

# Energy, Infrastructure and Communications

## 9

### CHAPTER

*Physical infrastructure has a direct bearing on sustainability of growth and overall development. The economic miracle of the high-growth Asian economies was accompanied by substantial investments in infrastructure. Evidence also suggests that creation of infrastructure, through its direct and indirect effects, has a significant impact on poverty reduction. In the Indian context, though there has been some improvement in infrastructure development in transport, communication and energy sectors in recent years, there are still significant gaps that need to be bridged. The current economic slowdown provides an opportunity for countries like India that have a substantial degree of unmet infrastructure requirements. This is reinforced by the understanding that spending on infrastructure has large multiplier effects.*

9.2 Development of infrastructure would not only ameliorate the supply side bottlenecks to growth, but also provide the requisite demand side stimulus to growth. The rapid construction of highways facilitates human and material movement across the country. Apart from improving connectivity, the development of secondary and tertiary roads can open up hitherto unconnected regions to trade and investment and step up access to goods, services and employment opportunities. The role of civil aviation and shipping is central to furthering trade, external commercial opportunities, domestic business and industrial growth. The rapid growth in tele-connectivity and tele-density has

already ushered in a communication revolution, though there is still enormous scope for expansion. Against this background, this chapter reviews the current pace of development of infrastructure, energy and communications in India. The review of progress in physical infrastructure is combined with energy and communications in view of the close inter-linkages between these sectors.

#### OVERVIEW OF PERFORMANCE

9.3 The capacity creation in infrastructure sectors presented a mixed picture in 2008-09 (Table 9.1). While telecom and petroleum sectors

**Table 9.1 : Indicators of infrastructure capacity creation**

Item	2006-07	2007-08	2008-09
Power capacity addition (MW)	6853	9263	3454
Addition to refinery capacity- petroleum (MT)	7.34	11.72	29.00
Road length upgraded -NHAI - km.	636	1683	2203
Road works completed under PMGSY (km)	30710	41231	52405
RKMs electrified (railways)	361	502	797
Addition to port capacity (MTPA)		27.3	23.6
Addition to switch capacity- telecom (000 lines)	9602.7	7159.0	14392.6

Sources : 1. Ministry of Power, 2. Ministry of Petroleum and Natural Gas, 3. Ministry of Statistics and Programme Implementation, 4. Natinal Rural Roads Development Agency, 5. Ministry of Railways, 6. Department of Shipping.

have done well in 2008-09, when compared to the recent years, the power sector exhibited considerable shortfall.

9.4 The demand for infrastructure products and services is substantially a derived demand. As the economy slumped in activity, consequent to the commodity price and oil price shocks and then the global economic crisis, most infrastructure sectors too witnessed subdued growth in production/services during 2008-09 (Table 9.2). A comparison of the growth figures for H1 2008-09 with H2 2008-09 reveals that the production and services of most of the infrastructure sectors underwent a drastic slowdown in the second half of the year. The port and air cargo growth slowed down considerably, reflecting the sluggishness in import and export growth in the second half of 2008-09. The rail freight growth too slowed down, but to a lesser degree, because the coal sector, which accounts for a substantial chunk of the rail freight experienced robust production. Along with coal, the growth in tele-connectivity stood as exception amidst the general slowdown.

## Power

9.5 The growth in electricity generation by power utilities during 2008-09 at 2.7 per cent fell much short of the targeted 9.1 per cent. Despite the sharp decline in hydro and nuclear generation in 2008-09, the growth in total electricity generation was positive due to the 5 per cent plus growth in thermal generation (Table 9.3). It is further seen that, despite being quantitatively smaller, it is the visibly higher growth in power generation in the private sector compared to the Central and state sectors that pushed the growth in total generation close to 3 per cent.

**Table 9.3 : Power generation (\*) by utilities (billion kWh)**

	Sector	2007-08	2008-09	Growth (per cent)
Thermal	Central	240.36	245.96	2.3
	State	261.78	280.48	7.1
	Private	56.67	63.66	12.1
	<b>Total</b>	<b>558.82</b>	<b>590.10</b>	<b>5.6</b>
Hydro	Central	41.81	43.36	3.7
	State	76.27	64.50	-15.3
	Private	5.49	5.22	-4.8
	<b>Total</b>	<b>123.57</b>	<b>113.08</b>	<b>-8.4</b>
Nuclear	Central/			
	<b>Total</b>	<b>16.78</b>	<b>14.71</b>	<b>-12.3</b>
Bhutan IMP		5.90	11.8	
All-India	Central	298.95	304.03	1.7
	State	338.05	344.97	2.1
	Private	62.16	68.89	10.6
	<b>Total</b>	<b>704.45</b>	<b>723.80</b>	<b>2.7</b>

Source : Central Electricity Authority

\* Excludes generation from captive and non-conventional plants and thermal plants below 20 MW units and hydro plants below 2 MW.

9.6 The negative growth in power generation from hydro stations during 2008-09 was mainly due to less inflow into reservoirs, resulting from low rainfall during the monsoon. Generation of power from nuclear power stations also registered negative growth, mainly due to fuel supply constraints. Other reasons for the lower growth in power generation during the year 2008-09 included: shortage of coal and gas, shortfall in capacity addition, delay in achieving commercial operation/ commencement of full generation from some newly commissioned units due to non-completion of balance of plant works and

**Table 9.2 : Growth in infrastructure services/production (per cent)**

Item	2006-07	2007-08	H1 08-09*	H2 08-09*	2008-09*
Crude petroleum	5.6	0.4	-0.8	-2.9	-1.8
Petroleum refinery	12.6	6.5	4.5	1.5	3.0
Natural gas	-1.4	2.1	4.8	-1.6	1.4
Coal	5.9	6.0	7.9	8.3	8.1
Electricity generated	7.3	6.3	2.6	2.9	2.7
Railway freight	9.2	9.0	8.5	1.5	4.9
Port cargo	9.5	12.0	7.2	-3.3	2.1
Air export cargo	3.6	7.5	8.0	-1.8	3.4
Air import cargo	19.4	19.7	5.9	-16.6	-5.7
Air passenger traffic (inter)	12.1	11.9	7.2	0.8	3.8
Air passenger traffic (dom.)	34.0	20.6	-7.5	-16.5	-12.1
Cell phone connections-telecom	85.4	38.3			44.8

Source : Ministry of Statistics and Programme Implementation.

\* Figures are provisional.

initial stabilization problems in some of the new thermal units.

### Power deficit

9.7 All-India peak shortage declined in 2008-09 as compared to 2007-08, mainly due to the lower growth in peak demand (0.9 per cent) as compared to growth in peak demand met (6.6 per cent). In contrast, the energy shortage increased, because the growth in requirement (5.1 per cent) was greater than the availability (3.8 per cent) (Figure 9.1). While all regions experienced shortages, western and north-eastern regions experienced the maximum shortages.

### Power supply position

9.8 Plant load factor (PLF), a measure of efficiency, has shown a steady improvement over the years. However, the PLF of thermal power stations declined during 2008-09 mainly due to: loss of generation because of shortage of coal, constraints in supply of lignite from the Neyveli plants and delay in attaining commercial operation/ commencement of full generation from some newly commissioned

**Table 9.4 : Plants load factor of thermal power stations**

(Figures in per cent)

Category	2006-07	2007-08	2008-09*
State Electricity Boards	70.6	71.9	71.2
Central Sector	84.8	86.7	84.3
Private Sector	86.3	90.8	91
<b>REGIONS</b>			
Northern	79.6	81.4	81.8
Western	79.3	80.3	79.5
Southern	83.9	84.9	83.3
Eastern	68.3	69.6	64.7
North-Eastern	16.8	20.4	47.6
<b>All-India</b>	<b>76.8</b>	<b>78.6</b>	<b>77.2</b>

Source : Central Electricity Authority  
\* Provisional

units on account of delay in competition of balance of plant works (Table 9.4).

9.9 The power sector uses about 74 per cent of the country's coal production. Coal-fired thermal units account for 66 per cent of total power generation in the country. The dependence on imported coal went up from about 10.2 MT in 2007-08 to about 16.0 MT in 2008-09 (Table 9.5).

**Table 9.5 : Coal consumption and imports by power stations (MT)**

Year	Consumption	Imports
2005-06	281.3	10.4
2006-07	302.5	9.7
2007-08	329.6	10.2
2008-09	355.0	16.1

Source : Ministry of Power

9.10 Out of the total installed generating capacity in the country, about 10.0 per cent is based on gas or liquid fuel (excluding diesel). The supply of gas to power stations that use gas as the primary fuel remains inadequate (Table 9.6).

**Table 9.6 : Gas availability for power**

Year	Required at 90% PLF (MMSCMD)*	Shortfall (MMSCMD)	Generation Loss (BUs)**
2005-06	53.4	18.0	23.9
2006-07	61.2	26.1	26.3
2007-08	65.7	27.5	31.2
2008-09	66.6	29.2	33.7

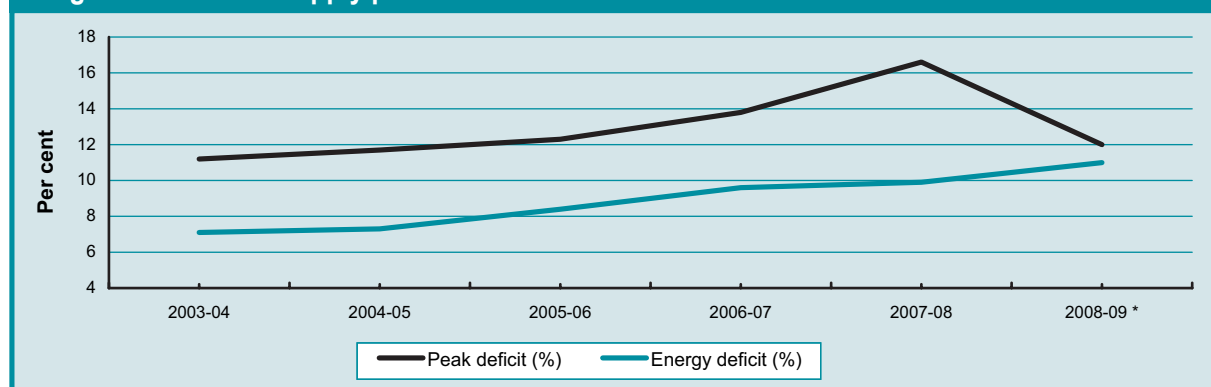
Source : Ministry of Power

\* Based on Normative gas requirements.

\*\* Generation loss due to shortage of gas estimated based on operation of power plant at 90 per cent PLF.

Note: BU – Billion units; MMSCMD – Million Metric Standard Cubic Meter Per Day

**Figure 9.1 : Power supply position**



**Table 9.7 : Capacity addition during the Eleventh Five Year Plan (MW)**

Status	Central	State	Private	Total
Plan target	36874	26783	15043	78700
Commissioned (as on 26.3.2009)	3990	7094	1383	12467
Under construction	29540	18269	19734	67543

Source : Ministry of Power

### Capacity addition

9.11 In keeping with the target set by the National Electricity Policy (NEP), 2005 to raise per capita availability from 704 units in 2007-08 to 1,000 units per annum by the end of 2012, a capacity addition of 78,700 MW has been set for the Eleventh Five Year Plan, of which 19.9 per cent is in the hydel sector, 75.8 per cent thermal and the rest nuclear.

9.12 A number of projects envisaged for the Eleventh Five Year Plan have made steady progress, with most of these are in a position to be commissioned well within the plan period. The status of placement of orders for the main plant (thermal projects) and main civil works (for hydro projects) is given as under (Table 9.7).

9.13 The target for 2007-08 was initially fixed at 16,335 MW which was subsequently reduced to 12,039 MW. Against this revised target, a capacity addition of 9,263 MW, comprising 2,423 MW hydro, 6,620 MW thermal and 220 MW nuclear was achieved during the year. A capacity addition target of 11,061 MW comprising of 9,304 MW thermal, 1,097 MW hydro and 660 MW nuclear was originally planned for 2008-09. On account of revision in definition of commissioning of thermal projects, the capacity addition target for the year 2008-09 has been revised as 7,530 MW comprising of 5,773 MW thermal, 1,097 MW hydro and 660 MW nuclear, against which a capacity of 3,454 MW has been added up to 31.03.2009 (Table 9.8). (As per the new definition, commissioning of the plant is "related to actual output in the form of generation that is emerging from plant for auxiliary consumption and input to the grid based on its designated fuel and completion of all plants and equipments required for fuel handling and safe operation of the plant.")

9.14 The main reasons for under achievement of capacity addition targets during 2007-08 and 2008-09 were delayed and non-sequential supply of material by suppliers, shortage of skilled manpower for construction and commissioning of the projects, contractual disputes between project authorities, contractors and their sub-vendors, delay in readiness

**Table 9.8 : Capacity addition during 2008-09 (MW)**

		Target*	Achievement	Achievement (per cent)
Thermal	Central	2910	750	25.8
	State	2957	852	28.8
	Pvt.	3437	883	25.7
	<b>Total</b>	<b>9304</b>	<b>2485</b>	<b>26.7</b>
Hydro	State	1097	969	88.3
	<b>Total</b>	<b>1097</b>	<b>969</b>	<b>88.3</b>
Nuclear	Central	660	Nil	Nil
	<b>Total</b>	<b>660</b>	<b>Nil</b>	<b>Nil</b>
All-India	Central	3570	750	21.0
	State	4054	1821	44.9
	Pvt.	3437	883	25.7
	<b>Total</b>	<b>11061</b>	<b>3454</b>	<b>31.2</b>

Source : Central Electricity Authority

\* Unrevised

of balance of plants (BOPs) by the executing agencies, shortage of fuel (gas and nuclear) and design problem in CFBC boiler (Giral Lignite TPP).

### Monitoring of capacity addition

9.15 The Ministry of Power has adopted a monitoring system of capacity addition with three broad levels: the Central Electricity Authority (CEA), Ministry of Power (MoP) and Power Project Monitoring Panel (PPMP). CEA and Ministry of Power hold quarterly review meetings with developers and other stakeholders.

### Ultra mega power projects

9.16 Under the coal-based Ultra Mega Power Projects (UMPPs), each with a capacity of 4,000 MW, nine sites were identified; one each in Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Andhra Pradesh, Gujarat, Karnataka, Maharashtra and Tamil Nadu. Development work is being undertaken in the Mundra Project awarded to the Tata Power company and the Sasan and Krishnapatnam UMPPs awarded to the Reliance

Power Ltd. Financial bids in respect of Tilaiya UMPP were opened on 28.01.2009 wherein the Reliance Power Ltd. at a levelized tariff of Rs. 1.770 per kWh has emerged the successful bidder. Letter of Intent (LOI) was issued on 12.02.2009.

### Development of hydro power

9.17 There are 40 hydro projects with an aggregate capacity of 13,085 MW under construction. The main reasons for the slow development include difficult and inaccessible potential sites, difficulties in land acquisition, rehabilitation, environmental and forest-related issues, inter-state issues, geological surprises and long gestation period. Private sector participation has been increasing; there are 11 schemes with an installed capacity of 4,111 MW under construction in private sector. 84 schemes with an installed capacity 22,383 MW have been allotted to private developers by states. Bulk of the potential which is in the Himalayan region is yet to be tapped. Out of the 162 projects for which preliminary feasibility reports were prepared under the 50,000 MW H.E. initiative, 77 schemes (33,951 MW) have been taken up for detailed survey & investigation and preparation of detailed project report/implementation. So far, DPRs for 18 schemes have been prepared.

9.18 Under the new hydro policy, the dispensation for project development allowed for PSUs would be available to the private sector for a period of five years. The affected families are expected to get a better relief and rehabilitation (R&R) package. For the developer, the risks associated with construction, operation and maintenance would be reduced and early financial closure would be facilitated. The task force, headed by the Minister of Power, shall resolve issues relating to allocation of sites, clearances, environment and wildlife issues, compensation to host states, land acquisition, rehabilitation and resettlement, sharing costs and benefits of power generation, water storage, navigation and flood moderation. A task force has been constituted for

developing the model contract documents for the hydro power projects.

### Merchant power plants

9.19 The concept of merchant sale of power is part of the new "Hydel Policy 2008". To enable the project developer to recover costs incurred in obtaining the project site, he would be allowed a special incentive by way of merchant sales up to a maximum of 40 per cent of the saleable energy. In case of thermal plant, merchant sale up to 15 per cent can be allowed.

## TRANSMISSION, TRADING, ACCESS AND EXCHANGE

### National Grid

9.20 An integrated power transmission grid helps to even out supply-demand mismatches. The existing Inter-regional transmission capacity of about 20,750 MW connects northern, western, eastern and north-eastern regions in a synchronous mode operating at the same frequency and the southern region asynchronously. This has enabled inter-regional energy exchanges of about 46,000 million units (2008-09), thus contributing to greater utilization of generation capacity and an improved power supply position. Proposals are underway to have synchronous integration of southern region with the rest.

### Trading of electricity

9.21 Power trading helps in resource optimization by facilitating the disposal of surplus power with distribution utilities and in meeting the short-term peak demand. The Central and State Electricity Regulatory Commissions have powers to grant inter-state and intra-state trading licences, respectively. CERC has so far granted 43 inter-state trading licences, of which 41 are in existence as on 31.03.2009. Traders are categorized on the basis of volume of electricity to be traded and the net worth of the trader (Table 9.9 and Box 9.1).

**Table 9.9 : Electricity trading**

Period	Volume of electricity traded (MUs)	Weighted average purchase price (Rs./kWh)	Weighted average sale price (Rs./kWh)	Trading margin (Rs./kWh)
2005-06	14,188.8	3.14	3.29	0.09
2006-07	15,022.7	4.47	4.51	0.04
2007-08	20,964.8	4.48	4.52	0.04
2008-09	21916.9	7.25	7.29	0.04



**Box 9.1 : Inter-state trading Regulations, 2009**

The Central Electricity Regulatory Commission (CERC) issued new Inter-state Trading Regulations in February 2009. The aim was to tighten the terms and conditions for grant of trading licence keeping in view the current price of the trading power and the liquidity requirements of the power trading business and to encourage only the serious players. The important features of the new regulations include:

- Definition of inter-state trading has been revised to explicitly include electricity imported for resale.
- Number of categories of licensees has been reduced from 6 to 3.
- Net worth requirement has been increased to the range of Rs. 5 crore to Rs. 50 crore keeping the prevalent prices of traded power in view.
- Net worth definition has been revised to discount the loans and advances given to the associates.
- New conditions of liquidity i.e. current ratio and liquidity ratio have been introduced to adjudge the credit-worthiness of the applicant.
- Technical qualifications of the full time professionals have been specified.
- Definition of associate has been rationalized.
- A provision has been made that licensee shall not purchase electricity from the entities which are defaulting in payment of UI charges, transmission charges, charges of NLDC/RLDC/ ULDC, if so directed by CERC. These regulations are also applicable to the existing licensees. They are required to comply with the new net worth requirement and liquidity requirement by March 31, 2010.

**Operationalization of open access**

9.22 Open access is an important framework seeking to promote competition. The regulations on open access in inter-state transmission together with the regulations on inter-state trading are issued by the Central Electricity Regulatory Commission (CERC). The responsibility for the introduction of open access at the distribution level rests with the State Electricity Regulatory Commissions (SERCs) (Box 9.2). Open access in inter-state transmission is fully operational. The open access transactions at inter-state transmission have increased from 778 in 2004-05 to 5,933 in 2006-07. The number was 9,560 in 2007-08 and 9,347 in 2008-09 (up to December 2008). Status of applications received for open access in distribution is at table 9.10. The open

access charges are widely different across States (Figure 9.2).

**Power exchange**

9.23 CERC has issued guidelines for setting up power exchange. It has also given approval to two (2) applications for setting up power exchange. The two power exchanges, viz. the Indian Energy Exchange Ltd (IEX)., New Delhi and the Power Exchange India Ltd.(PXIL), Mumbai have already started their operations from June 27, 2008 and October 22, 2008 respectively (Table 9.11).

**Guidelines for procurement of electricity**

9.24 The Central Government has issued guidelines for procurement of power by Distribution Licensees through competitive bidding and Standard

**Table 9.10 : Status of applications received for open access in distribution (31-3-2009)**

States	Received		Approved		Implemented	
	No.	MW.	No.	MW.	No.	MW.
Andhra Pradesh	9	130.5	2	44	2	44
Chhattisgarh	14	332.8	6	66	5	53
Gujarat	15	871.4	15	871.4	15	871.4
Madhya Pradesh	29	59.6	29	59.6	29	59.6
Maharashtra	46	13170.5	41	13122.5	5	88
Rajasthan	30	271.1	12	165.3	12	165.3
Tamil Nadu	12	1764	0	0	0	0
Other States (*)	19	874.2	11	133.9	8	113
<b>Total</b>	<b>174</b>	<b>17474.1</b>	<b>116</b>	<b>14462.7</b>	<b>76</b>	<b>1394.3</b>

Source: Forum of Regulators

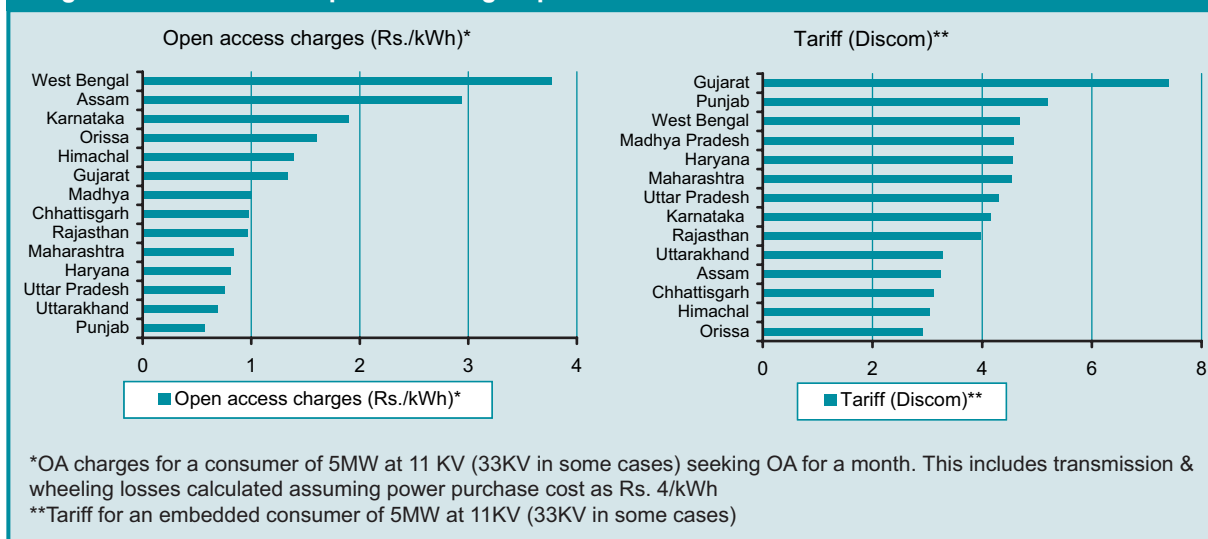
(\*): Other states include Haryana, Himachal Pradesh, Jharkhand, Kerala, Orissa, Punjab, Uttar Pradesh and West Bengal.

MW=megawatt

### Box 9.2 : Recommendations of the task force on open access (Extracts)

- Central and states' ERCs should be advised to comply with the statutory requirements relating to open access State Governments and state ERCs should enable operationalizing open access.
- SERCs should specify temporary connection charges to be charged by the Discom for standby supply.
- States ERCs should provide open access to all consumers of 1 MW and above within five years from the coming into effect of the amendment of the Act in January 2004.
- The tariff for distribution companies should specify energy charges and wheeling charges separately.
- Transmission and trading should be segregated by all states.
- States should be advised to set up SLDCs as independent entities with financial and operational autonomy.
- SERCs should ensure enabling arrangements such as standby supplies at affordable prices, metering and settlement.
- IPPs, captive and small generators should be allowed to bring power to the market in grant of open access.
- Regulators should meet bulk consumers and stakeholders to address their concerns.
- The supplies from the unallocated Central quota of CPSUs should not be permitted to be sold by a recipient state and/or its utilities outside the recipient state at prices exceeding the regulated tariff and the permissible trading margin.
- 25 per cent of the Centre's discretionary allocation of 15 per cent of CPSU generating capacity may be made available for direct sale by CPSUs to open access consumers. For new capacity of CPSUs, 50 per cent of the unallocated quota may be reserved for sale to open access consumers.

### Figure 9.2 : Net cost of power through open access



### Table 9.11 : Volume and price of electricity transacted by power exchanges

		Aug. 2008	Sept. 2008	Oct. 2008	Nov. 2009	Dec. 2008	Jan. 2009	Feb. 2009	Mar. 2009
Volume (MUs)	IEX	239.81	278.54	375.19	450.65	354.10	291.70	180.80	377.17
	PXIL			2.12	19.40	14.90	24.73	36.77	51.44
Price (Rs./ unit)	IEX	7.61	7.95	8.32	7.47	6.64	6.16	6.85	8.33
	PXIL			7.57	7.22	6.58	6.86	7.42	8.54

Bidding Documents (SBDs) for long-term procurement of power from Case-2 projects having specified site and SBDs for long-term procurement from Case-1 projects, where the location, technology

or fuel is not specified. The guidelines for procurement of power by Distribution Licensees through competitive bidding were amended before issuing SBDs for Case-1.

## REFORMS IN DISTRIBUTION

9.25 Some of the major initiatives in helping utilities to improve efficiency and commercial viability included establishment of regulatory mechanism at the Central and state level, restructuring of the state power utilities, metering of feeders & consumers, energy accounting & auditing and securitization of outstanding dues of CPSUs. The Ministry of Power signed the MoUs with the states to undertake time-bound distribution reforms. 28 states have constituted independent regulatory commissions and 23 SERCs have issued tariff orders for rationalizing tariffs. States are moving towards Multi-Year Tariff (MYT), Time of Day (ToD) metering and intra-state Availability Based Tariff (ABT). 16 SEBs/Electricity Departments have been unbundled and corporatized, and 23 SERCs have issued open access regulations. Consumer Grievances Redressal Forums and Ombudsmen have been constituted/appointed in 22 states.

### AT&C losses and restructured APDRP

9.26 The Accelerated Power Development Reforms Programme (APDRP) was launched in 2002-03 as additional central assistance to states for strengthening and upgrading sub-transmission and distribution systems of high-density load centres, in order to reduce AT&C loss and commercial loss and to improve quality and reliability of supply. So far, Rs. 7,646.35 crore has been released to the states under the investment component and another Rs. 2,879.73 crore for cash loss reduction under the incentive component. The Power Finance Corporation indicated that the aggregate technical and commercial (AT&C) losses of the state power utilities

at the national level for 2004-05, 2005-06 and 2006-07 were 34.82 per cent, 35.18 per cent and 33.07 per cent respectively of the total energy available for sale. Although at the national level the AT&C losses have not shown much improvement, the losses have come down in towns where APDRP has been implemented (Box 9.3).

9.27 The Chief Ministers' Conference, held on May 28, 2007, resolved to reduce AT&C losses to at least 15 per cent through the next five years in the APDRP project areas. Further, State Governments must ensure upfront payment to the utilities for free or subsidized provision of power. It was decided to continue APDRP during the Eleventh Five Year Plan, with revised terms and conditions, as a Central Sector Scheme, with a size of Rs. 51,577 crore, focused on actual, demonstrable outcomes in loss reduction. Towns and cities with a population of more than 30,000 (10,000 in case of special category states) and certain high-load density rural areas would be covered under the scheme. Projects under the scheme would be taken up in two parts. Part A would include projects for baseline data construction and IT applications for energy accounting / auditing and consumer service centres. Part B shall include regular distribution strengthening projects.

9.28 Expected investment in Part A is Rs. 10,000 crore and that in Part B is Rs. 40,000 crore. Initially, funds for the projects under both the parts will be provided through loan which will be converted into grant on specified conversion conditionalities relating to achievement of project targets about baseline data (Part A) and reduction of AT&C losses (Part B). Restructured APDRP will also cover an enabling component for the implementation of APDRP (Part

### Box 9.3 : Recommendations of the working group on AT&C loss reduction (Extracts)

Considering the need to evolve uniformity in approach for loss reduction, the Forum of Regulators constituted a Working Group which, inter alia, recommended the following:

- Transmission losses should not be clubbed with distribution losses. It is essential that losses should be segregated into technical and non-technical (commercial) losses.
- The third party verification of technical and financial data of the utilities may be done.
- SERCs should pay attention to estimation of energy supplied to un-metered agricultural consumers.
- The trajectory for loss reduction should keep in view the actual loss levels, past capital expenditure made for improving network and future capital expenditure plans.
- Payback period and life cycle cost analysis should be carried out for selecting the appropriate technological intervention aimed at reducing technical losses.
- Feeder for agriculture supply should be segregated, where the supply to agriculture is substantial.
- Under-achievement of the loss reduction target should be borne by the licensee and SERCs may encourage suitable local area based incentive and disincentive schemes for the staff of the utilities linked to reduction in losses.



C) and facilitating reforms in the power sector and a separate component to provide incentive for utility staff (Part D) in towns where AT&C loss levels are brought below the base line levels (Box 9.3).

9.29 The Power Finance Corporation Ltd. (PFC) is the nodal agency for operationalizing the programme. The steering committee, constituted to implement the programme, has approved 599 projects at the cost of Rs. 1,947.70 crore under Part 'A' of R-APDRP.

### Rural electrification

9.30 Under the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), which is continued during the Eleventh Five Year Plan, 59,882 villages have been electrified and connections to 53.78 lakh BPL households have been released (up to 31.3.2009). 327 projects have been sanctioned for implementation in Phase-I of Eleventh Five Year Plan period at a sanctioned cost of Rs. 16,254.12 crore for electrification of 49,704 un-electrified villages and release of electricity connections to 161.76 lakh BPL households. 280 projects have been awarded till 31.3.2009. Besides 327 projects, ongoing 235 projects of Tenth Five Year Plan are also being

executed during Phase 2 of the Eleventh Five Year Plan. Franchisees are in place in 97,211 villages in 16 states.

### Energy conservation and efficiency

9.31 The Bureau of Energy Efficiency (BEE) has taken initiatives to promote energy efficiency, targeting reduction in demand of 5 per cent during the Eleventh Five Year Plan (Table 9.12).

9.32 To create awareness, painting competitions are held every year for students of Class 4 and 5. The National Action Plan on Climate Change has decided to launch a national mission for enhanced energy efficiency for achieving growth with ecological sustainability by devising efficient and cost-effective strategies for end-use Demand Side Management through innovative service delivery and promotion of market based implementation at an accelerated pace.

### PETROLEUM AND GAS

9.33 The petroleum sector has been shaken by the wild swings in international oil prices during 2008-09. The production of crude and products witnessed slack growth in 2008-09, compared to the previous

**Table 9.12 : Conservation initiatives**

Initiative	Components	Achievements/developments
<b>Bachat Lamp Yojna</b>	Provides high quality compact fluorescent lamps to consumers at rate comparable to that of incandescent bulbs	The scheme was recently approved by the CDM Executive Board of the UNFCCC and implementation has just begun
<b>Standards &amp; Labeling Scheme</b>	Lays down minimum energy performance standards for high energy equipment and appliances.	Avoided capacity generation of 828 MW.
<b>Energy Conservation, Building Code and existing buildings</b>	Sets performance standards for new commercial buildings with connected load of more than 500 KW or 600 KVA of electricity consumption	Avoided 7 MW capacity addition.
<b>Demand Side Management</b>	DSM in agriculture & municipalities	Approval for implementing the scheme was received in 2008-09.
<b>Strengthening state designated agencies (SDAs)</b>	Financial assistance to SDAs for strengthening institutional capacities	Avoided capacity addition of 793 MW
<b>National Energy Conservation Awards</b>	For specified sectors large, medium and small industries. For SDAs and municipalities from 2008	Avoided capacity addition of 475 MW
<b>Energy efficiency in enterprises</b>	For small and medium enterprises	Approval for implementing the scheme has been obtained.

Source : Ministry of Power.

Table 9.13 : Petroleum industry production				
	Item	Unit	2007-08 <sup>a</sup>	2008-09
Reserves (balance recoverable) <sup>b</sup>	(i) Crude oil	MT	725	770
	(ii) Natural gas	BCM	1055	1090
Production	(i) Crude oil	MT	34.12	33.51
	(ii) Petroleum products <sup>c</sup>	MT	146.99	152.68
Consumption	(i) Crude oil <sup>d</sup>	MT	156.1	160.77
	(ii) Petroleum products	MT	128.95	124.17
Refinery Installed Capacity		MT	148.97	148.97
Refinery Production (Throughput)	(i) Public sector	MT	112.54	112.22
	(ii) Private sector	MT	43.56	48.55
<b>Total</b>		<b>MT</b>	<b>156.1</b>	<b>160.77</b>
Natural Gas	(i) Gross production	BCM	32.402	32.85
	(ii) Utilization	BCM	31.478	31.77
Exploratory drilling	(i) Wells	No.	106	121
	(ii) Metreage	000' No.	293	342
Wells & Metreage drilled	(i) Wells	No.	359	355
	(ii) Metreage	000' No.	872	871

Source: Ministry of Petroleum & Natural Gas

a= Provisional

b= As on April 1st of the initial year

c= Includes LPG production from Natural Gas

d= Refinery crude throughput;

MT= Million Tonne

BCM= Billion Cubic Metre

year. The 3 per cent growth in refinery production in 2008-09 was mainly on account of the impressive growth of private sector production. While the production of crude oil declined in 2008-09, its consumption increased. In contrast, the production of petroleum products increased by 3.9 per cent in 2008-09, while its consumption declined. The growth in diesel consumption which stood at 6.7 per cent in 2006-07, rose to 11.1 per cent in 2007-08 and then declined to 8.4 per cent in 2008-09, year-on-year. Major reasons for the slowdown in growth included industrial slowdown, business slowdown in sectors like automobiles, transporters strike in January 2009, etc. With the commissioning of Reliance Petroleum Ltd. (SEZ) Refinery in Gujarat in December 2008, the total installed capacity of India refineries increased from 148.97 MMTPA to 177.97 MMTPA by the end of 2008-09 (Table 9.13).

### Progress under new exploration licensing policy

9.34 Since operationalizing the NELP in 1999, in seven rounds of NELP, 203 Production Sharing Contract (PSC) have been signed, thereby increasing the area under exploration more than four times. In the recently concluded NELP-VII, 181 bids were received from 95 companies including 21 foreign companies. Under NELP, 68 oil and gas discoveries have been made by private/joint venture (JV) companies in 19 blocks, which have added more than 600 MMT of oil equivalent hydrocarbon reserves. As on April 1, 2009, investment commitment under NELP is about US\$ 10 billion on exploration, against which actual expenditure so far under NELP is about US\$ 4.7 billion. In addition, US\$ 5.2 billion investment has been made on development of discoveries (Table 9.14).

Table 9.14 : Progress under new exploration license policy							
Parameter	NELP I	NELP II	NELP III	NELP IV	NELP V	NELP VI	NELP VII
No. of blocks awarded	25	23	23	21	20	52	44
No. of PSCs signed	24	23	23	20	20	52	41
Signed in	2000	2001	2003	2004	2005	2007	2008
Area awarded (sq. km)	1,94,735	2,63,050	2,04,588	1,92,810	1,15,180	3,06,200	1,21,000

Source : Ministry of Petroleum & Natural Gas

### Coal-bed methane policy

9.35 Under the first three rounds of the CBM policy, 26 CBM exploration blocks are under operation and 6 TCF reserves have already been established in 4 CBM blocks. First commercial production of CBM commenced from July 2007. Preparation for launch of CBM IV is in progress.

### National gas hydrate programme

9.36 In tune with the road map for NGHP, India has acquired core samples with the help of the drill ship "JOIDES Resolution". In December 2008, an MoU was signed between the Directorate General of Hydrocarbons and the U.S. Geological Survey for exchange of scientific knowledge and technical personnel to exploit the potential of the gas hydrate as an alternate source of energy.

### Acquisition of oil and gas assets abroad

9.37 In view of the demand-supply gap in hydrocarbons, national oil companies are encouraged to pursue equity oil and gas opportunities overseas. Oil & Natural Gas Corporation Videsh Limited (OVL) produced about 8.78 million metric tonnes of oil and equivalent gas during the year 2008-09 from its assets abroad in Sudan, Vietnam, Russia, Syria and Colombia. In 2008, OVL acquired two oil blocks each in Brazil and Colombia. The largest ever acquisition of a foreign company, Imperial Energy Plc., U K (IEC) by an Indian public sector company, ONGC-Videsh Ltd. took place in 2008. Besides, IEC-OVL-IOC alliance, BPCL along with Videocon, too have acquired oil assets abroad.

### Oil prices

9.38 International prices of crude oil and petroleum products remained volatile in the recent

past. The Indian basket of crude oil, which averaged US\$ 79.25/bbl during 2007-08, went up to US\$ 142.04 per barrel on July 3, 2008 and then slumped steeply to US\$ 35.83 per barrel on December 24, 2008, before recovering to US\$ 46.02 per barrel in March 2009. The average for the year 2008-09 stood at US\$ 83.57 per barrel. The benefit of softening international oil prices has been partly offset by the depreciation of the rupee. Despite India importing over 75 per cent of its crude oil requirement, final energy consumers have not been made to bear the brunt of oscillating oil prices, as the major part of elevated international oil prices during the first half of 2008-09 was shared by the Government, upstream oil companies and oil marketing companies (OMCs). Following the sharp rise in international oil prices up to May 2008, the prices of petrol, diesel and domestic LPG were increased in June 2008 by Rs. 5/litre, Rs. 3/litre and Rs. 50/cylinder at Delhi with corresponding increase in rest of the country. Following the softening of international crude prices, the domestic prices were reduced in two phases in December 2008 and January 2009 by Rs. 10.00 per litre for petrol, Rs. 4.00 per litre for diesel and Rs. 25.00 per cylinder for domestic LPG (14.2 kg weight).

### Under-recoveries

9.39 The OMCs pay trade/import parity price to refineries when they buy products. The difference between the required prices based on trade parity / import parity and the regulated actual selling price realized (excluding taxes, dealer commission) resulted in the under-recoveries in oil companies, the burden of which have been shared by the Government (oil bonds), upstream oil companies (offer of discount on crude oil sold to the oil marketing companies) and OMCs themselves (Table 9.15).

**Table 9.15 : Under-recoveries and its financing**

	(Rs. crore)			
	2005-06	2006-07	2007-08	2008-09
PDS Kerosene	14,384	17,883	19,102	28225
Domestic LPG	10,246	10,701	15,523	17600
Petrol	2,723	2,027	7,332	5181
Diesel	12,647	18,776	35,166	52286
Total Under-Recovery	40,000	49,387	77,123	103292
Burden Sharing (percentage)				
Oil Bonds	28.8	48.8	45.8	59.04
Upstream assistance	35.0	41.5	33.3	30.98
Balance borne by OMCs.	36.3	9.6	20.9	Nil

Source : Ministry of Petroleum & Natural Gas

**Box 9.4 : Developments in the petroleum and natural gas sector - 2008-09**

- Under NELP-VII, the award of 44 blocks has been approved.
- First crude oil production from MA field in deepwater block D6 in Krishna- Godavari Basin started in September 2008 with initial production of about 5,000 barrels per day by the Reliance Industries Limited and the NIKO Resources Limited.
- Natural gas development project for development of gas discoveries D1& D3 in block D6 of KG Basin is being undertaken by the Reliance Industries Limited (RIL) and NIKO Resources Limited. The first gas production from this block is expected during 2009.
- Government has conveyed “in principle” approval to the Public Sector Oil Marketing Companies for introducing composite cylinders for marketing domestic LPG, subject to there being no subsidy.
- OMCs have started the service of using Unique Toll Free telephone Numbers for public grievances redressal.

**Efforts towards energy conservation**

9.40 Petroleum Conservation Research Association (PCRA) is mandated to spread the awareness on energy conservation through field activities like energy audit, fuel oil diagnostics, service to small-scale industries, institutional training, seminars, exhibitions and workshops. PCRA has carried out technical/R&D interventions aimed at reducing energy intensity in small and medium enterprises (Box 9.4). PCRA has also taken up a Media Campaign “Save Fuel yanni Save Money”. Based on the PCRA experience, a book titled “Practical Guide to Energy Conservation” was prepared. Besides, chapters related to energy conservation have also been included in NCERT books.

9.41 In order to contain adulteration and diversion of PDS kerosene, over 62 per cent of retail outlets selling more than 200 KLs per month have been automated and 87 per cent of tank-trucks fitted with Global Positioning System at the end of October 2008. Marker system has facilitated detection of adulteration of fuels by the Oil Marketing Companies. Marketing of non-PDS kerosene in one litre bottles, piloted in two districts of Haryana, has been expanded to cover five districts in Haryana.

9.42 As a result of economic meltdown and the financial/credit crisis, oil prices have slumped. International agencies project world oil demand to fall in 2009. The product prices have fallen faster than crude prices resulting in drop in refining margins.

**COAL**

9.43 Raw coal production during 2008-09 is provisionally estimated at 493.20 million tonnes (MTs) as against 457.08 MTs during 2007-08, registering a growth rate of 7.90 per cent. The coking coal production during April-February 2009 was 29.76 MTs as against 29.70 MTs (RE) in the corresponding

period last year. The growth rate of raw coal production was around 6 per cent during the period from 2003-04 to 2007-08 which was increased to about 8 per cent during 2008-09. This increase was due to enhanced production by all stakeholders especially captive blocks and large public sector undertakings (PSUs) like Coal India Limited (CIL) and SCCL. There was no change in prices of coal in 2008-09. The import of coal has been increasing over the years. It is expected to be 60 MTs in 2008-09, compared to about 20 MTs till 2003-04. While the import of coking coal has increased from 12.99 MTs in 2003-04 to 27.00 MTs, the import of non-coking coal increased significantly from 8.69 MTs to as high as 33 MTs during the period which is primarily to meet the increasing demand of the power sector.

9.44 During the Tenth Five Year Plan, CIL identified 91 mining projects, of which 86 projects with a total capacity of 207.01 MTs per annum were approved. During the Eleventh Five Year Plan period, 125 projects with a total capacity of 298.18 MTs per annum have been identified. Of this, 40 projects with a total capacity of 112.37 MTs have already been approved. SCCL plans to open six underground mines and 14 open cast mines during the Eleventh Five Year Plan.

9.45 Besides, for securing metallurgical coal supplies overseas, CIL is pursuing two alternative routes viz. participation in Joint Venture of PSUs for formation of a Special Purpose Vehicle (SPV) to secure coal resources abroad and acquisition of coal mines/blocks.

9.46 Under e-auction of coal sale, initiated in 2007-08, CIL offered 13.06 MTs in 2008-09 against which the allocation was 5.32 MTs, while SCCL sold 2.99 MTs under e-auction. While CIL secured a 43 per cent increase over the notified price under e-auction while SCCL secured 100 per cent increase over the notified price in 2008-09.



9.47 To improve quality of coal and to upgrade technology in mines, CIL and SCCL have initiated many steps for additional capacity for beneficiation of non-coking coal and supply of quality coal as per buyers' choice. CIL's initiatives include; identification of seven high capacity underground mines for development with latest technology, restart of mining in eight abandoned mines forming joint ventures with reputed mining companies, introduction of Continuous Mines as Mass Production Technology, PSLW in more mines, introduction of high wall mining and upgradation of equipment size.

9.48 As on March 31, 2009, 201 coal blocks with geographical reserves of coal of 45.89 billion tonnes (BTs) have been allocated to eligible companies. Of the 201 blocks, 3 blocks have been de-allocated and mining lease of one block has been declared void. Out of remaining 197 blocks, 97 blocks with reserves of 27.59 BTs have been allocated to PSUs. Out of the 100 blocks allocated to private companies with geographical reserves of 17.93 BTs, production has commenced in 23 blocks. During April-February 2008-09, the production from these coal blocks was 27.82 MTs.

9.49 CIL was conferred Navratna status in October 2008 on the condition that the company

will be listed within three years. Five subsidiaries of CIL — Mahandadi Coalfields Limited, Northern Coalfields Limited, South Eastern Coalfields Limited, Western Coalfields Limited and Central Coalfields Limited — have been granted Mini Ratna (category-I) status.

9.50 In pursuance of the recommendations of the Energy Coordination Committee, the Administrative Staff College of India (ASCI), Hyderabad was appointed as a consultant for preparing a report on the appointment of a Coal Regulator.

## RAILWAYS

9.51 The Indian Railways is the world's third largest rail network under a single management. Better resource management through increased wagon load, faster turnaround time and a more rational pricing policy has led to a perceptible improvement in the performance of the Railways. Out of the freight and passenger traffic, the freight segment accounts for about 70 per cent of revenues. Within the freight segment, bulk traffic accounts for nearly 84 per cent of revenue earning freight traffic (in physical terms), of which about 43 per cent is coal (Table 9.16).

**Table 9.16 : Performance of the Indian Railways**

Particulars	Change (per cent)			
	2007-08*	2008-09*	2007-08	2008-09 d
<b>1. Revenue earning freight traffic (million tonnes)</b>	<b>793.9</b>	<b>832.1</b>	<b>9.0</b>	<b>4.9</b>
Coal	336.9	369.4	7.5	9.7
Raw materials for S.P. (excl. iron ore)	11.1	10.9	—	(-) 2.6
Pig iron & finished steel	25.8	27.1	—	5.3
Iron ore for export	136.7	130.5	—	-4.6
Cement	79.0	86.0	8.0	8.8
Food grains	38.2	34.1	-8.7	-10.7
Fertilizers	35.9	41.2	4.6	15.1
POL	35.9	38.8	1.9	8.0
Container Service	21.1	28.9	—	36.4
Balance (other goods)	73.3	65.2	—	-11.0
2. Net tonne kilometres (billion)	521.3	538.2	8.4	3.2
3. Net tonne kms./wagon/day (BG)	3539 a	8472 c	9.3	—
4. Passenger traffic orig. (million) (d)	6524 b	6971 b	5.0	6.9
5. Passenger kilometres (billion)	770 b	778 b	10.8	—

Source : Ministry of Railways:

a) Upto March in terms of 4-wheelers,  
c) Calculated in terms of 8-wheelers,

b) April-February (estimated),  
d) Excludes Metro Kokatta.

\*Excludes 1.21 MT for 2007-08 and 1.12 MT for 2008-09 for Konkan Railway Loading. Figures of 2007-08 reflect the revised commodity group as modified from October 2007. As such, except for Coal, Pig Iron and finished steel from S.P., Cement, Foodgrains, Fertilizers and Mineral oil (POL), these are not comparable with the figures of previous years.



## Freight charges

9.52 Railways have rationalized the freight structure extensively to make it simple and transparent. Pursuing market responsive freight policies, the value-based freight rates have been changed to fixed ones. Under the new pricing strategy, surcharge is levied during peak season and discounts offered during lean season, but, peak and non-peak seasons have been fixed uniformly for all the commodities while many commodities have different peak and non-peak seasons. Therefore in 2008-09, Railways have decided to modify this policy as per the prevailing market conditions. In order that the difference between highest and lowest rates is not more than two times, freight rates for petrol and diesel were reduced by more than 17 per cent during the last three years.

## Passenger fares

9.53 There is no change in Second Class fares on Suburban sections. Second Class Fares upto Rs.50.00 per passenger on Non-suburban Mail/ Express including Superfast trains and Ordinary passengers have been reduced by Re.1. Second Class Fares beyond Rs.50.00 per passenger on Non-Suburban section of M/E & Passenger including Superfast trains have been reduced by 2%. Sleeper class fares beyond Rs.50.00 per passenger for Mail/ First Class, AC 2-tier, AC- 3-tier and AC Chair Car has been reduced by 2% for all distances. There is no change in the existing fares of First Class Mail/ Express and Ordinary trains.

## Upgradation of passenger amenities

### Station amenities

9.54 Out of the 594 stations identified for upgradation of passenger amenities through Model Station scheme, 325 stations have already been developed, while the rest are at various stages of progress. Under the plan to identify five stations in each Division to give a facelift on priority basis under the Touch & Feel Scheme, 637 stations have been identified and 395 stations have been completed. The works for upgradation of passenger amenities at B and D category stations are planned to be completed by March 2010. In order to accommodate longer trains carrying 24/26 coaches, platforms at more than 502 (out of 596) stations have also been completed during last three years.

## Train information

9.55 Real time train running information to passengers is proposed to be provided through online coach indication display boards and train arrival and departure display boards. The trial on one of the pilot project "Satellite Imaging for Rail Navigation (SIMRAN)" using the real time train tracking through GPS and mobile (GSM) technologies has been successfully completed by RDSO, Lucknow in coordination with the Indian Institute of Technology (IIT), Kanpur.

## Computerization of passenger and freight services

9.56 The computerized passenger reservation system of Indian Railways is the largest passenger reservation network in the world, with 1,721 locations and more than 6,800 terminals (end-2008-09). On an average, 3.82 crore passengers per month are being booked in PRS with average passenger earning of Rs.1,300 crore per month. Further, Railways has tied up with the India Post for operation of PRSs through Post Offices (Table 9.17).

**Table 9.17 : PRS facilities**

	Before 2006-07	2006- 07	2007- 08	2008- 09
Number of locations where PRS facilities were made available	1317	82	234	88

## Unreserved ticketing system

9.57 Computerized unreserved ticketing system (UTS), a project 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 from any station to any station in a defined "cluster.". Presently, UTS is available at 2,079 locations with about 5,320 counters. Automatic ticket vending machines have been installed at 375 locations.

## Freight operations information system

9.58 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 at divisions and zones.

FOIS Phase II (Terminal Management System– TMS) has been commissioned at 523 locations.

### Rail safety

9.59 With steps taken to ensure safety, the accidents per million train kilometre, an important index of rail safety, came down from 0.55 in 2001-02 to 0.20 in 2008-09. The number of consequential train accidents decreased from 194 in 2007-08 to 177 in 2008-09. Special Railway Safety Fund (SRSF), created in 2001-02 to wipe out the arrears in renewal and replacement of over-aged assets and for safety enhancement within six years, expended was Rs. 16,318 crore till 2007-08. Most of the intended works were completed by 2007-08. Adequate contribution is being made to the Depreciation Reserve Fund (DRF) for future asset renewals (Box 9.5).

### Investment in capacity

9.60 To meet the increasing traffic requirement, the production capacity at CLW was increased from 150 in 2006-07 to 200 locos per annum in 2007-08. Further, an order has been placed on BHEL in December 2007 for supply of 50 WAG-7 electric locos. To meet the increasing requirement of POH of electric locos, a Greenfield POH workshop with state-of-the-art facilities to undertake POH of 100 electric locos per annum is being constructed in Vadodara in Gujarat. The status of track electrification is as under (Table 9.18).

9.61 Dedicated Freight Corridor (DFC) involves an investment of more than Rs. 28,000 crore, comprising the Eastern Corridor from Ludhiana to Dankuni and Western Corridor from Mumbai to Dadri/ Tughlakabad (a total of 3,287 km). The project is planned to be implemented by an SPV called Dedicated Freight Corridor Corporation of India

**Table 9.18 : Status of Indian Railways electrification**

Period	RKMs electrified	Expenditure (Rs. crore)
2006-07	361	270.80
2007-08	502	488.97
2008-09	797	780.37

Source : Ministry of Railways

Limited and will be funded through internal generation, domestic/external borrowing as well as multilateral funding sources. Both corridors will be electrified. Logistic parks are also being planned along the DFC. The Government is also planning various industrial zones/nodes under the Delhi-Mumbai Industrial Corridor project along the Western Corridor.

9.62 Considering the need for developing Dedicated Freight Corridors on other important routes, feasibility studies on North-South (Delhi-Chennai), East-West (Mumbai-Kolkata), East Coast (Kharagpur-Vijayawada) and Southern (Chennai-Goa) have been conducted.

### Technology upgradation

9.63 RailTel was set up for creating OFC-based communication infrastructure for train operations and to generate revenue through commercial exploitation of surplus capacity. RailTel has set up an OFC network of 34,932 RKMs, of which 25,130 RKMs is of high bandwidth capacity. A PAN India MPLS network for providing connectivity to data and voice circuits have also been set up. Till date, 220 important and about 3,150 other stations have been put on OFC network. With this, the Indian Railways is now in a position to lease the surplus capacity on commercial terms.

### Box 9.5 : Achievements and new initiatives in signaling

- To increase efficiency and safety, modern signaling system with route relay / panel / electronic Interlocking along with multi aspect colour light signaling in replacement of over-aged mechanical / multi-cabin signaling system has been provided at 416 stations.
- Automatic block signaling (ABS) has been provided on 349 RKms to increase line capacity.
- Intermediate block signaling (IBS) has been provided on 87 block sections to increase line capacity, by splitting the longer block sections.
- Anti collision device (ACD) is operational as a pilot project on Katihar-Guwahati-Dibrugarh-Ledo section of the North Frontier Railway.
- Train protection and warning system (TPWS) has been provided on 50 RKMs in Chennai-Gummidipundi Section on the Southern Railway as an aid to drivers. This will prevent cases of "signal passing at danger" and overspeeding.
- 910 stations have been provided with highly durable LED signals to improve reliability and visibility of signals.
- Automatic clearance of block section has been provided at 492 sections through use of axle counter. This will reduce dependence on human element and enhance safety.

## Fuel consumption

9.64 Instructions have been issued to make all-out efforts to contain the consumption of diesel at last year's level with measures to improve fuel efficiency and reduce wastage. Besides, good practices like switching off locos when detention at any location is more than 30 minutes, strict regulation of shed fuel consumption, better maintenance of diesel locos and especially of fuel injection system, ensuring the working of dynamic brakes on locomotives, monitoring of trip fuel rations and review, checks on accounting of fuel at fuelling installations, and, rationalization of fuelling of locos to maximize topping of HSD oil from lower-priced installations, have been adopted. Zonal railways have been asked to encourage staff to come up with suggestions for effecting economy in fuel consumption (Table 9.19).

**Table 9.19 : Diesel Oil consumption/HSD Oil consumption**

(in million litres)

Year	Traction	Non-traction
2004-05	2080.634	34.173
2005-06	2111.190	39.109
2006-07	2211.531	39.949
2007-08	2284.061	43.729

Source : Ministry of Railways

## ROADS

9.65 The country's road network consists of national highways, state highways, major district roads, other district roads and village roads. Out of the total length of national highways, about 30 per cent length is single lane/intermediate lane, about 53 per cent is two-lane standard and the remaining

17 per cent is four-lane or more standard. Though national highways comprise only about 2 per cent of the total length of roads, they account for about 40 per cent of the total traffic.

## National highways development project

9.66 The project is implemented by the National Highways Authority of India (NHAI). Phase I & II of NHDP envisaged 4/6 laning of about 14,330 kilometres of national highways, at a total estimated cost of Rs. 65,000 crore (at 2004 prices). These two phases consist of the Golden Quadrilateral (GQ), the North-South & East-West corridors, Port Connectivity and Other Projects. GQ connects Delhi, Mumbai, Chennai and Kolkata. The North-South and East-West Corridors connects Srinagar in the North to Kanyakumari in the South and Silchar in the East to Porbandar in the West. Under the Port Connectivity Project, roads connecting 12 major ports will be improved.

9.67 As of March 31, 2009, 11,037 km of national highways under NHDP has been completed, the bulk of which lies on the GQ (Table 9.20). Nearly 98 per cent works on GQ have been completed by March 2009 and the NS and EW corridors are expected to be completed by December 2009.

9.68 Approval of the Government has been given for; (a) upgradation of 12,109 km under NHDP Phase-III at an estimated cost of Rs. 80,626 crore, (b) two-laning with paved shoulders for 5,000 km of national highways under NHDP Phase-IV at an estimated cost of Rs. 6,950 crore, (c) six-laning of 6,500 km of NHs comprising 5,700 km of GQ and balance 800 km of other sections of NHs under NHDP Phase-V at a cost of Rs. 41,210 crore, (d) 1,000 km of expressways with full access control on new

**Table 9.20 : National highways projects (March 31, 2009)**

(km)

Sl. No.	NHDP Component	Total length	Completed 4 lane	Under implementation	Balance for award of civil works
1	GQ	5,846	5,721	125	-
2	NS-EW	7,142	3,436	2,915	791
3	Port connectivity	380	206	168	6
4	Other NHs	962	781	161	20
5	NHDP -III	12,109	787	1,878	9,444
6	NHDP Phase V	6,500	106	928	5,470
7	NHDP Phase VII	700	0	19	681
<b>Total</b>		<b>33,639</b>	<b>11,037</b>	<b>6,194</b>	<b>16,412</b>

Source : Department of Road Transport & Highways

alignments at a cost of Rs. 16,680 crore under NHDP-Phase-VI, and (e) construction of ring roads, grade separated intersection, flyovers, elevated highways, ROBs, underpasses and service roads at a cost of Rs. 16,680 crore under NHDP Phase-VII.

9.69 The implementation of NHDP has been faced with a number of constraints that include delays in land acquisition and removal of structures, shifting of utilities, law and order problem in some states and poor performance of some contractors.

### Financing of NHDP

9.70 The main source of finance of NHAI for the implementation of various phases of NHDP is the fuel cess. The present rate of cess is Rs. 2.00 per litre on both petrol and diesel, a part of which is allocated to NHAI to fund implementation of NHDP. During 2008-09, an amount of Rs. 9,329.85 crore has been provided for the national highways and for state roads out of the same. Of this, Rs. 6,972.47 crore is for national highways and Rs. 2,171.64 crore for the state roads (including Rs. 500 crore from unspent balance of the previous years). An amount of Rs. 185.74 crore has also been allocated during 2008-09 for development of state roads.

9.71 The funds allocated from the cess is leveraged by NHAI to borrow additional funds from the domestic market. The Government of India has also taken various loans from the World Bank (US\$ 1,965 million), Asian Development Bank (US\$ 1,605 million) and the Japan Bank for International Cooperation (yen 32,060 million) for financing projects under NHDP. These multilateral loans are passed on to NHAI by the Government partly in the form of a grant and partly as loan. NHAI also negotiated a direct loan of US\$ 165 million from ADB for one of its projects. The funds provided to NHAI including the borrowings from the market are utilized for the projects and for servicing and repayment of borrowings from domestic market (Table 9.21).

**Table 9.21 : Financial structure of NHAI**

(Rs. crore)

Year	Cess Funds	External Assistance		Borrowings	Budgetary Support
		Grant	Loan		
2005-06	3,269.74	2400	500	1289	700
2006-07	6,407.45	1,582.50	395.50	1500	110
2007-08	6,541.45	1,788.80	447.20	305.18	265
2008-09	6,972.47	1,515.00	379.00	1,096.26	159

Source : Department of Road Transport & Highways

### Special Accelerated Road Development Programme in the North-eastern Region

9.72 The Special Accelerated Road Development Programme for North-eastern region (SARDP-NE) aims at improving the road connectivity to state capitals, district headquarters and remote places of NE region. It envisages two- four-laning of about 5,174 km of national highways and two-laning/ improvement of about 4,589 km of state roads. This would provide connectivity to 85 district headquarters to national highways/ state roads. The programme has been divided into the following two phases:

- Phase A would include improving 2,619 km of roads consisting of 2,029 km of national highways and 590 km of state roads at an estimated cost of Rs. 16,286 crore. Of this, the Department of Road Transport & Highways (DoRTH), Border Roads Organisation (BRO) and State PWDs have been assigned with the development of 1,795 km of roads. Out of this, 1,400 km of roads at an estimated cost of Rs. 4,285 crore has been approved for execution and the remaining 395 km has been approved "in-principle" by the Government. Improvement of the remaining length of 824 km of national highways is to be done by NHAI. Out of this, works on 330 km will be done by inviting bids for construction works and balance length of 494 km will be taken up on BOT basis. Out of 1,400 km roads to be executed by DoRTH, BRO & state PWDs, projects covering a length of 1,065 km at a cost of Rs. 3,378 crore has been approved till date and works are in progress. The likely target date of completion for phase A is 2012-13.
- Phase B involves two-laning of 4,825 km of national highways and two-laning/ improvements of state roads. Phase B is approved only for DPR preparation and investment decision is yet to be taken by the Government. The Arunachal Pradesh Package for Road and Highways involving roads of 2,319 km length was also approved by the Government. Out of this, 1,472 km is national highways and 847 km is state/general staff/ strategic roads.

9.73 The high-powered inter-ministerial committee, set up to appraise and coordinate individual subprojects under SARDP-NE, has approved sub-projects covering 1,065 km length at a cost of Rs. 3,378 crore, under Phase A of the programme.

### Construction of rural roads under PMGSY

9.74 The Eleventh Five Year Plan has projected an investment requirement of Rs. 41,347 crore (at 2006-07 prices) in rural roads. During the first two



**Table 9.22 : Construction of rural roads under PMGSY**

Year	Length of road works completed (km)	Expenditure (Rs. crore)
2005-06	22891	4100.4
2006-07	30710	7304.3
2007-08	41231	10618.7
2008-09	52405	15162.0

Source : National Rural Roads Development Agency

years of the Eleventh Five Year Plan, an expenditure of Rs. 25,780.7 crore has been incurred on rural roads under PMGSY. Additionally, there are roads built by PWD and the Panchayati Raj institutions in the rural areas (Table 9.22).

9.75 Under PMGSY, the limited absorption capacity of states in terms of the number of programme implementation units (PIUs) at district level and at the State Rural Roads Development Agencies (SRRDAs) constrained the programme initially, but could be mitigated gradually. Further, shortage of contractors is being felt in many states. Need-based relaxation in the bidding capacity and packaging of works has helped to overcome this problem to an extent. Besides, in the beginning, in some states, the personnel with the implementing agencies like the Rural Engineering Services, Rural Works Departments, Zilla Panchayat Engineering Units and the Panchayat Raj Engineering Departments were not well-equipped in road construction compared to their counterparts in the Public Works Department.

### Legal framework and recent initiatives

9.76 The expansion of the road network, carrying 87 per cent for passenger movement and 61 per cent for freight movement in 2004-05, has necessitated appropriate changes in related laws and regulations. Some of the important changes include:

- The Carriage by Road Act, gazetted in October 2007, will replace the Carriers Act, 1865 that governs the rights and liabilities of the common carriers. This is expected to make the transport system transparent, facilitate modernization of systems of transportation trade through registration of common carriers and provide scope for apportionment of liability between common carrier and consignor. A working group has been constituted to frame rules under the Act.

- The Motor Vehicles Act, 1988 (MVA), amended thrice since, has been the principal instrument for regulating motor vehicles. In response to suggestions received from various quarters, a proposal for amendment of the MVA Act was approved by the Union Cabinet and a Bill was introduced in the Rajya Sabha on May 15, 2007. The Bill was referred to the department-related Parliamentary Standing Committee for examination. The committee submitted its report in April 2008 which has been examined.
- The Rules for accreditation of bus body builders, notified in March 2007, to bring in uniformity in bus body design and to enhance safety and comfort to passengers, came into effect from March 23, 2008. Bus body builders would be accredited through the system of zonal and national level accreditation board and only such approved builders would undertake bus body building, as per the laid-down specifications. Efforts are being made to operationalize the zonal/national accreditation system. Similarly, the department is also in the process of finalizing the truck body code.
- Keeping in view the financial position of various states and the enormous unmet demand for public transport, the Central Government proposes to assist states through the viability gap funding to improve public transport, subject to certain reforms to be undertaken by the State Governments. A scheme in this regard has been approved by the Planning Commission.
- Road transport is primarily a state subject. However, due to heterogeneous approach by various state authorities, the sector has not achieved the growth commensurate with its potential. A committee was constituted under the chairmanship of Shri D. Thangaraj to finalize a policy for road transport sector. The committee submitted its report on March 27, 2008, inter alia, recommending a National Road Transport Policy. The Union Cabinet will now be approached for approval of the policy document.
- In February 2007, the Committee on Road Safety and Traffic Management recommended for the creation of a National Road Safety and Traffic Management Board, a National Road Safety Fund through earmarking 1 per cent of the cess on petrol and diesel and a National Road Safety Policy. The Union Cabinet would now be approached for creation of the board and the National Road Safety Fund and for seeking approval on the National Road Safety Policy. The proposed policy envisages focused and effective measures to address road safety issues.



- An ambitious scheme has been launched for the creation of National Register and State Registers of Driving Licences (DL) and Registration Certificates (RC) of motor vehicles and interlinking of the Regional Transport Registering Authorities/State Transport Authorities with an estimated cost Rs. 148 crore during the Eleventh Five Year Plan. This will enable creation of a national database on driving licences and registration certificates of motor vehicles will be accessed at the check posts to ensure whether taxes have been paid and documents of vehicles are in order.

## CIVIL AVIATION

9.77 The Civil Aviation sector had undergone dramatic expansion during the Tenth Five Year Plan period which continued during 2007-08. The volume of air traffic increased sharply during 2004-07, with a near doubling of the number of domestic and international air passengers (combined). However, during 2008, this sector showed signs of slowdown due to steep rise in the cost of ATF (air turbine fuel) and the global economic slowdown. The number of domestic passengers declined by 5 per cent during 2008 as compared to 2007. However, the silver lining is that the domestic cargo showed a growth of 14.55 per cent. Fall in ATF prices augers well for the passenger traffic in 2009.

### Fleet size

9.78 There are 11 scheduled passenger operators and one cargo operator in the country with a combined fleet size of 407 aircraft. In 2008, the scheduled operators/ companies were given permission to import 62 aircraft. To promote regional connectivity and to expand air connectivity among smaller cities, a separate category of Scheduled Air Transport (Regional) Services has been introduced. At present, MDLR Airlines operates such services in the Northern Region with two aircraft in its fleet. There are also 99 non-scheduled airline operators who have 241 aircraft in their inventory.

9.79 Subsequent to amalgamation of Air India and India Airlines with National Aviation Company Ltd., the brand name "Air India" has been retained with "Maharaja" as its mascot. The merged entity along with its subsidiary companies, with more than 140 aircraft, would enter the list of top 30 airlines globally in terms of fleet size. As on December 31, 2008, the company has inducted 42 new Boeing/Airbus aircraft to its fleet out of 111 aircraft ordered in December 2005.

## Airport development

9.80 The international airports at New Delhi and Mumbai have been restructured and modernization and upgradation works are being carried out through private participation. The construction of first phase development works in Delhi started in early 2007 and is likely to be completed by March 2010. The cost of development works for first phase is about Rs. 8,975 crore. The construction works for Mumbai airport started in January 2007 and is expected to be completed by March 2010. The development works are to cost around Rs. 9,802 crore and are expected to be completed by 2012.

9.81 The plan for modernizing/expanding Kolkata airport at Rs. 1,942.51 crore has been approved. Passenger terminal building would be 1,80,000 sq m. having pile foundations including all civil and superior finishing works at par with highest international standards. The pavement works include extension of secondary runway by 400 m towards southern side, construction of associated taxi tracks, apron/parking bays and two rapid exit taxiways. The integrated passenger terminal building is designed to handle 20 million passengers annually with peak hour capacity of 7,452 passengers. Construction of the building, to be completed in 30 months at the cost of Rs. 1,602.61 crore was awarded on October 6, 2008. The pavement works, to be completed in 12 months at Rs. 95.24 crore, was awarded on August 25, 2008. Both the works are in progress.

9.82 The plan for modernizing and expanding Chennai airport amounting to Rs. 1,808 crore was approved in August 2008. The proposal consists of construction of domestic terminal covering an area of 67,700 sq m, extension of existing Anna International Terminal of 59,300 sq m, extension of secondary runway across the Adiyar River and construction of parallel taxi-track and parking bays. The letter of intent for construction of terminal building amounting to Rs. 1,273 crore was issued in October 2008 and the work for extension of runway, taxi-track and parking bay has been awarded. The entire project is likely to be completed by the end of 2010. On completion, passenger handling capacity at Chennai will be increased from 9 million to 23 million.

## Development of non-metro airports

9.83 The Airports Authority of India is upgrading and modernizing 35 non-metro airports in the country in a time bound manner. Development of airports in the North-eastern region is being taken up on priority

basis. Architectural design competitions for terminal buildings at Ahmedabad, Thiruvananthapuram, Jaipur, Udaipur, Dibrugarh, Trichy, Lucknow, Mangalore, Bhubaneswar, Indore, Ranchi, Port Blair, Vadodara, Madurai, Bhopal, Raipur, Tirupati and Coimbatore airports have been held. The terminal buildings will be modular in design for easy expansion. The terminal building at Nagpur and Srinagar airports have been expanded and modified for integrated operations. Terminal building works have been completed in Ahmedabad (domestic), Kullu, Kangra, Porbandar, Udaipur, Gaya, Nagpur, Belgaum, Akola, Calicut, Hubli, Surat, Aurangabad and Trichy airports. The development works on the airside and city side are likely to be completed by March 2010.

9.84 The city side development of 24 airports will be undertaken with private sector participation under PPP mode. These airports include Ahmedabad, Amritsar, Guwahati, Jaipur, Udaipur, Thiruvananthapuram, Lucknow, Madurai, Mangalore, Aurangabad, Khajuraho, Rajkot, Vadodara, Bhopal, Indore, Raipur, Vizag, Trichy, Bhubaneswar, Varanasi, Agatti, Dehradun, Ranchi and Dimapur. The scope of city side development, through PPP, would comprise commercial development of property, car park and cargo operation. Request for Qualification (RFQ) for Amritsar and Udaipur has already been issued and five interested parties have been short-listed for each of them. Development works at additional 13 non-metro airports are being undertaken for completion in a similar time frame. These airports are Akola, Belgaum, Calicut, Cooch Behar, Dibrugarh (Mohanbari), Gondia, Hubli, Kullu (Bhuntar), Mysore, Rajahmundry, Surat, Srinagar and Vijayawada airports.

### Maintenance, repair and overhaul joint ventures

9.85 A Joint Venture Agreement for creation of maintenance, repair and overhaul centre for Airbus aircraft was signed in October 2008 between the National Aviation Company of India Ltd. (NACIL) and the European Aeronautic Defence and Space Company (EADS), a global leader in aerospace, defence and related services. Both NACIL and EADS will hold 50-50 equity in the joint venture. The total project cost is estimated to be US\$40 million spread over five years. The MRO Centre is expected to start its operations in early 2009 at the Indira Gandhi International Airport, New Delhi. It would also become a member of the Airbus MRO network. To begin with, the joint venture will undertake airframe maintenance and repair of Airbus aircraft of NACIL, which will later

be extended to other types of aircraft and other airlines. The facility would also cater to the markets in the South Asia region and neighbouring countries. A MRO facility to undertake major checks of B-777 aircraft of NACIL and B-737 aircraft of Air India Express is being set up as a joint venture between NACIL and Boeing at Nagpur, which will be functional by 2011.

### Cargo and ground handling initiatives

9.86 NACIL has entered into joint venture agreements with the Singapore Airport Terminal Services (SATS) for cargo and ground handling activities at Bangalore International Airport Limited and for ground handling at Hyderabad International Airport Limited. The joint venture has become operational at Hyderabad and Bangalore.

### Liberalization of air services

9.87 The Government continued its overall liberal approach in 2008 in the grant of traffic rights under bilateral agreements with foreign countries. To enable greater connectivity and to provide more commercial opportunities to all operating carriers, traffic rights have been enhanced with countries like Mexico, Saudi Arabia, Oman, Bahrain, UAE, Pakistan, Bangladesh, Thailand, Belgium, Germany, Qatar, Iran, Japan, Bhutan, Azerbaijan and Turkey in 2008. 1,05,298 additional seats/week have been granted to the designated airlines of foreign countries on reciprocal basis to operate to/from India in 2008. Besides, to open new city connections in India for international carriers, 26 new points of call in India have been granted to the designated airlines of 16 countries in 2008.

### Airport Economic Regulatory Authority

9.88 As per the Airport Economic Regulatory Authority (AERA) Act, 2008 whose commencement (except Chapters III & VI) has been notified w.e.f 1.1.2009, AERA was required to be established by 1.4.2009. The functions of AERA include; fixing, reviewing and approving tariff structure for the aeronautical services and users' fees which may be levied by the service providers for airport development and monitoring prescribed performance standards relating to quality, continuity and reliability of service.

### Training

9.89 A premier pilot training institute named, Rajiv Gandhi National Flying Institute has been established at Gondia, Maharashtra to augment the

ongoing efforts of flying training schools. This institute is a joint venture between the Airports Authority of India and CAE Inc of Canada. Ground training courses for the initial batch has already commenced. Further, there are plans to set up a National Institute of Aviation Training and Management (NIATM) for training in aircraft maintenance engineering and other aviation related subjects, The institute is likely to be operational by September 2009.

### Promotional activities

9.90 To actively engage states and Union Territories (UTs) in development work and to provide them a platform for placing their concerns directly to the Government of India, a National Conference on Civil Aviation was held in January 2008 at New Delhi with the Ministers/Chief Secretaries/Administrators of States/UTs. Further, to bring the stakeholders of the aviation industry together on an interactive platform, the Ministry of Civil Aviation in collaboration with FICCI organized "India Aviation 2008"—the first international exhibition & conference—from October 15-18, 2008 at Hyderabad. The United States was the partner country for this event.

## PORTS

9.91 India's coastline of 7.517 km, spread over 13 states/UTs, is studded with 12 major ports and 200 non-major ports. Of the non-major ports, about 60 are handling traffic. The total traffic carried by both the major and minor ports during 2007-08 was estimated at around 723 MT. The 12 major ports carry about three-fourths of the total traffic, with Visakhapatnam as the top traffic handler in each of the seven years.

### Traffic growth

9.92 In 2008-09, the cargo handled by major ports registered growth of 2.1 per cent against 13.9 per cent in the corresponding period of 2007-08. About 80 per cent of the total volume of ports' traffic handled was in the form of dry and liquid bulk, with the residual consisting of general cargo, including containerized cargo (Table 9.23). There was an impressive growth of 14.8 per cent per annum in container traffic during the five years ending 2007-08. Half of the world's traded goods are containerized, and this proportion is expected to increase further. The Jawaharlal Nehru Port Trust (JNPT), India's largest container port, handled roughly 4.1 million TEUs in 2007-08.

**Table 9.23 : Traffic at major ports**

(million tonnes)				
Commodity	2006-07	2007-08	2008-09	Growth% over 2007-08
POL	154.3	168.7	174.4	3.4
Iron ore	80.6	91.8	94.1	2.5
Fert. & raw materials	14.9	16.6	18.2	9.6
Foodgrains	5	2.2	2.2	0.0
Coal	60	77.5	70.6	-8.9
Vegetable oil	3.6	3.8	4.8	26.3
Other liquids	10.9	8.5	11.9	40.0
Containerized cargo	73.4	87.8	93.1	6.0
Others	61.1	62.4	61.1	-2.1
<b>Total</b>	<b>463.8</b>	<b>519.3</b>	<b>530.4</b>	<b>2.1</b>

Source : Department of Shipping

### Capacity addition

9.93 The annual aggregate cargo handling capacity of major ports increased from 504.75 MT per annum (MTPA) in 2006-07 to 532.07 MTPA in 2007-08. The average turnaround time increased marginally from 3.6 days to 3.9 days.

9.94 The average output per ship berth-day improved from 9,745 tonnes in 2006-07 to 10,071 tonnes in 2007-08. The pre-berthing waiting time at major ports on port account, however, increased from 10.05 hours in 2006-07 to 11.40 hours in 2007-08 and reduced to 9.59 hours in 2008-09. Significant inter-port variations in pre-berthing waiting time continued to persist (Table 9.24).

9.95 Despite having adequate capacity and modern handling facilities, the average turnaround time is 3.85 days during 2008-09, compared with 10 hours in Hong Kong, undermines the competitiveness of Indian ports. Since ports are not adequately linked to the hinterland the evacuation of cargo is slow leading to congestion. To this end, all port trusts have set up groups with representatives from NHAI, the railways and State Governments to prepare comprehensive plans aimed at improving road-rail connectivity of ports. The NHAI has taken up port connectivity as major component of NHDP. An efficient multi-modal system, which uses the most efficient mode of transport from origin to destination, is a prerequisite for the smooth functioning of any port. It involves coordinating rail and road networks to ensure good connectivity between ports and the hinterland.

**Table 9.24 : Inter-port variations at Indian ports**

Name of port	Average pre-berthing waiting time (hours) (on port A/c)			Average turnaround time (days)		
	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Kolkata (KDS)	0.13	0.24	1.27	3.89	4.87	4.60
Haldia Dock Complex	26.05	33.44	24.46	3.97	4.26	4.21
Mumbai	5.22	5.07	7.20	4.63	4.44	4.73
JNPT	5.45	10.20	9.84	1.67	1.85	1.96
Chennai	0.80	1.00	0.93	3.40	4.60	4.15
Cochin	0.29	1.21	1.31	2.19	1.99	2.14
Visakhapatnam	4.78	5.10	4.35	3.65	3.91	3.93
Kandla	35.28	32.64	28.08	5.46	5.13	5.20
Mormugao	19.34	18.35	11.48	4.46	4.03	3.61
Paradip	1.41	1.48	1.30	3.54	5.54	4.78
New Mangalore	1.87	1.92	0.96	3.14	3.21	3.00
Tuticorin	3.22	4.32	3.36	3.67	3.80	3.66
Ennore	0.31	0.75	0.73	1.89	2.08	2.35
<b>All Major Ports</b>	<b>10.05</b>	<b>11.40</b>	<b>9.59</b>	<b>3.62</b>	<b>3.93</b>	<b>3.85</b>

Source : Department of Shipping

9.96 Traditionally, most ports in the world are owned by the public sector. But privatization of port facilities and services has now gathered momentum. An enabling policy framework has been put in place by the Government. Depending on the nature of facility/service, private operators can enter into a service contract, a management contract, a concession agreement or a divestiture to operate port services. Areas that have been opened up to the private sector on a BOT basis include construction of cargo handling berths and dry docks, container terminals and warehousing facilities and ship-repair facilities.

## TELECOMMUNICATIONS

9.97 Indian telecom industry continued to register significant growth in 2008-09. Indian telecom network, with about 414 million connections in February 2009, is the third largest in the world, while it is credited with the second largest wireless network in the world. At the current pace, the target of 500 million connections by 2010 is well within reach. The Government of India has reiterated its commitment to reach out to the remote and uncovered areas and to augment the broadband facilities in rural areas (Box 9.6).

### Box 9.6 : Major policy initiatives in telecom

- Detailed guidelines for a controlled, simultaneous, ascending e-auction for spectrum for 3G and BWA service were announced on August 1, 2008. The allocation of spectrum for 3G and BWA services will boost telecom sector.
- Telecom Centres of Excellence (TCOE) concept is being established in a public-private partnership (PPP) mode with all stakeholders onboard, to promote application oriented research and to assist and train high level decision makers to manage sector reforms and corporate managers to manage networks and services. There will be eight TCOEs at the premier academic institute of the country with the seven major telecom operators supporting one centre each. The spectrum management centre is being developed in an autonomous model with the support of an industry consortium.
- To regulate unsolicited calls from telemarketers, a regulation has been implemented with a "National Do Not Call Registry (NDNC). About 7.2 million subscribers have registered on the NDNC and there has been a substantial reduction in unsolicited calls.
- It has been decided that there should be no cap on the number of access providers in any service area.
- On March 3, 2008, selective roaming facility for pre-paid subscribers between Assam and North-east and vice-versa were permitted subject to certain conditions.
- On July 11, 2008, provision of mobile service within 500 metres of the international boarder within Indian territory has been permitted.



## Growth

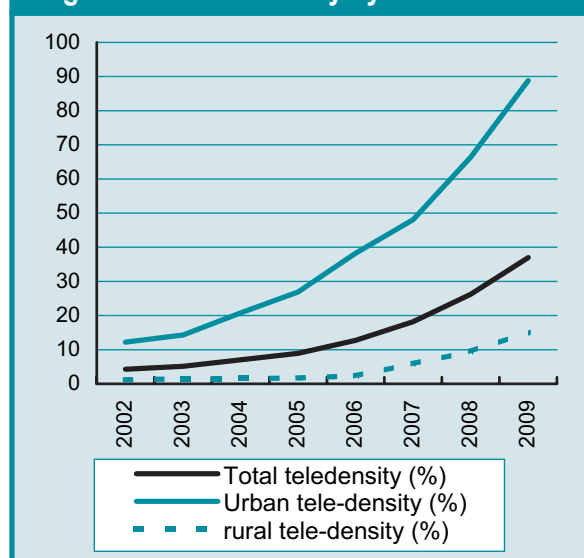
9.98 The total number of telephones increased from 76.53 million by end-March 2004 to 413.85 million by end-February 2009. About 113.36 million telephones, at the rate of more than 14 million subscribers every month, were added during the 11 months of 2008-2009. Total tele-density increased from 12.7 per cent in March 2006 to 35.65 per cent in February 2009. While rural tele-density reached 13.81 per cent in January 2009, the urban tele-density shot up to 83.66 per cent (Table 9.25 and Figure 9.3).

**Table 9.25 : Growth of telephones over the years**

	(in million)			
	March 06	March 07	March 08	Feb. 09
Fixed lines	40.23	40.77	39.41	37.73
CDMA	32.67	44.62	68.38	92.14
GSM	69.19	120.47	192.70	283.98
Wireless (CDMA & GSM)	101.86	165.09	261.08	376.12
Gross Total	142.09	205.86	300.49	413.85
<b>Annual growth (%)*</b>	<b>44</b>	<b>45</b>	<b>46</b>	<b>37.72</b>

Source : Department of Telecommunications  
\* point to point

**Figure 9.3 : Tele-density by end March**



9.99 While the wireless subscriber base grew at a compound annual growth rate (CAGR) of 75.9 per cent per annum since 2003, the wire-line segment has been declining gradually. The share of wireless

phones increased from 24.3 per cent in March 2003 to 90.88 per cent in February 2009. Improved affordability of wireless phone has made universal access objective more feasible. The Government has taken several steps directed at reduction in entry barriers, creation of a level-playing field between incumbents and new entrants and forward looking regulation. Consequently, the share of private sector in total telephone connections increased to more than 79 per cent in February 2009 against a meager 5 per cent in 1999.

## Rural telephony

9.100 With the special thrust given to rural telephony, the number of rural telephones went up from 12.3 million in March 2004 to 112.71 in January 2009. The strategy for rural network expansion involves provision of phones through market mechanisms in the viable areas and through Universal Service Obligation (USO) Fund in the non-viable areas. While village public telephones (VPTs) and rural community phones (RCPs) will enable public access, a scheme of RCPs has been launched under USO(F) to create the infrastructure in rural and remote areas. Out of more than 22.71 lakh public call offices (PCOs) functioning in the country, two lakh are in the rural areas. The Mobile Grameen Sanchar Sewak Scheme providing telephone at the doorstep of villagers is in place in about 12,000 villages. About 8,61,459 wireless broadband connections with speed of at least 512 kbps always on, shall be provided by BSNL with subsidy support from USO(F).

## Internet/Broadband

9.101 Recognizing the importance of increasing broadband connectivity for the growth of knowledge-based society, several steps have been taken to promote broadband. As a result, the broadband subscribers grew from a meager 0.18 million as on March 2005 to about 5.69 million by February 2009.

9.102 An agreement has been signed with BSNL in January 2009 to provide wire-line broadband connectivity to rural and remote areas by leveraging the existing 27,789 rural exchanges and copper wire-line network and by facilitating the service providers in creating broadband infrastructure. Under this, BSNL would provide 8,61,459 wire-line broadband connections from rural telephone exchanges with subsidy from USO Fund. The speed of each of the broadband connections shall be at least 512 kbps always on, with the capability to deliver data, voice and video services in the fixed mode. The rural



broadband connectivity will cover Government, institutional users, gram panchayats, higher secondary schools, public health centres and individual users. Subsidy would also be provided for setting up one kiosk from each rural exchange for providing public access to broadband services.

9.103 A proposal is being considered to provide broadband connectivity in rural and remote areas in a phased manner, under which 5,000 blocks would be connected by wireless broadband and villages coming within a radius of 10 kms. of the taluk/block headquarters would be covered. Guidelines have been issued for broadband wireless access (BWA) services. BWA services will increase broadband penetration.

### Foreign direct investment

9.104 Foreign direct investment (FDI), an important source to meet the resources for rapid network expansion, is presently permitted in various telecom services from 74 per cent to cent per cent. The total FDI inflows since January 2000 to December 2008 is Rs. 27,482.96 crore and the inflow during 2008 is Rs. 11,595.48 crore. The last four years saw many renowned telecom companies setting up their manufacturing base in India. With the Government initiatives, leading world majors in telecom equipments, like Nokia, Motorola, Sony Ericsson, Samsung, Flextronics and LG Electronics have set up their mobile phone manufacturing units meeting more than 50 per cent of the domestic demand, besides exports. Nokia-Siemens Network, Ericsson and Tejas Networks have setup their manufacturing units for wireless equipments including BTS and complete transmission equipment within the country. With a view to promote and develop exports of telecom equipments and services, the Government has already set up Telecom Equipment and Services Export Promotion Council.

### Activities under Universal Service Obligation Fund

9.105 USO Fund continues to subsidize the developments in rural telecom sector through

the following:

- Under operation and maintenance of village public telephone (VPT) about 5,49,133 VPTs are currently eligible for financial support as on 28.2.2009. In line with the agreements were signed with BSNL in November 2004 to provide subsidy support for provision of VPTs in 66,822 uncovered villages, 56,736 VPTs have been covered by BSNL as on 28.02.2009. The remaining will be covered in a phased manner by November 2009.
- Under agreements signed in September 2004 for providing 40,705 rural community phones (RCP) in villages with population of more than 2,000 and not having PCO facility, 40,616 RCPs have been provided till February 2009.
- Multi-access radio relay (MARR)-based VPTs installed before April 2002 are being replaced under USO(F). Out of a total of 1,86,872 MARR-based VPTs, 1,83,756 have been replaced till February 2009.
- USO(F) support is given for provisioning of rural direct exchange lines (RDELs) in all the 1,685 net cost positive short distance charging areas (SDCAs) (Table 9.26)
- A scheme has been launched by the Government to provide support for setting up and managing 7,871 infrastructure sites spread over 500 districts in 27 states for the provision of mobile services. The infrastructure so created shall be shared by three service providers for provision of mobile services. Mobile services from these towers are likely to be launched in a phased manner. As on 28.02.2009, about 3,941 towers have been set up under this scheme. Mobile services from about 3,715 BTSs installed on many of these towers have started. About 10,128 towers are proposed to be installed under second phase of the scheme.

9.106 Efforts are now being made to achieve the target of 600 million telephone subscribers by the end of Eleventh Five Year Plan. It is also proposed to achieve rural tele-density of 25 per cent by means of 200 million rural connections at the end of the Eleventh Five Year Plan.

**Table 9.26 : USO Fund: collections and disbursements**

Year							(Rs. crore)
	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	Total
Collections	2143.2	3457.7	3533.3	4211.1	5405.5	_	20404.4
Disbursements	200.0	1314.6	1766.9	1500.0	1290.0	655.9	7027.3

Source : Department of Telecommunications

9.107 The Eleventh Five Year Plan has targeted to provide the broadband for all secondary and higher secondary schools; all public health care centres and gram panchayats. It is also envisaged that Internet and broadband subscribers will increase to 40 million and 20 million respectively, by 2010.

## POSTS

9.108 With 1,55,035 post offices — 1,39,173 rural and 15,862 urban — as on 31.3.2008, India Post is credited with the largest postal network in the world. One post office serves 7,174 people and covers an area of approximately 21.12 sq. km.

### Project arrow and launch of new logo

9.109 Department of Posts launched a pilot project “Project Arrow” with the objective of making a tangible difference in the post office operations that matter to the common man. It was launched in two phases; Phase I : proof of concept phase — in 50 post offices, and Phase II : a pilot phase — in another 450 post offices in different postal circles. The project aims at providing fast, reliable and efficient postal services to the customers. Having been widely appreciated, the project is now proposed to be extended to another 4,500 post offices in Phase III.

9.110 Franchisee outlets have been introduced to cater to growing demand, where it is not possible to open departmental post offices. So far, 328 franchised outlets have been opened.

### New mail paradigm

9.111 The mail profile in India Post has changed substantially with increase in volume of mail in business-to-customer (B2C) and business-to-business (B2B) segments. In line with this, India Post has designed a new mail paradigm whereby technology would be leveraged to create focal points for expeditious delivery of mails. Mail Business Centres (MBCs) with the state-of-the-art technology and modern mailing tools are being designed as an integrated mail business hub for collection, processing and delivery of (bulk) mail. Up to March 2009, 161 mail business centres have been designated in the country. Besides, to set up automatic mail processing at Delhi and Kolkata, global tender has been invited for installation and commissioning on turnkey basis and maintenance. The dedicated freighter aircraft, wet leased in August 2007, for carriage of mail, parcel and logistics to and from the North-eastern region on Kolkata-Guwahati-Imphal-Agartala-Kolkata, is now carrying

a payload of approximately 14 tonnes. The proposal to wet lease two more freighter aircraft has been approved.

### Computerization and networking

9.112 By the end of 2008-09, a total of 9,674 POs — including rural — have been computerized. 1,233 offices have been networked with the National Data Centre. The strong IT-base has enabled a range of e-enabled services. The on-line domestic money transmission service, iMO, launched in 2006, that enables customer to receive money in minutes from the post offices providing this service is functional over 1,000 locations. Electronic Clearance Service (ECS) is offered all 15 locations of RBI and 21 locations of the SBI for payment of monthly interest under Monthly Income Scheme. The electronic money order (eMO), launched in October 2008, facilitates transmission of ordinary money orders through electronic media in the same tariff structure as the existing money order service. e-Payment under which different bills are paid by customers in post offices which are then electronically consolidated and paid to the service provider is now available in about 5,700 post offices and will soon be extended to all 9,693 computerized post offices. Under e-Post service started in 2004 to bridge the digital divide physical messages are transmitted through electronic system as an e-mail and the message is printed and delivered anywhere in India as a letter.

### Premium services

9.113 The revenue from premium services grew from Rs. 425.74 crore in 2003-04 to Rs. 2,141.48 crore in 2008-09. Speed Post, covering more than 1,200 towns, has a market share of 27 per cent in the courier segment. Its revenue has increased from Rs. 152.23 crore in 2002-03 to Rs. 690.09 crore in 2008-09. Bill Mail Service, introduced in 2004 to meet the requirements of financial and services sectors, increased its revenue in four years from Rs. 19.35 crore to Rs. 178.30 crore in 2008-09. Business Post was introduced to provide complete mailing solutions, including pre-mailing activities of printing, folding, addressing, inserting and franking. Its revenue has increased from Rs. 120.36 crore in 2002-03 to Rs. 1,013.33 crore in 2008-09.

### Active partner in financial inclusion programme

9.114 The total number of live accounts with the post office increased from 14.23 crore in 2003-04 to

20.95 crore upto March, 2009. The outstanding balance in post office savings bank accounts in 2007-08 was Rs. 3,54,434 crore. The number of rural postal life insurance policies increased from 26.66 lakh in 2003-04 to 74 lakh in 2008-09.

### Leveraging the postal network

- The payment of wages to National Rural Employment Guarantee Scheme (NREGS) beneficiaries is currently operational in 19 postal circles comprising of 21 states, through 90,000 post offices (including HOs/SOs/BOs). Nearly 2.92 crore NREGS accounts have been opened up to 31 March, 2009 and the amount disbursed is approximately Rs. 3,907 crore.
- India Post has tied up with the State Bank of India to sell its products through identified post offices. Started in five states of Tamil Nadu, Andhra Pradesh, Karnataka, Maharashtra and Jharkhand, the scheme was later extended to 10 states on a pilot basis. Nearly 1.25 lakh accounts have been opened under the liability products. The total asset products sold so far amounts to Rs. 10.3 crore.
- NABARD in collaboration with the Department of Posts is providing micro-credit to self-help groups (SHGs) through identified post offices. The corpus fund for implementing this project is given by NABARD. The pilot project is in operation in five districts. So far, 777 SHGs have been provided with a loan of Rs. 1.85 crore.
- The Department of Posts has signed an agreement with ICICI Prudential Life Insurance Company Ltd. in September 2008 to retail their pension products through select post offices on referral model. The company has equipped the postal staff and the identified post offices for the scheme. Till now, about 90 head offices have started distributing the pension products of ICICI.
- Sale of gold coins has been launched in October 2008 by tying up with the Reliance Money Limited. The scheme is available in 262 post offices. Revenue earned as commission up to March 2009 is 57.80 lakh.
- Old-age pension is being paid through post office savings accounts in Bihar, Chhattisgarh, Jharkhand and Madhya Pradesh, and through money order in Himachal Pradesh, Gujarat, Rajasthan and Tamil Nadu.
- Posts has been assisting the Central Government public authorities in implementing the Right to Information (RTI) Act by providing services of its designated Central Assistant

Public Information Officers (CAPIOs). For this, sub post masters at tehsil level act as the CAPIO for accepting RTI requests and appeals. The department has designated 4,000 post offices as receipt points. During October-December 2008, 2,270 applications were received and forwarded.

- An MoU was signed between India Post and the Ministry of Railways for sale of railway tickets through post offices. The scheme is presently operative at 34 locations, and will be extended to rural areas also.

### International relations

9.115 All foreign post offices and sub foreign post offices have been computerized. International parcel post hubs have been established at Delhi, Mumbai and Kochi for specialized handling of parcels. The paper-based international money order service is being replaced with electronic international money order service to ensure speedy and secure transmission with up to date accounting. As per the agreement signed between India and UAE in January 2008, the electronic service was launched in April 2008. Initially, the service is being offered from UAE to India through all head post offices in Delhi, Mumbai, Chennai, Kolkata, and the state of Kerala covering 97 head post offices.

9.116 Launch of World Net Express : A bilateral agreement has been signed between India Post and Deutsche Post AG in November 2008 for providing new services to domestic and international customers. The article would be booked by selected post offices for delivery in about 200 countries around the world using the DHL network.

### Global business

9.117 A Global Business Division has been set up in the Department of Posts to help India Post emerge as an organization with worldwide capabilities. The alpha version of the India Post Global Business portal was launched in May 2008 to offer efficient and modern postal services to its customers.

### URBAN INFRASTRUCTURE

9.118 The increasing pressure of population on urban infrastructure makes it necessary to improve the urban civic services like drinking water supply, sewerage, solid waste management and urban transport. Municipal institutions responsible for providing these civic services are facing acute shortage of capacity and resource.

## Jawaharlal Nehru National Urban Renewal Mission

9.119 JNNURM, launched in 2005-06, enables the Mission cities to take steps for sustainable improvements in their civic services levels, through an additional central assistance (ACA) of Rs. 50,000 crore for seven years beginning from 2005-06 and an equal amount from the State Governments and urban local bodies (ULB). Out of the ACA, Rs.25,500 crore is for the submission, urban infrastructure and governance (UIG), which, inter alia, includes urban renewal, water supply (including desalination plants), sanitation, sewerage and solid waste management, urban transport, development of heritage areas and preservation of water bodies. Memorandum of Agreement (MoA) for urban reform agenda has been signed with 62 mission cities and 6 ULBs falling under the urban agglomeration of the cities. There is now a better appreciation at the state level of the importance of developing and sustaining the infrastructure through appropriate user charges. Further, many states and ULBs have started meeting timelines committed for implementation of the reforms under the MoA.

### Fresh initiatives under JNNURM

9.120 The mission cities have undertaken reforms which contribute to sustainable functioning of local bodies, which, inter alia, include; comprehensive land titling legislation in Rajasthan, creation of a municipal cadre-municipal accounts service in Andhra Pradesh, setting up of urban transport fund in Surat and Pimpri-Chinchwad and setting up of urban transport authority in Hyderabad, Jaipur, Chennai, Bangalore and Mumbai. ULBs have initiated various steps to improve collection of property tax and user charges.

### Additional central assistance

9.121 Rs. 4,455.37 crore was provided for 2008-09 as ACA for the sub-mission on urban infrastructure and governance. Since inception till March 2009, 461 projects have been sanctioned at an approved cost of Rs. 49,422.48 crore for 62 cities across 31 states. While ACA admissible for these projects is Rs.23,411.09 crore, ACA released has been Rs. 7,428.40 crore. Of this, 138 projects have been approved with project cost of Rs. 19,065.85 crore during 2008-09. The ACA admissible for these projects is Rs. 8,685.90 crore, of which Rs. 3,545.49 crore has been released. While sanctioning projects, priority has been accorded to sectors that directly

benefit the common man and the urban poor, viz, water supply, sanitation and storm water drainage.

9.122 Mission cities in states such as West Bengal, Maharashtra, Kerala and Gujarat have adopted public-private partnership (PPP) through appropriate policies and projects as a part of the reform agenda. PPP initiatives have been taken by Indore, Vadodara, Pune and Ahmedabad for establishing city bus services and in Kochi in solid waste management.

### Initiatives for non-mission cities

9.123 A parallel scheme of Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT) for non-mission cities and towns was also launched in 2005-06 under JNNURM. An amount of Rs.3, 279.69 crore was provided as ACA in 2008-09 for the scheme. Since inception till March 2009, a total number of 747 projects have been sanctioned at an approved cost of Rs. 12,793.81 crore for 632 towns. ACA admissible for these projects is Rs. 10,311.76 crore against which Rs. 5,820.71 crore has been released. During 2008-09, 315 projects were approved with project cost of Rs. 6,478.55 crore. The ACA admissible for these projects is Rs. 5,229.12 crore, out of which Rs. 3,280.26 crore has been released.

### Monitoring of JNNURM

9.124 A programme called PEARL (Peer Experience and Reflective Learning) has been instituted for creating networks between JNNURM cities for cross learning and knowledge sharing on urban reforms and city governance. The other measures taken for monitoring projects under JNNURM include: (i) supporting professionally manned programme management unit (PMU) at state level and programme implementation unit (PIU) at ULB level, (ii) appointment of independent review and monitoring agencies (IRMA), (iii) capacity building and communication activities for slow performing cities through rapid training programme (RTP) and (iv) community participation fund for increasing engagement of citizens in urban management.

### Debt financing for urban infrastructure

9.125 To facilitate leveraging of debt for urban infrastructure projects, credit rating of ULBs has been undertaken in the mission cities. Of the 58 ULBs which have been assigned draft ratings, 36 ULBs have investment grade credit rating. Under the Pooled Finance Development Fund (PFDF) Scheme, which



is envisaged to provide credit enhancement to ULBs to access market borrowings through state-level pooled finance mechanism, Eight states have set up their "State Pooled Finance Entity" as per guidelines. The first proposal for issue of tax-free Pooled Finance Development Bond worth Rs. 45.00 crore by Water and Sanitation Pooled Fund, the designated instrument of Tamil Nadu, was notified and appropriate releases towards the Fund and project development cost were made in February 2008. In the present economic scenario, however, the progress of the scheme has been generally slow.

9.126 The Ministry of Urban Development has prescribed standardized service level indicators for four basic urban services (water supply, sewerage, solid waste management and storm water drainage) for enabling cities to monitor, manage and improve their services delivery. Comprehensive set of guidelines with indicators (covering access to services, quality and reliability of services, cost effectiveness) and a framework for data collection, collation and analysis and a reporting mechanism as well as bench marking has been prepared and circulated. The mission cities in particular are expected to keep these bench marks in view while implementing projects under the Mission.

9.127 While capacity building for JNNURM mission cities and towns covered under UIDSSMT are addressed through the specific provisions in the programme parameters, a separate capacity building programme, capacity building scheme for urban local bodies (C-BULB) has been drawn up to address the needs of those municipal bodies which are not covered under JNNURM.

9.128 Further, financial support under C-BULB are extended to the identified institutions/cities/states for setting up of centres of excellence, addressing specific capacity gaps including in areas such as urban planning, socio-economic and environmental planning, project implementation and management, preparation of detailed project reports, municipal service delivery including water supply, sewerage and sanitation, solid waste management, financial management, urban transport, cost recovery and user charges, implementation of capacity building programmes in pursuance of National Urban Sanitation Policy, implementation of municipal reforms like property tax reforms, accounting reforms, e-governance, public private partnership etc, and undertaking applied research and development programmes related to water supply, sanitation, solid waste management and urban development.

## National Urban Sanitation Policy

9.129 The policy, formally launched in November 2008, the international year of sanitation, envisages transforming all the towns and cities of the country into 100 per cent sanitized, healthy and livable spaces and ensuring sustained public health and improved environmental outcomes for its citizens (Box 9.7). Special focus has been given to hygienic and affordable sanitation facilities particularly for the urban poor and women. The policy focuses on achieving outcomes and building capacities rather than on mere construction of infrastructure. The main components include; awareness generation and bringing about behavior change, achieving open defecation — free cities, re-orienting institutions and mainstreaming and prioritizing sanitation in all urban management initiatives; sanitary disposal of wastes, promoting proper usage and maintenance of sanitation facilities; strengthening urban local bodies to provide sanitation services by supporting capacity building and training at state level.

### Box 9.7 : Recent decision

Desalination plant at Chennai: In January 2009, the Central Government approved construction of a 100 million litre per day (MLD) sea water reverse osmosis desalination plant at Nemmeli near Chennai at a total cost of Rs. 908.28 crore, of which Rs. 871.24 crore will be grant from the Central Government to the State Government of Tamil Nadu. The project is likely to be completed in 2010-11 and augment per capita water supply from 100 litre per capita per day to 144 lpcd.

## Urban Transport

9.130 Urban transportation covers private and public modes. The public transport provides easier access to economic opportunities to the poor by maximizing urban-rural linkages and is more energy efficient and less polluting. The Ministry of Urban Development launched the National Urban Transport Policy (NUTP) in 2006 to ensure accessible, safe, affordable, quick and sustainable mobility for all.

9.131 The Ministry had been providing grants to the extent of 40 per cent for studies in urban transport, which, inter alia, included studies to develop comprehensive traffic and transportation plans, feasibility studies and detailed project reports (DPR) for urban transport projects, under the Centrally-sponsored scheme of Urban Transport Planning. The response of the states, however, has not been satisfactory. To make it more attractive, a



new scheme was launched w.e.f. August 2008 to provide central financial assistance up to 80 per cent for taking up studies/DPRs (50 per cent in case of DPRs). The objective is to guide and facilitate implementation of National Urban Transport Policy.

### Box 9.8 : Urban Transport

Buses for Urban Transport under JNNURM: As a part of the second stimulus package for the economy, the Central Government decided in January 2009 that the states, as a one-time measure, will be provided assistance under the UIG component of JNNURM for purchase of buses for their urban transport systems. The purchase of 14,240 buses at a cost of Rs. 4,581 crore has been sanctioned, against which Rs. 995 crore of ACA has been released till end-March 2009.

### Metro Rail Systems

9.132 Delhi and Kolkata have introduced metro rail system in their cities. Delhi Metro Railway Corporation (DMRC) is a joint venture company of the Government of India and the Government of National Capital Territory of Delhi. Delhi Metro Rail System, technically known as Delhi Mass Rapid Transit System (MRTS), has incentivized modal shift from cars to public transport by virtue of its fast, efficient and environment friendly services. It has set high standards for project completion with quality and without time and cost overruns.

9.133 Delhi MRTS Phase I project (65.1 km.) are fully commissioned in November, 2006. The Phase II, sanctioned for construction/extension (121.765 km) consists Vishwavidyalaya -Jahangir Puri, Central Secretariat-Qutab Minar, Shahdara-Dilshad Garden, Indraprastha-New Ashok Nagar, Yamuna Bank-Anand Vihar ISBT, Kirti Nagar-Mundka corridors. Apart from this, Phase II consists of extension of Delhi Metro from Ambedkar Nagar in Delhi to Sushantlok (Gurgaon), extension of New Ashok Nagar in Delhi to NOIDA Sector-32, High Speed Express Link from New Delhi Railway Station to IGI Airport (that will reduce the journey time to only 16 minutes presently from 45 minutes), Central Secretariat to Badarpur, High Speed Express link from IGI Airport to Dwarka Sector-21 and Metro link from Dwarka Sector-9 to Sector-21. Shahdara-Dilshad Garden corridor has been commissioned on 30.6.2008. All these corridors are targeted for completion before the Commonwealth Games scheduled to be held in October, 2010.

9.134 The existing Kolkata Metro is under the direct control of the Ministry of Railways as a

government enterprise. The East-West Corridor Metro Rail project for Kolkata on the DMRC model over a length of 13.77 km. from Howrah to Salt Lake Sector V, has been approved by the Gol in June 2008. Though the project is scheduled for completion by October 2014; some portion may be opened by October 2013. A special purpose vehicle (SPV) of the Government of India and Government of West Bengal at 50:50 equity participation has been constituted for successful execution of the project as well as its operation and maintenance (Table 9.27) .

**Table 9.27 : Financing pattern for East-West Metro Corridor Kolkata**

(Rs. crore)				
Sl. No.	Particulars	Gol	Government of WB.	Total
1.	Equity	(15%)	(15%)	(30%)
		701.50	701.50	1403.00
2.	Subordinate debt	(10%)	(15%)	(25%)
		467.50	701.50	1169.00
3.	Sub Total(1+2)	(25%)	(30%)	(55%)
		1169.00	1403.00	2572.00
4.	Senior-term debt			(45%)
	(JBIC now JICA			2104.00
5.	Grand total (3+4)			(100%)
				4676.00

Source : Ministry of Urban Development

9.135 The Government of India approved the Bangalore Metro Rail Project in April 2008. This consists of double-line electrified North-South and East-West Corridor, covering total length of 33 km. The East-West Corridor is from Baiyappanahalli to Mysore Road terminal and North-South Corridor is from Yeshwantpur Terminal to Rashtreeya Vidyalaya Road terminal. The tracks would be on standard gauge. The project is a joint venture of the Government of India and Government of Karnataka (Table 9.28 and Box 9.8). The project is scheduled to be completed by December, 2011. The first section of 7 km is scheduled to be completed in March 2010.

9.136 For better connectivity with the National Capital Region, a commuter rail system, namely, Integrated Rail cum Bus Transit (IRBT) System, which constituted Phase-I of the Regional Rapid Transit System (RRTS) is contemplated. The Planning Commission had set up a task force in 2006. The NCR Planning Board (NCRPB) has

**Table 9.28 : Financing pattern for Bangalore metro rail project**

(Rs crore)

Sl. No.	Particulars	Government of India	Government of Karnataka	Total
1.	Equity	(15%)	(15%)	(30%)
		959.25	959.25	1918.50
2.	Subordinate debt	(10%)	(15%)	(25%)
		639.15	959.25	1598.75
3.	Sub Total(1+2)	(25%)	(30%)	(55%)
		1598.75	1918.50	3517.25
4.	Senior-term debt (JBIC)			(45%)
				2877.75
5.	Grand total (3+4)			(100%)
				6395.00

Source : Ministry of Urban Development

awarded a consultancy study on an "Integrated Transportation Plan for National Capital Region".

9.137 Proposals for Bus Rapid Transit System (BRTS) have been approved for Ahmedabad, Bhopal, Indore, Jaipur, Pune, Rajkot, Surat, Vijayawada and Visakhapatnam under JNNURM covering more than 408 km at an estimated cost of about Rs. 4,510 crore, of which around Rs. 2,065 crore is Central assistance. A number of other cities are also coming up with BRTS proposals to be funded under JNNURM.

9.138 Considering the need for improving city bus service, urban bus specification, has been prepared and circulated to all states/ UTs, and to JNNURM mission cities, with a view to transform the way city residents travel. The Government has advised the states and cities to introduce ITS-enabled modern city bus service on PPP model. Cities of Bhopal, Jodhpur, Udaipur, Jalandhar, Ludhiana and Jaipur have introduced such service.

9.139 Unified Metropolitan Transport Authority (UMTA) has been set up for Jaipur, Bangalore, Hyderabad, Mumbai and Chennai by the respective State Governments, to facilitate coordinated planning, implementation and integrated management of urban transport projects.

9.140 Since problems of urban transport are of relatively recent origin, the ability to fully understand and deal with them is yet to fully mature. A scheme for capacity building at urban local body, Central and State Government levels has been proposed for sanction.

## FINANCING OF INFRASTRUCTURE

9.141 The Eleventh Five Year Plan envisages an infrastructure investment of 20,56,150 crore (at 2006-07 prices), equaling US\$ 514 billion, to be shared between the Centre, states and private sector in the ratio of 37.2, 32.6 and 30.1 per cent.

### Debt financing

9.142 The total required debt financing has been estimated at Rs. 9,88,035 crore (Table 9.29). The gap between the likely availability of debt resources and the estimated debt requirement is sought to be bridged through enhanced credit, ECBs, pension and insurance funds and other debt funds on commercially viable terms. The actual flow of debt resources to infrastructure needs to be evaluated against the requirement indicated above. However, this is rendered difficult on account of insufficient information. Nonetheless, the available information on flow of investible resources to infrastructure sectors, gathered from different sources, is presented in this section.

**Table 9.29 : Likely sources of debt financing for the Eleventh Five Year Plan**

(Rs. crore at 2006-07 prices)

	Total XI Plan	2007-08	2008-09
Domestic bank credit	423691	49848	63207
Non-bank financial companies	224171	23852	31485
Pension/insurance companies	55414	9077	9984
External commercial borrowings	122263	19593	21768
Likely total debt resources	825539	102370	126444
Estimated debt requirement	988035	131718	155704

Source : Planning Commission

9.143 Net bank credit to infrastructure in any year is defined as the difference between end-March amounts of outstanding gross deployment of bank credit to infrastructure. Setting the flow of credit during 2007-08 and 2008-09 against the estimated requirement, it seems that the flow of bank credit may bridge a portion of the gap between the likely debt resources and the estimated debt requirement (Table 9.30).

**Table 9.30 : Bank credit to infrastructure**

(Rs. Crore)

Net bank	Infra-structure (Total)	Power	Tele-com	Roads & Ports	Other Infra-structure
2006-07	30122	12659	991	5246	11226
2007-08	61745	21909	18597	9546	11692
2008-09	66770*	na	na	na	na

Source : Reserve Bank of India

\* Annual variations in February, 2009.

na: Not available

9.144 In the stock of infrastructure investment made by insurance companies by end-2007-08 (Rs. 93,924.2 crore), the public sector companies had a share of 94.3 per cent. With increasing infrastructure investment of insurance companies, their share increased from 2.5 per cent 2004.05 to 5.7 per cent 2007-08. In 2006-07, the public sector insurance companies made a significant step up in their infrastructure investment, but could not sustain the pace in 2007-08 (Table 9.31).

**Table 9.31 : Investment by insurance companies in infrastructure**

(Rs. crore)\*

	2004-05	2005-06	2006-07	2007-08
Public sector companies	7211.2	3933.7	27656.7	8309.0
Private sector companies	462.6	775.3	1249.3	2090.8
Total	7673.8	4709.0	28906.0	10399.8

Source : Insurance Regulatory Authority of India

\* Figures are provisional.

9.145 Flow of resources to infrastructure through external commercial borrowings had quadrupled from 2005-06 to 2007-08, but then came down drastically during 2008-09 (Table 9.32). Major ECB receiving sectors, air transport and telecom, witnessed slowdown in ECB flows during 2008-09. While the ECB flow to the infrastructure sectors in the first three quarters of 2008-09 remained less than the corresponding periods in 2007-08, ECB flows to infrastructure in Q4 2008-09 were higher than those of Q4 2007-08. The spike in 2007-08 was largely due to the increased flow of ECBs to air transport, which may not be fully treated as infrastructure.

9.146 Infrastructure sectors have started raising significant amounts through private placement of debt. (While private placement has equity and debt

**Table 9.32 : Flow of external commercial borrowings to infrastructure**

(US\$ million)

Sector	2005-06	2006-07	2007-08	2008-09*
Air transport	145	1109	4740	1914
Power	683	1346	865	1518
Shipping	519	500	665	988
Telecommunications	843	2405	3021	1905
Other infrastructure	382	853	953	591
<b>Total of above</b>	<b>2571</b>	<b>6211</b>	<b>10244</b>	<b>6915</b>

Source : Reserve Bank of India

\* Provisional

components, the sector-specific information on equity components is not available). It may be seen that power and transport sectors raised substantially higher resources during 2008-09 through private placement of their debt, compared to the previous years (Table 9.33).

**Table 9.33 : Funds through private placement (only debt) in infrastructure**

(Rs. crore)

Sector	2006-07	2007-08	2008-09 (Prov)
Power generation & supply	5275.0	3468.0	12738.1
Roads & highways	585.3	388.1	2297.2
Shipping	Nil	Nil	436.0
Telecommunications	390.0	Nil	4350.0
<b>Total (of the above)</b>	<b>6250.3</b>	<b>3856.1</b>	<b>19821.3</b>

Source : PRIME Database

### Equity financing of infrastructure

9.147 Out of the total private sector infrastructure investment of Rs. 6,19,591 crore projected during the Eleventh Five Year Plan, Rs. 1,85,877 crore (30 per cent) is expected from internal accruals/equity financing, with Rs. 23,450 crore and 28,276 crore expected to realize in 2007-08 and 2008-09 respectively. The total capital raised through public and rights issues (altogether) had increased from Rs. 33,508 crore in 2006-07 to Rs. 87,029 crore in 2007-08 and then declined to Rs. 14,720 crore in 2008-09. Corresponding to this, there has been a steep decline in the capital raised through public and rights issues by infrastructure sectors (Table 9.34).

**Table 9.34 : Capital raised through public and rights issues**

(Rs. crore)

Sector	2006-07	2007-08	2008-09
Power	30	13,709	958
Telecommunication	2,994	1,000	100

Source : SEBI

9.148 The inflow of foreign direct investment to the infrastructure sector increased by more than five times in 2007-08 (Table 9.35). The pace of FDI inflows to infrastructure sectors was kept up during 2008-09.

**Table 9.35 : FDI flows to infrastructure (US\$ million)**

Sector	2005-06	2006-07	2007-08	2008-09
Power	87.1	157.5	968	984.8
Non-conventional energy	0.1	2.1	43.2	85.3
Petroleum & natural gas	14.2	89.4	1426.8	412.3
Telecommunications	623.6	477.7	1261.5	2558.4
Information & broadcasting	56	43.6	321.5	762.3
Air transport	10.3	92.1	99.1	35.2
Sea transport	53.6	72.5	128.4	50.2
Ports	0.5	0	918.2	493.2
Railway related components	14.7	25.8	12.4	18.0
<b>Total (of above)</b>	<b>859.9</b>	<b>960.7</b>	<b>5178.8</b>	<b>5399.6</b>

Source : Department of Industrial Policy & Promotion  
\* Information & broadcasting including print media;  
\*\* Air transport including air freight

### Infrastructure development and public private partnerships

9.149 About a third of the Planning Commission's estimate of Rs. 20,01,776 crore (at 2006-07 prices) required for infrastructure development during the Eleventh Five Year Plan is expected to be met through private investment and public-private partnerships (PPPs). Besides supplementing limited public sector resources, PPPs bring in private sector expertise, cost reducing technologies and efficiencies in operation and maintenance. While encouraging PPPs, six constraints have been identified:

- Policy and regulatory gaps, specially relating to specific sector policies and regulations;

- Inadequate availability of long-term finance (10 year plus tenor)-both equity and debt;
- Inadequate capacity in public institutions and public officials to manage PPP processes;
- Inadequate capacity in the private sector - both in the form of developer/investor and technical manpower;
- Inadequate shelf of bankable infrastructure projects that can be bid out to the private sector.
- Inadequate advocacy to create greater acceptance of PPPs by the stakeholders.

9.150 To address these constraints, several initiatives have been taken by Government of India to create an enabling framework for PPPs. Progressively, more sectors have been opened to private and foreign investment, levy of user charges is being promoted, regulatory institutions are being set up and strengthened and fiscal incentives are given to infrastructure projects. Approval mechanism for PPPs in the Central sector has been streamlined through setting up of Public Private Partnership Appraisal Committee (PPPAC). Standardized bidding and contractual documents have been notified.

9.151 To address the financing needs of these projects, various steps have been taken such as setting up of the India Infrastructure Finance Company Limited (IIFCL) to provide long tenor debt to commercially viable infrastructure projects; and launching of a scheme for financial support to PPPs in Infrastructure to provide viability gap funding (VGF) to PPP projects. IIFC (UK) Ltd., a wholly-owned subsidiary of IIFCL at London — operates with the objective of borrowing funds from the Reserve Bank of India (RBI) and lending to Indian companies implementing infrastructure projects in India solely for meeting capital expenditure outside India. RBI would be providing up to US\$ 5 billion to IIFC (UK) Ltd by subscription of 10-year maturity USD denominated bonds, in several tranches, of the subsidiary. Multilateral agencies such as the Asian Development Bank have been permitted to raise rupee bonds and carry out currency swaps to provide long-term debt to PPP projects. Setting up of dedicated infrastructure funds are also being encouraged to increase the flow of equity investments.

9.152 For building the capacity of public institutions in preparing a pipeline of credible, bankable projects that can be offered to the private sector, State Governments and Central Ministries are being provided with technical assistance in the form of in-house PPP, MIS experts and access to a panel of



legal firms. Other measures include assistance to State Governments and Central Ministries in hiring consultants through a panel of transaction advisers and preparation of sector-specific toolkits for engaging in PPPs. To deepen the capacity building of public functionaries at the state and municipal level, a national training programme on PPPs is being developed which will be delivered through Central and state administrative institutes. As the reach of PPP increases across sectors, the capacity of the private sector to manage these projects over their entire life cycle of 20 to 30 years would also have to be enhanced. In addition, steps need to be taken to provide adequate skilled manpower in different sectors. The Government of India has announced National Skill Development Mission and National Skill Development Corporation has been established in the PPP mode to scale up skill development activity.

9.153 For providing financial support for project development activities to the states and the Central Ministries, the Scheme and Guidelines for India Infrastructure Project Development Fund (IIPDF) have been notified. The IIPDF ordinarily assists up to 75 per cent of the project development expenses in the form of interest free loan. On completion of bidding, the project development expenditure is expected to be recovered from the successful bidder. PPP projects in urban and social sector have been identified as pilots, which are being structured in collaboration with the implementing authorities. The objective is to develop sustainable demonstration projects that may eventually have a catalytic effect on PPPs in these sectors.

9.154 A website, [www.pppinindia.com](http://www.pppinindia.com), has been created which is devoted to PPP initiatives in the states and Central Ministries. An online database,

### Box 9.9 : Viability gap funding for PPP projects

Infrastructure projects often have high social, but an unacceptable commercial rate of return. These are generally characterized by substantial investments, long gestation periods, fixed returns, etc. which, make it essential for Government to support infrastructure financing, through appropriate financial instruments and incentives. With a view to support infrastructure projects, the Scheme for Financial Support to PPPs in Infrastructure (Viability Gap Funding Scheme) was announced in 2004 and its operational modalities were put in place by 2005. The scheme aims to ensure wide spread access to infrastructure through the PPP framework by subsidizing the capital cost of their access. It provides financial support in the form of grants, one time or deferred, to make infrastructure projects commercially viable. The scheme provides total Viability Gap Funding up to 20 per cent of the total project cost. The Government or statutory entity that owns the project may provide additional grants out of its budget up to further 20 per cent of the total project cost. Viability Gap Funding under the scheme is normally in the form of a capital grant at the stage of project construction.

The National Highway Development Project (NHDP) also utilizes the instrument of viability gap funding for meeting the twin object was of inclusive growth (affordable user charges determined upfront) and harnessing private sector efficiencies in creation and maintenance of the infrastructure assets. Viability gap funding, normally up to 40 per cent of the total project cost, is provided to the PPP road projects. It is in the form of a capital grant at the stage of project construction (up to 20 per cent of the total project cost) and O&M support (up to 20 per cent of the total project cost).

VGF PPP Projects in NHDP					VGF for State Roads and other Projects				
Rs. Crore					Rs. Crore				
Phase	No. of Projects	Length	Project cost	VGF Sought (Net of premium)	Sectors	No of Projects	Project	VGF cost (Estimated Requirement)	VGF Sought
<b>Awarded Projects</b>					<b>Awarded Projects</b>				
I	8	344	2977	578	Roads	14	4657.70	866.89	197.52
II	17	829	5868	31	Urban	1	11814.00	2362.00	0
III	37	1627	20331	3732	<b>Total</b>	<b>15</b>	<b>16471.70</b>	<b>3228.89</b>	<b>197.52</b>
V	7	1030	7733	-2291	<b>Projects under bidding</b>				
VII	1	19	1655	281	Roads	29	9747.54	2060.40	NA*
<b>Total</b>	<b>70</b>	<b>3849</b>	<b>38564</b>	<b>2331</b>	Urban	1	7660.00	1532.00	NA*
<b>Projects Under Bidding</b>					Tourism	1	148.87	29.77	NA*
II, III, V	52	5680	58860	13015	<b>Total</b>	<b>31</b>	<b>17556.41</b>	<b>3622.17</b>	<b>NA*</b>
<b>Grand Total</b>	<b>122</b>	<b>9529</b>	<b>97424</b>	<b>15346</b>	<b>Grand Total</b>	<b>46</b>	<b>34028.11</b>	<b>6851.06</b>	<b>197.52</b>

\* Not applicable since projects, still under bidding.

www.pppindiadatabase.com, has been developed to provide comprehensive and current information on PPP projects at the Central, state and sectoral levels (Table 9.36). A communication strategy is being developed to enhance awareness about PPPs among key stakeholders and for establishing platforms for dialogue and by dissemination of information on PPP projects that have worked well and those which have not achieved the intended benefits (Box 9.9).

9.155 There is a broad acceptability towards the need for engaging in PPPs in the country. However, the constraints cited above and need for sustained

<b>Table 9-36 : State-wise PPP projects (Projects based on value of contracts)</b>				
<b>State</b>	<b>Total Number</b>	<b>Upto 250 crore</b>	<b>Above 250 crore</b>	<b>Value of contracts</b>
Andhra Pradesh	36	22	14	10818.0
Delhi	8	5	3	9813.0
Gujarat	27	7	20	17700.0
Jharkhand	6	5	1	681.0
Karnataka	27	21	6	5253.0
Kerala	9	2	7	12353.0
Madhya Pradesh	25	16	9	4856.0
Maharashtra	25	7	18	31142.0
Punjab	18	15	3	1339.0
Rajasthan	37	35	2	2040.0
Sikkim	24	10	14	17111.0
Tamil Nadu	28	9	19	10058.0
Uttar Pradesh	5	0	5	2108.0
West Bengal	5	1	4	2055.0
Other States/ UTs*	20	10	10	8549.0
<b>Total</b>	<b>300</b>	<b>165</b>	<b>135</b>	<b>135876</b>
<b>SECTOR-WISE FIGURES</b>				
Airports	6	0	6	20041.0
Ports	38	9	29	43053.0
Railways	3	1	2	1007.0
Roads	187	108	79	47755.0
Urban Development	35	31	4	6218.0
Energy	31	16	15	17802.0
<b>Total</b>	<b>300</b>	<b>165</b>	<b>135</b>	<b>135876</b>

Source : [www.pppindiadatabase.com](http://www.pppindiadatabase.com)

(\*): Other States/UTs include; Bihar, Chhattisgarh, Haryana, Goa, Orissa, Puducherry & Andaman and Nicobar Islands

Government intervention have been accentuated by the current economic downturn. The slowing of economies and resultant shrinking income and demand has dampened the PPP exuberance due to drying up of sources of debt and equity for PPP projects. Nevertheless, an overriding perspective remains that investments would continue to flow to well structured projects; greater focus of project revenues/viability and optimal risk management arrangements are likely to attract private capital. This approach points towards imperatives of developing capacities to structure projects and exploring alternative financing mechanisms.

9.156 In the wake of the global financial crisis, the Government of India has initiated a series of measures to sustain the impetus in investments in infrastructure. Foreign borrowing rules have been eased by removing "all-in-cost" ceilings on such borrowings, expanding the definition of infrastructure sector for availing external commercial borrowings (ECBs), allowing corporates engaged in the development of integrated townships to avail ECBs under the approval route and raising foreign investment limit in corporate bonds to US\$ 15 billion. NBFCs, dealing exclusively with infrastructure financing, would be permitted to access ECB from multilateral or bilateral financial institutions, under the approval route of RBI.

9.157 The India Infrastructure Finance Company Limited (IIFCL) has been authorized to raise Rs. 10,000 crore through tax free bonds to provide refinance to banks for their loans in the road and port sector for which bids have been submitted on or after 31.1.2009. The refinance from IIFCL would supplement the resources available with banks to finance such infrastructure projects involving projects worth Rs. 25,000 crore. To fund additional projects of about Rs. 75,000 crore during the next 18 months, IIFCL is being enabled to raise Rs. 30,000 crore by way of tax-free bonds in several tranches, once the funds raised during 2008-09 have been effectively utilized.

### Time and cost overruns in infrastructure projects

9.158 The progress of the Central sector projects, each costing Rs. 100 crore and above, is being monitored by the Department of Programme Implementation on a monthly basis. In March 2009, the projects in the roads, power, railways, petroleum, telecom, coal and steel sectors constituted more than 94 per cent of the total number of monitored projects. The cost overrun is calculated on the basis of the subsequent revisions, till the reporting

**Table 9.37 : Progress of Central sector projects (Rs. 100 crore and above)**

Month of	Number of projects	Total Cost (of all projects)	Cost over run	Ahead of projects that were:			
				Ahead	On time	Delayed	Without any fixed date (or no date) of completion
Oct-07	514	344699	9.6	2.9	31.3	41.8	23.9
Dec-07	513	346320	10.6	2.5	32.0	40.9	24.6
Apr-08	519	351996	10.9	2.5	28.1	49.7	19.8
Jul-08	516	364214	11.8	2.7	30.0	41.5	25.8
Oct-08	521	392778	11.4	2.7	31.9	46.4	19.2
March-09	552	468813	11.6	1.4	26.4	50.7	14.9

Source : Ministry of Statistics and Programme Implementation

month, to the original cost of sanction (Table 9.37). Over time, there has been no visible positive change in the timeliness of completion of projects; nor in the avoidance of cost overruns, as evidenced in table 9.37.

## CHALLENGES AND OUTLOOK

9.159 Provision of quality infrastructure is a crucial prerequisite for sustainable growth. In the current Indian context, the programme for infrastructure building is undertaken broadly through two routes: first, through planned execution of large infrastructure projects under the Central and State Government agencies and through private initiatives including PPPs, and, second through public works programmes, which have the twin objectives of creating infrastructure and generating employment for the poor. As such, the expected impact of these two approaches to creation of infrastructure is different. While public works programmes are concentrated in the rural areas with small, short-duration projects, the bigger infrastructure projects have an urban-rural mix, which is different across sectors. Public work programmes have been considerably scaled up in the recent years with the introduction of new nationwide schemes and the consolidation of existing schemes. Indisputably, both the approaches to creation of infrastructure would need to be invigorated. It is also equally important to ensure the coordination between these two approaches so as to promote balanced development of infrastructure throughout the length and breadth of the country.

9.160 Tracking the build-up of rural infrastructure is marred by inadequate and lagged information base. The latest consolidated information on the

roads below the level of national highways is 2003-04. The generation of timely information is, of course, constrained by the multiplicity of implementing agencies and inadequate data management systems at the ground level. Nonetheless, there is an inescapable need to put in place mechanisms for obtaining updated, reliable information on infrastructure creation at all levels at a regular frequency.

9.161 The Eleventh Five Year Plan (2007-12) has estimated an investment requirement of US\$ 500 billion in infrastructure for broad-based and inclusive growth. The foregoing analysis indicates that achieving this is a challenging task. The Eleventh Five Year Plan has envisaged mobilization of private resources in substantial degree to supplement the efforts of the Governments. In recent years, tangible progress has been made in attracting private investment in infrastructure. However, such public initiatives are constrained by factors like inadequate shelf of bankable projects and shortage of long-term finance for projects. These are difficult issues but not insurmountable, given the resilience that the Indian economy and its financial system has demonstrated amidst adversities.

9.162 Availability of finance is only a necessary condition for investment. Once a project is financially closed, it is faced with issues like disputes in land acquisition, rehabilitation, contractual issues, shortage of raw materials, capital goods and fuel, environmental disputes and inadequate availability of skilled manpower. These problems result in delays in the completion of infrastructure projects. These problems have wide ramifications, yet, there is no option but to address them systematically, as timely implementation of projects is critical for ensuring their financial viability, as also for reaping the projected economic benefits.