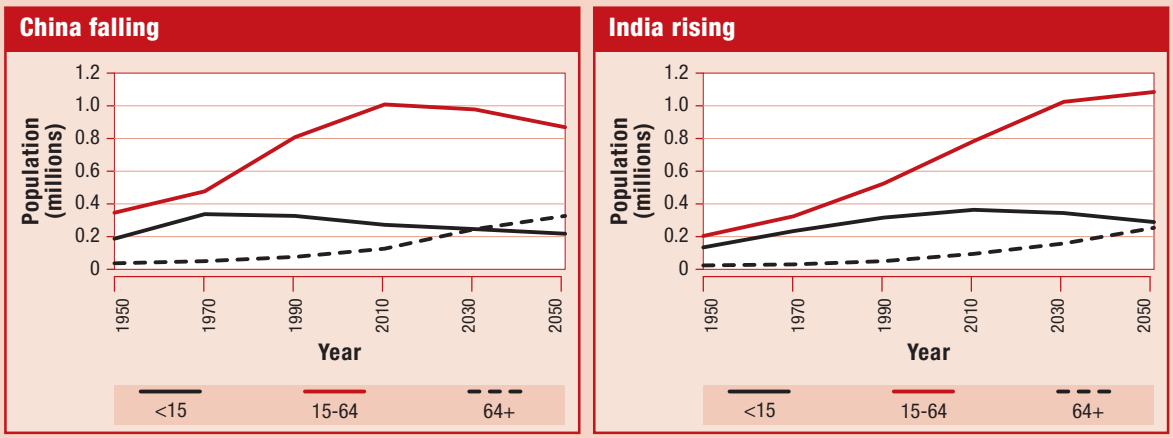
Cities may hold the key to our future. India is entering what we term as "Three Great Transformations": (1) growth of cities; (2) jobs to meet rising aspirations of a young adult population; and (3) doubling household incomes. Some 200 million new entrants to the labour force will migrate from rural to urban areas, and lift India's economy-wide (including rural) productivity, growth and average incomes. Urbanisation is pulling people out of rural poverty. But the process is knife-edge: failure will lead to chaotic cities, unfulfilled aspirations, and slower growth.

...As a Demographic Bulge Looms (millions in age-group)



Patterns : India's urban population is underestimated, partly because of definitional reasons, and will approach some 45% of the population (495 million), compared to 30% (295 million) in 2009. This is equivalent to building 1 additional Greater Mumbai or Greater Delhi every year. Growth is taking place in peripheries of major agglomerations: Greater Mumbai, Delhi, Kolkata, Chennai, Bangalore, Hyderabad, Ahmedabad. The number of 1 million plus cities grew from 9 in 1971 to 35 in 2001, and may rise shortly to 47 such cities (including our second-tier faster growing cities, such as Kanpur, Surat, Jaipur, and Lucknow). Below them are still smaller but bourgeoning towns. Satellite imagery of night-time lights shows the growing urban "hot-spots".

Urbanisation Lags....



Managing Land Markets : Land prices are climbing across India. Once conversion from agricultural to urban use is permitted---a difficult regulatory process---land prices can jump twenty-fold. The reason: land values reflect the capitalisation of future expected income stream in urban settings (than in farming). As land prices rise, they drive cost-push inflation. The answer does not lie in tightening land conversion regulations, but to

act counter-intuitively to: (1) improve land conversion processes; (2) sell publicly acquired lands in auctions; and (3) lean with markets and improve the supply of accessible land through better transport. Land is abundant (urban land area is only some 2% of total arable land); it is accessible land that is scarce.

Cities On the Brink : A recent rating on sanitation (19 indicators) by the Ministry of Urban Development reveals that 190 out of 423 municipalities in India are on the brink of environmental disaster (coded red)---many in the poorest states of UP and Bihar, but also Andhra Pradesh. Another 229 are judged in need of major improvement, many in the richest states. The sanitation standards in Gaya and Aligarh make up the median of India's 423 cities. Only 4 make it to safe levels, and none to the highest standard.

Institutions : Institutional reforms are urgent. Absent reform, it can undermine public trust: from master planning, to regulatory improvements, basic local services (water, sanitation, roads, public transport, safety, low-cost housing), and greater independence and accountability of locally elected city managers, as intended under the 74th Constitutional Amendment Act for urban local bodies. While the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) launched in 2005 is funding infrastructure projects in 65 cities (requirements include an urban plan, project report, and an MOU which commits to a set of reforms, including implementation of the 74th Amendment, community involvement, municipal reforms, and earmarking funds and lands for the poor), the project remains limited. Local capacity is also severely limited. Financial management and procurement systems are weak and PPPs to fund investments limited.

Financing Urban Investments : The scale of funding needs is enormous. A recent study estimated that some US$1.2 trillion would be required over two decades, and annually an average of about US$95 per capita, versus one-fifth that currently. An alternative estimate: some 7-8 percent of GDP annually, versus the 0.6 percent currently. Lessons from elsewhere, especially in East Asia, adapted to India's setting, could be useful. Possible elements:

- Urban Land Value Capture. Public land sales by transparent auctions are essential, instead of being captured by others. In China, while originally unregulated and non-transparent, a constitutional change in 1988 required all public land transactions (land use rights) to be auctioned under open, competitive bidding, similar to Singapore and Hong Kong, with proceeds flowing to the municipalities. Between 1990-2002, the speed and extent of such transactions is what permitted much of new urban landscape in China to emerge (from Guangdong to Shanghai). Mumbai auction of public lands (Bandra-Kurla) have raised large sums.
- Enforcement and Dispute Settlement: Improving Land Administration and Courts. Land administration needs to be improved. Specialized courts to handle contract disputes are needed to restrain opportunistic behavior by developers or local authorities.
- Public Redistributive Uses. Some part of land value has to be transparently provided to the community, especially low-cost public housing, which has long dominated successful East Asian urbanization; and improved connectivity in rural areas and communities, including rehabilitation and resettlement.
- Public Land, Densification, Land taxes, and user charges. Publicly owned land has to be fully listed, encroachments removed, and managed transparently---including regular sales to manage land markets. Similarly, eased floor-area-ratios can expand the supply of buildable space (density). Land taxes and user charges need to brought to economic levels.
- State governments to improve area planning and wider connectivity. Local municipalities should handle local needs. But larger urbanization strategy will need state government master plans for overlapping jurisdictions and area-wide planning, including new cities and transport corridors. Tamil Nadu, Andhra Pradesh and Gujarat are testing new ways.
- Increased Central government funding. JNNURM will need redesign, expansion and deepening, addressing much larger funding needs---for critical public needs, such as low-cost housing, urban transport, slum re-development, and water and sanitation. A programmatic transfer, rather than project-by-project sanctions, may be needed, benchmarked against front-loaded reforms and results.

Sources: (1) Isher Judge Ahluwalia and others, 2011. Urbanisation and Economic Growth in India, mimeo. (2) McKinsey Global Institute, April, 2010. India's Urban Awakening: Building Inclusive Cities, Sustaining Economic Growth. (3) IDFC, 2009. India Infrastructure Report-Land A Critical Resource for Infrastructure (4) Dowall David, and Paavo Monkkonen, 2008. Urban Development and Land Markets in Chennai, India. International Real Estate Review, Vol. 11 No. 2, pp 142-165

Vihar, and Vikarabad during 2010-11. These projects will contribute towards amelioration of basic services in these towns. Approved in 2009, the scheme is perceived as co-terminus with the Eleventh Five Year Plan, i.e. operational till 2012.

11.132 The North Eastern Region Urban Development Programme (NERUDP) was launched in November 2009 with ADB assistance. The project aims to assist the States of Tripura, Mizoram, Sikkim, Meghalaya, and Nagaland to address challenges of urban development in their capital cities. During 2010-11, the States worked on preparing projects related to water supply and solid waste management.

Urban transport

11.133 Urban transport is one of the key elements of urban infrastructure. As compared to private modes of transport, public transport is energy efficient and less polluting. The public transport system also helps improve urban-rural linkage and improves access of the rural/semi-urban population in the periphery to city centres for the purpose of labour supply without proliferation of slums within and around cities.

11.134 In this background, the major objective of urban transport initiatives is to provide efficient and affordable public transport. A National Urban Transport Policy (NUTP) was laid down in 2006, with the objectives of ensuring easily accessible, safe, affordable, quick, comfortable, reliable, and sustainable mobility for all.

11.135 In order to provide better transport, proposals for bus rapid transit system (BRTS) were approved for Ahmedabad, Bhopal, Indore, Jaipur, Pune, Rajkot, Surat, Vijayawada, and Vishakhapatnam cities under the JNNURM. During the current financial year, one more proposal for a BRTS in Kolkata has been approved under the JNNURM taking the number of cities supported for BRTS to 10, covering a total length of 452.20 km at a total estimated cost of ₹ 5203.79 crore. Admissible Central financial assistance out of this amount is about ₹ 2374.45 crore.

11.136 Purchase of 15,260 buses at a total cost of ₹ 4723.97 crore has been approved under the scheme, out of which ACA admissible is ₹ 2088.84 crore. Till December 2010, more than 10,000 modern intelligent transport system(ITS)-enabled, low floor and semi-low floor buses have been delivered to States/Cities.

Metro Rail Projects

11.137 In order to give proper legal cover to metro projects, the Metro Railways Amendment Act 2009 was brought into effect in September 2009, providing an umbrella 'statutory' safety cover for metro rail work in all the metro cities of India. The Act was extended to the National Capital Region, Bangalore, Mumbai, and Chennai metropolitan areas with effect from 16October 2009.

11.138 The Government of India had approved the implementation of the Bangalore Metro Rail Project of 42.3 km length by Bangalore Metro Rail Corporation Ltd. (BMRCL). The project commenced on 20 January 2007 and is targeted for completion by 31March 2013.The Government of India had approved implementation of the east-west metro corridor of 14.67 km length in Kolkata by Kolkata Metro Rail Corporation Ltd (KMRCL). The project is targeted for completion by 31January 2015.The Government of India had also approved the implementation of the Chennai Metro Rail Project of 46.5 km length by Chennai Metro Rail Ltd. (CMRL). The project is targeted for completion by 31March 2015.

11.139 In addition, metro rail projects have been taken up on PPP basis in Mumbai for Versova-Andheri-Ghatkopar (11.07 km), Charkop to Mankhurd via Bandra (31.87 KM) and Hyderabad Metro (71.16 KM) with viability gap funding (VGF) support from the Government of India.

FINANCING INFRASTRUCTURE

Debt financing

11.140 Net bank credit to infrastructure in 2009-10 defined as the difference between outstanding gross deployment of bank credit to infrastructure in March 2009 and March 2010, increased substantially in the current fiscal (Table 11.11). As compared to net bank credit increase of ₹ 64,322 crore during April-November 2009-10 there has been an increase of ₹ 1,02,301 crore during April-November 2010, showing 59 per cent rise.

11.141 The total FDI inflows during April-November 2010 have been low compared to the inflows during the same period in the previous year. FDI inflows into the petroleum and natural gas and air transport

Table 11.11 : Increment Flow of Bank Credit to Infrastructure

(₹ crore)

Period	Infra-structure (Total)	Power	Tele-com	Roads & Ports	Other Infra-structure
2006-07	30,286	12,994	1,164	5,352	10,776
2007-08	62,220	21,947	18,663	9,429	12,179
2008-09	64,636	29,372	12,044	12,584	10,658
2009-10	1,09,916	63,394	9,036	26,509	10,956
2009 (April-Nov.)	64,322	37,806	761	18,408	7,326
2010 (April-Nov.)	1,02,301	52,502	38,367	8,790	2,643

Source: RBI.

sectors have been comparatively higher during the current financial year. FDI inflows into the power, telecommunications, and information and broadcasting sectors have been comparatively lower during 2010-11 (Table 11.12)

Infrastructure development and PPPs

11.142 Given the enormity of the investment requirements and limited availability of public resources for investment in physical infrastructure, it is imperative to explore avenues for increasing investment in infrastructure through a combination of public investment, PPPs and, occasionally, exclusive private investment wherever feasible.

11.143 With the objective of stimulating and mobilizing increased private-sector investments, either from domestic sources or foreign avenues, the Government has offered various incentives for the infrastructure sector for sustained economic growth. These include: allowing 100 per cent FDI(under the automatic route) in all infrastructure sectors including the roads, power, ports, and airport sectors; 74 per cent in telecom services and 100 per cent in telephone equipment; 49 per cent to100 per cent for various services in the aviation sector; extended tax holiday periods up to ten-year tax holidays (under section 80-IA of the Income Tax Act 1961) to enterprises engaged in the business of development, operation, and maintenance of infrastructure facilities; and emphasis on PPP as one of the preferred modes for project implementation.

11.144 The Government of India is actively encouraging PPPs through several initiatives. The appraisal mechanism for PPP projects has been streamlined to ensure speed, eliminate delays, adopt international best practices, and have uniformity in appraisal mechanism and guidelines. The appraisal mechanism notified includes setting up of the Public Private Partnership Appraisal Committee (PPPAC) responsible for the appraisal of PPP projects in the Central sector. The Committee has mandated detailed guidelines for submitting proposals and follows a predetermined time frame for according approval to proposals submitted in a time-bound manner. Standardized bidding and contractual

Table 11.12 : FDI flows to infrastructure (US$ million)

Sector	2007-08	2008-09	2009-10	April-Nov.-2009	April-Nov.-2010
Power	968	984.8	1,437.3	1237.8	984.0
Non-conventional Energy	43.2	85.3	497.9	67.0	44.1
Petroleum & Natural gas	1426.8	412.3	272.1	218.7	529.4
Telecommunications	1261.5	2558.4	2554.0	2223.3	1092.8
Information & Broadcasting *	299.2	748.7	491.2	419.9	272.4
Air Transport **	99.1	35.2	22.6	15.7	115.6
Sea Transport	128.4	50.2	284.9	279.8	288.6
Ports	918.2	493.2	65.4	65.4	10.9
Railway-related Components	12.4	18	34.2	25.1	0.4
Total (of above)	**5156.8**	**5386.1**	**5659.6**	**4552.7**	**3338.2**

Source: Department of Industrial Policy & Promotion.

Notes: * Information & broadcasting including print media;

**** Air transport including air freight.Variation in data is due to reclassification of some sectors.**

documents have been notified. Further, project sponsors are encouraged to award projects through a transparent open competitive bidding process, which leads to greater transparency and consistency.

11.145 PPP projects that are economically essential but commercially unviable are provided financial assistance in the form of Viability Gap Funding(VGF) and long tenor loans through the India Infrastructure Finance Company (IIFC) Limited. IIFC (UK) Ltd., a subsidiary of the IIFCL at London, has been established with the objective of borrowing funds from the RBI and lending to Indian companies implementing infrastructure projects in India solely for meeting capital expenditure outside India. In order to ensure quality project development activities by the States and Central Ministries, the India Infrastructure Project Development Fund (IIPDF) supports up to 75 per cent of the project development expenses in the form of interest-free loans. The projects, sponsored by State Governments and municipalities represent various sectors where PPPs are increasingly being adopted, namely urban sector, health and education, civil aviation, and roads.

11.146 PPP cells have been established in twenty-four State Governments/UT Administrations and thirteen Central Infrastructure Ministries, which have become the central core to catalyse PPPs in an efficient and effective manner in their respective sectors/States. The Government is providing assistance in the form of professional assistance (PPP and MIS Experts) to the PPP cells of the selected States and Central Ministries. An online database on PPP projects in the country www.pppindiadatabase.com and the website www.pppinindia.com have been developed. The purpose of the website is to provide comprehensive and current information on the status and extent of PPP initiatives in India at the Central, State, and sectoral levels. A panel of transaction advisers for PPPs has been notified for use by the States and other entities who are undertaking PPP transactions.

11.147 The Department of Economic Affairs (DEA), in collaboration with the ADB initiated the PPP Pilot Projects Initiatives where the process of structuring of PPP projects is closely watched over by the Central Government to develop demonstrable PPP projects in challenging sectors. Sixty PPP projects in various States, municipalities, and Central Ministries have been identified and are being thus developed, encompassing sectors such as rural secondary education, elementary education, greenfield hospitals and diagnostic centres, water supply and sanitation, affordable housing, training centres, and rural infrastructure.

11.148 As part of a wide-ranging effort to create an enabling environment for PPPs, the DEA has developed the National PPP Capacity Building Programme, in collaboration with the World Bank and the German KfW. The strategy is essentially aimed at enhancing the capacities of public functionaries engaged in identification, conceptualizing, structuring, and management of the PPP project development cycle. It also enhances awareness of key decision makers regarding the critical issues and choices in a PPP context. The nation-wide programme comprises four building blocks, namely training needs assessment, curriculum development, training of trainers, and roll-out. The training needs assessment and curriculum development have been completed and the National PPP Capacity Building Programme has been launched by the Finance Minister on 22 December 2010. The Programme will be implemented through State Administrative Training Institutes (ATIs) and Central Training Institutes (CTIs). Two level of training would be imparted through the training institutes, namely PPP sensitization courses and specialized modules on managing PPPs. Sector-specific PPP toolkits covering four sectors (highways, ports, solid waste management, and urban transport) have been launched by the Finance Minister on 22 December 2010. Risk and contingent liability frameworks and communication strategy for greater advocacy of PPPs is being developed.

11.149 Many State Governments have institutionalized measures to encourage private-sector engagement in creation of infrastructure and delivery of services. Infrastructure Development and Enabling Acts have been developed by Andhra Pradesh, Bihar, Gujarat, and Punjab. PPP policies and guidelines to facilitate PPP projects have been notified by Karnataka, Haryana, Orissa, Assam, Goa, Madhya Pradesh, and West Bengal. Other measures include development of sectoral policies for promoting PPPs, establishing nodal departments/ PPP cells, establishing VGFs (to supplement the VGF provided by the Central Government), establishing Project Development Fund (to

Table 11.13 : State-wise and Sector-wise PPP Projects

State	Total Number of Projects	Up to ₹ 100 crore	Between ₹ 251 and 500 crore	More than ₹ 500 crore	Value of Contracts (₹ crore)
Andhra Pradesh	71	2691.2	5147.4	36,748.7	44,587.3
Bihar	6	77.55	769.58	1246.7	2093.83
Chandigarh	1	15	0	0	15
Chhattisgarh	4	374	464	0	838
Delhi	9	95	408.2	10,374	10,877.2
Goa	2	250	0	0	250
Gujarat	31	407.28	3360.9	18496.98	22265.16
Haryana	4	0	270	2043.05	2313.05
Jammu and Kashmir	3	0	0	6319.76	6319.76
Jharkhand	8	681	398	625.07	1704.07
Karnataka	102	2672.94	13,136.31	28,499.6	44,308.85
Kerala	16	226	615.5	16351.5	17193
Madhya Pradesh	36	2026.6	2694.95	2949	7670.55
Maharashtra	30	887.85	1099.84	31,213.59	33,201.28
Meghalaya	2	226.12	0	536	762.12
Orissa	20	235.1	500	9930.63	10665.73
Puducherry	2	0	419	2947.8	3366.8
Punjab	21	1174.98	572	705	2451.98
Rajasthan	52	1307.71	1100.81	4497.76	6906.28
Sikkim	24	733.59	2669	13,708	17,110.59
Tamil Nadu	43	623.48	8902.16	9100	18,625.64
Uttar Pradesh	8	0	1458.57	4103.21	5561.78
Uttarakhand	1	0	478	0	478
West Bengal	8	200	1214.4	3299.06	4713.46
Inter-State	14	355.45	2474.37	6738	9567.82
Total	518	15,260.85	48,152.99	21,0433.41	27,3847.25
Sector	**Total Number of Projects**	**Up to ₹ 100 crore**	**Between ₹ 251 and 500 crore**	**More than ₹ 500 crore**	**Value of Contracts (₹ crore)**
Airports	5	0	303	18808	19111
Education	1	93.32	0	0	93.32
Energy	24	733.59	2669	13,708	17,110.59
Health Care	2	217	0	0	217
Ports	47	866	4070.29	64,777.09	69,713.38
Railways	4	102.22	905	594.34	1601.56
Roads	324	8760.51	36,721.42	1,01,363.98	1,46,845.91
Tourism	30	1492.08	0	1050	2542.08
Urban Development	81	2996.13	3484.28	10132	16612.41
Total	**518**	**15,260.85**	**48,152.99**	**2,10,433.41**	**2,73,847.25**

Source: I&I Division, DEA, Ministry of Finance.

supplement GOI grant under IIPDF), establishing panels of transaction advisers, and developing standardized bid documents, sectoral templates, and handbooks on PPPs. Awareness of schemes, guidelines, initiatives, and resource materials prepared is being created through PPP websites of Central and State Governments. These measures have resulted in a robust pipeline of over 518 projects (at different stages, i.e. bidding, construction, and operational) in diverse sectors with an estimated project cost of over ₹ 2,73,847.25 crore. (Table 11.13).

Challenges And Outlook

11.150 The level of investment and capacity addition made in the key infrastructure sectors during the first three years of the Eleventh Plan vis a vis the financial and physical performance achieved in the Tenth Plan indicates an optimistic outlook for infrastructure sector as a whole. Yet, to accelerate the pace of infrastructure development further, certain challenges need to be overcome. The foremost is to make huge capacity addition in a time-bound manner while ensuring that projects embody value for money and investment results in world class infrastructure. Infrastructure should at the same time be affordable and sustainable.

11.151 The Planning Commission has carried out a preliminary assessment of the investment in infrastructure during the Twelfth Plan(2012-17). The projected investment requirement would be of the order of ₹ 40,99,240 crore(about US$1025 billion). It is projected that at least 50 per cent of this investment would have to come from the private sector against about the 36 per cent anticipated in the Eleventh Plan. The public-sector investment would have to increase from ₹ 13,11,293 crore in the Eleventh Plan to about ₹ 20,49,620 crore. Thus financing infrastructure would be a big challenge in the coming years and to meet the challenge some innovative ideas and new models of financing would be required. Channelling domestic and foreign financial savings of this scale into infrastructure requires a judicious mix of policy interventions which balances the growth and stability objectives. The Deepak Parikh Committee has recommended developing the domestic debt capital market, tapping the potential of the insurance sector, and enhancing the participation of banks, financial institutions, and large non-banking financial companies (NBFCs) specializing in infrastructure financing.

11.152 Apart from the need for substantial financial outlays for infrastructure, there are several non-financing constraints that need to be addressed to avoid time and cost overruns. Urgent action is called for in addressing the problems of (i) tendering of unviable projects; (ii) bad quality of engineering and planning at DPR stage; (iii) lack of standardized and sub-optimal contracts; (iii) land acquisition delays and slow approval processes, especially environmental and forest clearances; (iv) insufficient optimization of procurement costs (of PSUs); (v) weak performance management in nodal agencies and PSUs and; (vi) inadequate availability of skilled and semi-skilled manpower.

11.153 It is important that priority should also be accorded to the physical outcomes from infrastructure development in India. There is urgent need to streamline land acquisition and environment clearance for infrastructure projects. There is a strong case for bringing in parity between the compensation package admissible under the Land Acquisition Act 1894 and that applicable to land acquisition under the National Highways Act 1956 to enable faster acquisition. The price discovery issues could perhaps be circumvented by allowing private parties to bid for supply of the land involved. It is also important that the 80 per cent minimum norm for physical acquisition of land before tendering should be strictly enforced through suitable disincentives. In case of road expansion projects, there may also be a case for excluding the land which is part of the original lanes from being counted as part of the acquired land. A national forest land bank, with clear paperwork and titles, could significantly reduce the approval time for forest clearances.

11.154 To overcome execution issues during the construction/building stage, the best available talent/skilled manpower, for the planning process and at project document preparation stage, needs to be hired. Significant upfront investment in engineering and planning (for example project creation, contracting, tendering, project scheduling) is required. Cost overruns may also be mitigated by moving away from item rates to lump sum EPC contracts for large projects and creation of greater capacity for project management and monitoring through a multidisciplinary agency. Investment in building managerial and technical capabilities of executing agencies on a par with the private sector (for example procurement, DPR, and monitoring)

is crucial. A way forward would be to kick-start a construction-focused vocational training programme through a commercially viable PPP.

11.155 There is also need to reassess the existing criteria and priorities used for allocation of funds to different sectors, for example, taking into account the growing need for peaking power rather than the base load capacity in the power sector, greater focus on rail and water transport, more demand-side measures in water rather than making huge investments in water supply augmentation. All this will require a macro-level approach and greater inter-Ministerial coordination.