9

Infrastructure

Introduction

Quality infrastructure, covering the services of transportation (railways, roads, ports, civil aviation); electricity transmission and distribution; communications (telecommunication and post); water supply and sanitation, and solid waste management, is one of the most important necessities for unleashing high and sustained growth and alleviating poverty, particularly in the backward States. From a policy perspective, there is now a widespread consensus that direct government production of all infrastructure services introduces difficulties concerning technical efficiency, adequate scale of investment, proper enforcement of user charges, and competitive market structure. At the same time, a pure reliance on private production in an unregulated market is not likely to produce sound outcomes. India has been actively engaged in finding the appropriate policy framework, which gives the private sector adequate confidence and incentives to invest on a massive scale, but simultaneously preserves adequate checks and balances through transparency, competition and regulation.

Review of 2004-05

9.2 In 2004-05, the infrastructure sector experienced mixed outcomes (Table 9.1). The growth rate in many key sectors accelerated in April-December, 2004-05. Strong growth rates have been noticed for electricity generation, railways, ports and civil aviation.

9.3 The overall power generation of 438 Billion Units (BU) during April-December, 2004-05 was marginally above the target of 437 BU and was 6.5 per cent above the power generation achieved in the same period of the previous year. Hydel power generation continued to enjoy high growth in the current year. Thermal and nuclear power generation grew by 4.7 per cent in April-December 2004-05, as against 2.4 per cent achieved in the corresponding period of the previous year.

9.4 The revenue earning freight traffic of 438.36 million tonnes carried by the railways in April-December, 2004-05 was 2.4 per cent above the target of 428.19 million tonnes and 7.7 per cent over the traffic achieved in the corresponding period of the previous year. Cargo handled at major ports also exceeded the target of 270.35 million tonnes by 2.1 per cent in the first ten months of the current year and was 11.1 per cent above the achievement in the same period of the previous year.

9.5 In the civil aviation sector, strong positive growth rates were experienced in passenger traffic (21.8 per cent) as well as export and import cargo handled (18.3 per cent) at the international and domestic terminals in April-December, 2004-05 compared to the growth rates in the corresponding period of the previous year.

9.6 The telecom sector witnessed a sharp decline in telecom tariff particularly in the Mobile, National Long Distance and International Long Distance segments. New cell phone connections grew by 20.8 per cent in April – December 2004-05 as compared to 13.1 per cent growth in the same period of the previous year. The target of a tele-density of 7 envisaged by March 2005 in the New Telecom Policy 1999 (NTP 99) has already been surpassed, with a tele-density of 8.62 at the

Table 9.1 : Trends in growth rates of infrastructure sectors (in per cent)

Items	Unit	2000-01	2001-02	2002-03	2003-04*	April-December* 2003-04	April-December* 2004-05
I. Energy							
1 Coal Production	Mn.tonnes	3.5	4.2	4.6	5.1	3.9	6.8
2 Electricity generated (Utilities only)	Bn. Kwh	3.9	3.1	3.2	5.0	3.4	6.5
(a) Hydel	,,	-7.6	-0.7	-13.7	15.6	10.5	17.6
(b) Thermal (incl.nuclear)	,,	7.4	2.5	6.2	3.5	2.4	4.7
3 Petroleum							
(a) Crude oil production	Mn.tonnes	1.5	-1.2	3.2	1.0	-0.5	2.9
(b) Refinery throughput	,,	20.3	3.7	4.9	8.2	7.2	6.7
II. Steel	Mn.tonnes	6.4	3.6	10.1	6.9	12.2	3.8
III. Cement	Mn.tonnes	-0.9	7.4	8.8	6.1	5.6	6.9
Weighted Average growth I to III		***5.1***	***3.2***	***5.6***	***5.4***	***5.8***	***5.4***
IV. Transport and communications							
1. Railway revenue-earning Goods traffic	,,	3.7	4.0	5.3	7.5	7.0	7.7
2. Cargo handled at major ports	,,	3.4	2.3	9.0	9.9	7.5	11.1
3. Telecommunications-new telephone connections Provided (Direct Exchange Lines)**	'000Nos.	27.2	23.9	21.5	40.1	29.1	21.4
4 Civil Aviation							
a. Export cargo handled	000 tonnes	5.1	4.1	13.3	1.0	0.0	11.8
b. Import cargo handled	,,	3.6	-1.0	18.6	13.8	9.7	30.1
c. Passengers handled at International Terminals	Million	4.6	-5.0	4.8	6.5	4.7	15.7
d. Passengers handled at Domestic Terminals	,,	7.7	-5.7	9.6	13.1	10.4	25.9

*** Provisional** ****WLL, Fixed and Cellular.**

Source : Item no. I to III Ministry of Commerce & Industry, IV.1 Ministry of Railways, IV.2 and 4 Ministry of Statistics and Programme Implementation and IV.3 Ministry of Communication.

end of 2004. With the current growth momentum, the telecom sector is expected to achieve a tele-density of 15 by the year 2006 or 2007.

Power

9.7 Power generation in 2004-05 was anticipated to touch 583.8 billion Kwh, a growth of 4.6 per cent over the last year. The growth of power generation in April-December 2004 was 6.5 per cent as compared to 3.4 per cent in the corresponding period last year (Table 9.2). The data on power generation includes only generation by utilities and, hence, understate generation in the country by failing to capture captive production. Nevertheless, end-consumers of electricity continue to experience shortages in terms of reliable access to electricity. Effective enforcement of Electricity Act, 2003 is necessary for solving the problems of power generation, transmission and distribution.

9.8 During the period from 1992-2004 power generation capacity grew at an annual rate of 4.16 per cent while GDP grew at an annual rate of 6.4 per cent (Table 9.3). During the two years 2002-03 and 2003-04, generation capacity of 7,687 MW was installed. Capacity addition of 5245.5 MW is targeted for the current year, of which 3,100 MW have already been commissioned.

9.9 Public policy has consistently attempted to encourage hydel and wind energy sources which do not rely on fossil fuels and also avoid carbon emissions. Some success in this regard is evident, with power generation from

Table 9.2 : Trends in the power sector (utilities only)

	2002-03	2003-04	April-December* 2003-04	April-December* 2004-05	Change over previous year 2003-04	Change over previous year 2004-05@
		(Billion KWH)			(per cent)	
1 Power generation**	531.6	558.3	411.4	437.9	5.0	6.5
(i) Hydro-electric	63.8	73.8	57.6	67.7	15.7	17.6
(ii) Thermal	448.6	466.8	340.5	357.9	4.1	5.1
(iii) Nuclear	19.3	17.7	13.3	12.3	-8.3	-7.2
2 Plant load factor of thermal plants (per cent)	72.2	72.7	70.2^	72.8^	NA	NA

*** Provisional @April-December ^April-November NA : Not Applicable**

**** Excludes generation from captive and Non-Conventional power plants.**

Table 9.3 : Installed electricity generation capacity

(Megawatt)

Year	Thermal	Hydro +Wind	Nuclear	Total
1991-1992	48,086	19,194	1,785	69,065
1995-1996	60,083	20,985	2,225	83,293
1999-2000	70,493	25,012	2,680	98,185
2003-2004	77,974	31,995	2,720	112,682
Compound growth (per cent), over 1991-2004	**4.11**	**4.35**	**3.67**	**4.16**

Source : Ministry of Power.

such sources growing at a faster rate. India has an estimated unutilized hydro power potential of more than 150,000 MW. A study by the Central Electricity Authority (CEA) has identified 399 potential hydel projects with an aggregate capacity of 107,000 MW, which are yet to be developed. The study has focused on six major river systems, and projects have been categorised in categories A, B & C based on their commercial viability. Of these projects, the Ministry of Power and Central Electricity Authority have identified 162 most promising projects, spread across 16 States, with an aggregate capacity of 50,560 MW.

9.10 During the first nine months of the year 2004-05 investment approvals totaling Rs.6,100 crore were accorded in the Central Sector to power generation schemes of 600 MW and Transmission schemes of 4,806 Circuit Kilometer (ckm is the product of the number of lines and the length in kilometer).

9.11 The Plant Load Factor (PLF) of the overall system, an important measure of the operational efficiency of thermal power plants, has improved significantly from 64.6 percent in 1998-99 to 72.9 per cent in the period April - November 2004, implying a secular improvement in the efficiency of power generation. During April-November 2004, the PLF of central power plants was higher than that of State Electricity Boards (SEBs) put together; while PLF of private plants was higher (87 per cent) than that in the public sector (Table 9.4). A striking aspect of the PLF data is that from 2002-03 to 2004-05 the PLF of SEBs and the central sector has been roughly stagnant. Over the same period, the private sector PLF rose sharply from 78.9 to 86.9 per cent. However, the average for SEBs as a whole masks substantial variation across States. The PLF for the eastern states are

Table 9.4 : Thermal plant load factor								
	1999-00	2000-01	2001-02	2002-03	2003-04	2003-04 (Upto Nov. 2003)	2004-05 (upto Nov. 2004)
I. State Electricity Boards	64.3	64.3	67.0	68.7	68.4	65.9	68.1
II. Central Sector	72.5	72.2	74.3	77.1	78.7	75.6	78.8
III. Private Sector	68.9	76.4	74.7	78.9	80.5	83.2	86.9
Northern	71.0	72.0	75.1	75.4	76.3	73.5	75.7
Western	72.3	72.1	74.1	75.8	75.1	72.3	76.7
Southern	79.6	79.7	82.4	86.4	83.4	81.7	81.2
Eastern	46.1	47.0	48.7	52.1	56.9	54.5	58.0
North Eastern	18.3	18.2	16.7	14.8	14.0	13.3	14.4
All India	**67.3**	**67.7**	**69.9**	**72.2**	**72.7**	**70.2**	**72.8**

particularly low, the lowest being 3.2 per cent for Bihar SEB. If the PLF of the eastern region is brought on par with the rest of the country, it would induce additional generation of 47 billion kilowatt hours per year. The eastern and north eastern regions are also bestowed with immense potential for cheap coal and hydro potential, which can be harnessed for meeting the growing energy demands of the regions as well as the power needs of the other regions.

Securitisation of outstanding dues

9.12 Considerable progress has been made in the settlement of dues payable by SEBs to Central Public Sector Undertakings (CPSUs) and the Railways through a one-time settlement scheme. All 28 State Governments signed the Tripartite Agreement envisaged under the scheme, which was between the State Government, Reserve Bank of India and the Government of India. Out of these, 27 States have issued bonds amounting to Rs.29,883 crore. The Government of National Capital Territory of Delhi securitized its outstanding dues by converting the dues into long-term advances of Rs.3,316.28 crore payable to the CPSUs concerned separately under bi-partite Agreements, as they do not have the power to issue bonds.

9.13 The scheme has resulted in improvement in collection of dues of the power sector CPSUs (Table 9.5).

Table 9.5 : Collection of dues from SEBs by CPSUs				
CPSU	2001-2002	2002-2003	2003-2004	2004-2005 (Apl.-Dec.)
NTPC	76.74	92.30	100.70	100.00
NHPC	69.03	94.44	97.06	100.00
PGCIL	88.92	95.16	98.30	99.40
NEEPCO	74.78	71.49	87.50	94.61
DVC	100.00	91.92	93.28	93.20

9.14 The rate of return of SEBs in 2004-05 works out to –28 per cent as against –38 per cent in 2003-04 (Table 9.6). The resource flow arising out of such poor return is very large. The direct transfers from State Governments to SEBs in 2004-05 amounted to Rs.9,825 crore. In addition, there was an uncovered subsidy of Rs.17,520 crore. Thus reforms in the electricity sector have the potential of making a considerable impact on the fiscal problems of States.

9.15 The Electricity Act, 2003 has helped enhance investment in the power sector. Eleven Independent Power Projects (IPPs) of more than 4000 MW capacity, involving investment of about Rs.13,700 crore, achieved financial closure in January-September, 2004. Eight IPPs of about 10,000 MW capacity with proposed investment of Rs.33,000 crore are being examined by investment bankers. These projects may achieve financial closure by February 2005.

Table 9.6 : Financial performance of the State power sector

(Rs. Crore)

		1991-92	2003-04(P)	2004-05 (RE)	2005-06 (AP)
A.	**Gross Subsidy involved**				
	(i) On account of sale of electricty to				
	(a) Agriculture	5,938	23,346	23,806	25,377
	(b) Domestic	1,310	8,885	9,639	10,033
	(c) Inter-State Sales	201	923	866	591
	Total	**7,449**	**33,154**	**34,311**	**36,002**
	(ii) Subventions Received from State Govts.	2,045	11,081	9,825	9,831
	(iii) Net Subsidy	5,404	22,073	24,486	26,170
	(iv) Surplus Generated by sale to other sectors	2,173	6,133	6,967	8,640
	(v) Uncovered Subsidy	3,231	15,941	17,520	17,530
B.	**Commercial Losses**				
	i) Commercial Losses (excluding subsidy)@	4,117	20,379	20,715	22,013
	ii) Commercial Losses (including subsidy)	NA	9,298	10,890	12,182
C.	**Rate of Return (ROR %) #**	**-12.70**	**-28.32**	**-27.97**	**-28.13**
D.	**Revenue Mobilisation**				
	Additional Revenue Mobilisation from achieving				
	(a) 3% ROR	4,959	22,538	22,936	24,362
	(b) From introducing 50 paise per unit from Agriculture/Irrigation	2,176	540	755	773

RE : Revised Estimates *** Provisional**
AP : Annual Plan Projection **# for losses without subsidy.**
@ Commercial losses are different from uncovered subsidy because they include financial results of other activities undertaken by the SEBs.

Note : 1 The information regarding commercial losses in case of Orissa an Delhi pertains to GRIDCO of Orissa and Transmission Company of Delhi only.

2 Information in case of Andhra Pradesh, Haryana, Rajasthan, Uttar Pradesh, Uttaranchal and Karnataka states is relating to transmission and distribution companies set up after the reforms. In case of other states, the information pertians to SEBs.

Source : Planning Commission.

Box 9.1 : Electricity tariff for 2004-09

CERC has emphasized that all future projects and new investment in generation, transmission and distribution, both by public sector utilities as well as independent power producers(IPPs) should be structured through a tariff based transparent competitive bidding process. This would be an improvement over the existing framework of detailed regulation based on a 'cost plus' approach, which leads to inefficiencies and lack of incentive for cost minimisation.

During the period of transition to a competitive bidding regime, CERC proposes that tariff regulation should move away from the cost plus actuals approach, to style of light handed regulation based on normative parameters. This would incentivise efficiency and streamline tariffs. These parameters include:

- In the new terms and conditions for regulating the tariff of projects set up on cost plus basis, CERC will adopt a normative debt equity ratio of 70:30 for all generation and transmission projects.
- The return on equity shall be 14 per cent post tax, uniformly applicable to CPSUs and IPPs.
- Advance against depreciation shall be allowed to meet debt service obligations by considering the repayment period of loan as 10 years. The development surcharge has been discontinued.
- The performance benchmarks of plant availability for hydro and thermal generating stations have been raised.
- Efficiency benchmarks for coal, lignite and gas based thermal generating stations have been raised.
- The norms for specific oil fuel consumption and auxiliary energy consumption within the power stations have been tightened.
- Normative benchmarks have been set for operation and maintenance expense payable to thermal generating stations and transmission licensees.
- The frequency linked unscheduled interchange (UI) rates for deviation from the generating or energy drawal schedules have been revised upward.

Power Trading

9.16 A central policy goal in the field of electricity is that of shifting to a competitive market framework, where electricity is bought and sold across an ecosystem of producers, consumers and intermediaries. This framework emphasizes choice by consumers, and competition amongst producers. Under this framework, patterns of energy conservation, investments in generation, and time-of-day characteristics of consumption would be shaped by price-based incentives.

9.17 A milestone in this evolution is the introduction of the "Availability Based Tariff", which is a stepping stone to a spot market for electricity. The Central Electricity Regulatory Commission (CERC) has implemented Availability Based Tariff (ABT) in all the five electrical regions of the country at the inter-State level. The price for `unscheduled inter-changes' (UI) of energy has been related to the grid frequency. Since the grid frequency drops below 50 hertz when demand exceeds supply and vice versa, this generates incentives for grid discipline, and for reduced demand and additional supply when there are shortages. As a consequence, grid discipline has improved remarkably; the grid frequency now stays much closer to 50 hertz as compared with the situation prior to the ABT. Among other things, this has helped reduce the damage to capital equipment caused by fluctuations in the frequency.

9.18 These developments have taken the market for electricity closer to other normal markets in the economy. While the ABT contains many elements of a spot market for electricity, it is still inhibited by major barriers to entry. The removal of these entry barriers will take this market closer to competitive conditions, and induce improvements in efficiency.

9.19 The Electricity Act, 2003 made considerable progress in terms of giving buyers and sellers of electricity flexibility to transact with each other. It emphasised the role of traders in serving the power needs of the country. Distribution, trading and transmission have now become licensed activities, while thermal generation has been de-licensed. The distribution licensee does not require a separate trading license. Apart from increased competition over the long term, the near-term impact of these measures will be that of making the owner-trader and distributor-trader business models a reality. Market development has been enabled by many other policy initiatives, including inter-regional link lines of roughly 9 GW capacity and online real-time information dissemination from the five Regional Load Dispatch Centres (RLDCs).

9.20 The typical participant in the market today is a state power utility, although some private generators and distribution licensees have also participated. Captive generators and high tension (HT) consumers are yet to participate in these transactions. A power utility essentially performs two functions to serve its customers - managing loads (the load serving side) and managing a portfolio of power generation facilities (the generation side). In matching these two sides of the business, it discovers mismatches on the supply and demand sides, and therefore needs to either procure more power or sell any power that is surplus. At the same time, a counterpart utility has a matching surplus or deficit positions, and this matching positions of counterpart utilities create an opportunity to buy and sell power - what has now come to be defined in the Electricity Act as 'trading' or purchase for resale. As of yet, this is a highly illiquid market; the trading volume of 11 billion kilowatt hours in 2003-04 was roughly only 3 per cent of electricity generation in that year.

Scheme for Rural Electricity Infrastructure and Household Electrification

9.21 Earlier, a village was defined as being electrified if at least one connection existed. In 2003-04, the definition of an electrified village was amended to require linking at least 10 percent of the households in the village, to require that electricity is provided to public places like schools, panchayat office, health centers, dispensaries and community centers, and to require that distribution transformers and distribution lines are provided in the

inhabited locality as well as a Dalit Basti/hamlet if it exists. Using this new definition, out of the total number of villages as of the 1991 census of 5,87,556, there were 1,12,401 villages where electrification had not been done.

9.22 The NCMP envisages electrifying all these villages over a five year period. The strategy through which this is sought to be achieved consists of the following elements:

(i) Creation of Rural Electricity Distribution Backbone (REDB) of 33/11 KV substations, with one such substation in each block appropriately networked and linked to the State transmission system.

(ii) Creation of Village Electricity Infrastructure (VEI) by providing Distribution Transformer(s) with at least one such transformer in every village.

(iii) Rural Households Electrification of unelectrified households from village distribution transformer(s).

(iv) Decentralized distributed generation system for such villages where grid connectivity is either not feasible or not cost effective.

Distribution reforms

9.23 Achieving sound policies on distribution is widely understood to be the key constraint in the power sector. There has been an effort to sign Memoranda of Understanding with State governments, under which they were to undertake distribution reforms in a time-bound manner, including setting up of a State Electricity Regulatory Commission (SERC), unbundling of State Power Utilities, metering of feeders and consumers, starting energy accounting and auditing, securitisation of outstanding dues of CPSUs, and grid discipline being promoted to improve both the quantity and quality of power supply. This approach has yielded significant results. As of date, 24 States have constituted SERCs and 18 have issued tariff orders in the direction of rationalizing the tariffs. 12 States have unbundled/corporatised their power utilities, and 10 others are expected to replicate this shortly. Distribution has been privatised in Orissa and Delhi, and Uttar Pradesh has invited Expressions of Interest for privatization of distribution. The 2002 privatization experience of Delhi has been encouraging so far (Box 9.2).

9.24 Continued progress is reported on metering. Metering at the feeder level rose from 81 per cent of States in 2000 to 96 per cent in 2004. Similarly, 77.6 per cent of States were

Box 9.2 : Privatization experience in Delhi

Electricity distribution was privatised in Delhi in July 2002. The transaction structure was focused on reduction of theft. Prior to privatization, the Aggregate Technical and Commercial (AT&C) loss level was 50.7 per cent. A loss reduction path of 17 percentage points was charted for the private distribution companies over a period of five years. These private companies have strong incentives to outperform these targets, since the loss reduction would be equally shared between consumers and the distribution companies. The energy shortage in Delhi has declined from 1.9 per cent in 2002-03 to 1.4 per cent in 2003-04. The index of power availability has also improved

Parameter	As on July 2002			2003-04			2004-05 (*)		
	BRPL	BYPL	NDPL	BRPL	BYPL	NDPL	BRPL	BYPL	NDP
Reliability Index (%)	96.98	96.46	98.5	N.A	N.A	99.57	98.84	98.64	99.64

(*) – Till Oct. 2004

Abbreviations :

BRPL : BSES Rajdhani Power Ltd.

BYPL : BSES Yamuna Power Ltd.

NDPL : North Delhi Power Ltd.

metering all consumers in 2000, which rose to 87 per cent in 2004.

9.25 The Central Electricity Authority has reported that the States of Arunachal Pradesh, Assam, Bihar, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya, Mizoram, Orissa, Rajasthan, Uttar Pradesh, Uttaranchal & West Bengal have shown reduction in Transmission and Distribution Losses (T&D) during 2002-03 in comparison to the previous year. On a national basis, the T&D loss dropped from 33.98 per cent in 2001-02 to 32.54 per cent in 2002-03.

9.26 Power Finance Corporation (PFC) conducted a study on the financial health of State Utilities. Based on data made available by 16 States, the study found that operating losses of State Power Utilities which were Rs.25,207 crore in 2001-02 had dropped to Rs.17,593 crore in 2002-03. The gap between Average Cost of Supply (ACS) and Average Revenue Realised (ARR), which was 110 paise per KWH during the year 2001-02, had dropped to approximately 63 paise per KWH during the year 2002-03 in these 16 states.

Accelerated Power Development Reforms Programme

9.27 With a view to giving a fillip to State Governments, SEBs and utilities to take adequate steps towards reduction of transmission, distribution and commercial losses, the Government is implementing the Accelerated Power Development and Reforms Programme (APDRP). Funds are released as Additional Central Plan Assistance to State Electricity Boards (SEBs)/Utilities for upgradation and strengthening of the sub-transmission and distribution system with the objective of reducing Aggregate Technical and Commercial (AT&C) losses, improving quality of supply of power, increasing revenue collection and improving consumer satisfaction. APDRP is also an instrument to leverage distribution reforms in the States. The Government has allocated Rs.3500 crore for APDRP in 2004-05: Rs.1,750 crore under the investment component and Rs.1,750 crore under the incentive component

9.28 Under the investment component, so far, 499 projects amounting to Rs.17,619 crore have been sanctioned in 29 States during the triennium ending in 2004-05. The disbursement for the year 2002-03 was Rs.17,55.51 crore and for 2003-04 was Rs.2,356.51 crore. APDRP provides incentives for achievement of loss reduction: so far six States have qualified and received the incentive payments (Table 9.7).

Table 9.7 : Releases under APDRP

(Rs. in crore)

State	Cash Loss Reduction	Incentive released
Gujarat	472.74	236.38
Maharashtra	275.78	137.89
Haryana	210.98	105.49
Rajasthan	275.42	137.71
Andhra Pradesh	530.22	265.11
West Bengal	146.00	73.00
Total	**1911.14**	**955.58**

9.29 The Government has announced recently the National Electricity Policy as envisaged in the Electricity Act, 2003 enunciating the Government's resolve to make available electricity to all households in five years and to fully meet the power demand by 2012 (Box 9.3). However, a continued focus on questions of open access, as enshrined in the Electricity Act, 2003 and a level playing field, for all present or future participants in the electricity sector, is required in order to obtain competitive conditions.

Telecommunications

9.30 After the announcement of New Telecom Policy 1999, progress in telecom in India has been extremely rapid. The total number of telephones (basic and mobile) rose from 22.8 million in 1999 to 88.6 million at the end of October, 2004. During 2003-04 itself, 21.92 million telephones were added, which was equal to the total number of phones installed as of 1999. During the first seven months of the 2004-05, 12 million phones have been added. Overall, tele-density rose from just 2.32 in 1999 to 8.2 in October 2004.

9.31 The structure and composition of telecom growth has undergone a substantial change in terms of mobile versus fixed phones

Box 9.3 : Salient features of National Electricity Policy

1. **Objectives :**
   (a) Access to electricity-Available for all households in next five years.
   (b) Availability of Power-Demand to be fully met by 2012. Energy and peaking shortages to be overcome and spinning reserve to be available.
   (c) Supply of Reliable and Quality Power at specified standards in an efficient manner at reasonably rates.
   (d) Per capita availability of electricity to be increased to over 1000 units by 2012.
   (e) Minimum lifeline consumption of 1 unit/household/day as a merit good by year 2012.
   (f) Financial Turnaround and Commercial Viability of Electricity Sector.
   (g) Protection of consumers' interests.
2. CEA to notify first National Electricity Plan in six months with a perspective up to 12th Plan period. The Plan prepared by CEA to be used by prospective generating companies, transmission utilities and transmission/ distribution licensees as reference document.
3. Development of Rural Electrification Distribution backbone, village electrification and household electrification to achieve the NCMP target of completing household electrification in next five years. Financial support in terms of capital subsidy to States for rural electrification. Special preference to Dalit Bastis, Tribal Areas and other weaker sections for rural electrification. REC to be nodal agency for rural electrification at Central Government level.
4. Creation of adequate generation capacity with a spinning reserve of at least 5 per cent by 2012 with availability of installed capacity at 85 per cent.
5. Full development of hydro potential. Provision of long term finance for these projects.
6. Choice of fuel for thermal generation to be based on economics of generation and supply of electricity.
7. Development of National Grid.
8. Cost of recovery of service from consumers at tariff reflecting efficient costs to ensure financial viability of the sector.
9. Provision of support to lifeline consumers (households below poverty line having consumption of 30 units per month) in terms of tariffs.
10. Availability based tariff (ABT) to be extended to State level for better grid discipline through economic signaling.
11. Special emphasis on time bound reduction of transmission and distribution losses.
12. Measures to promote competition aimed at consumer benefits.
13. Reliability and quality of power supply to be monitored by State Electricity Regulatory Commissions.
14. Exploitation of non-conventional energy sources such as small hydro, solar, biomass and wind for additional power 'generation capacity.
15. Central Government to facilitate the continued development of national grid. CTU and STU to undertake coordinated planning and development.
16. Transmission capacity to have redundancy level and margins as per international standards.
17. Adequate transitional financial support for reforming power utilities. Encouragement for private sector participation in distribution.
18. The State Regulatory Commissions to put in place independent third party meter testing arrangement.
19. Support for adoption of IT system for ensuring correct billing to consumers.
20. Speedy implementation of stringent measures against theft of electricity.
21. Full emphasis on augmentation of R&D base. Mission approach for identified priorities areas.
22. Demand side management through energy conservation measures. Label regarding energy efficiency to be displayed on appliances. Efficient agricultural pump sets and efficient lighting technologies to be promoted. Appropriate tariff structure for managing the peak load.
23. Special attention for developing training infrastructure in the field of regulation, trading and power market.
24. For giving boost to renewable and non-conventional energy sources, a prescribed percentage of power as specified by State Regulatory Commission to be purchased from such sources of energy at the earliest.
25. Necessary regulations and appointing Ombudsman for redressal of consumers' grievances to be in place in six months.

Table 9.8 : Growth of telephones over years								
Year	Fixed in Million			% of PSUs	Mobile incl. WLL mobile (in Million)			% of PSUs
	PSUs	Pvt.	Total		PSUs	Pvt.	Total	
2001-02	37.90	0.52	38.42	98.65	0.26	6.28	6.54	3.98
2002-03	40.53	1.10	41.63	97.36	2.64	10.35	12.99	20.32
2003-04	40.49	2.36	42.85	94.49	5.99	27.70	33.69	17.78
2004-05 (Oct.)	40.33	3.80	44.13	91.39	8.99	35.50	44.49	20.21

and public versus private participation. In 1999, both mobile phones and private sector separately accounted for 5 per cent of total number of phones. In October 2004, mobile phones accounted for 50 per cent of total phones and the private sector accounted for 44 per cent of total phones.

9.32 Mobile phones were once considered a luxury. In recent years, it has become clear that the capital costs of mobile telephony are lower, which makes mobile telephony the technology of choice for low-price telephony. Affluent households are going from one fixed line per family (analogous to a tele-density of 20) to one mobile phone per person (analogous to a tele-density of 100).

9.33 Few areas of India's economy have enjoyed as sharp a pace of structural change as that in the telecom sector. The rapid pace was the outcome of vigorous competition among firms and technologies. This drastic pace of structural change highlights the possibilities in other segments of infrastructure for eliciting massive investment by the private sector, and for benefiting the consumers through competition between old and new technologies.

9.34 Although India's 88.62 million strong telephone network, including mobile phones, is one of the largest in the world, with the low telephone penetration rate of about 8.20 phones per hundred population, the country offers vast scope for growth. Present projections suggest that by the end of 2007, the total number of phones could reach 250 million.

9.35 Over the recent period, public sector operators (BSNL and MTNL) have lost market share in fixed telephony from 98.65 per cent to 91.39 per cent (Table 9.8). In the past two years, Public Sector Undertakings (PSUs) have actually seen a decline in the number of fixed lines, while such lines have grown in the private sector. At the same time, the PSUs actually gained market share in mobile telephony, going from 3.98 per cent to 20.21 per cent share of the market. Overall, the share of PSUs declined from 90 per cent to 55.6 per cent.

9.36 While tele-density has risen sharply, India continues to lag far behind countries like Brazil and China, where the tele-density is more than 40 (Table 9.9). In order to 'catch up', there is a need to maintain vigorous pro-competitive efforts in terms of public policy, rapidly shift to new technologies, encourage entry of new players, and drive prices down through competition. The policy initiatives taken in the telecom sector recently address some of these issues (Box 9.4).

Table 9.9 : International comparison of Teledensity, December, 2003	
Countries	Teledensity
Australia	126.18
Bangladesh	1.56
Brazil	42.38
China	42.32
India	**6.60**
Indonesia	9.17
Nepal	1.70
Pakistan	4.42
Sri Lanka	9.57
U.K.	143.13
U.S.A.	116.43
Source : ITU.	

Box 9.4 : Major Policy Initiatives in Telecom Sector

- Broadband Policy announced on October 14, 2004
- Indoor use of low power equipments in 2.4 GHz band de-licensed from August 2004
- In April 2004, license fee for UAS reduced by 2% is in the range of 6-10% while that for CMTs is in the range of 8-12%
- Performance Bank Guarantee in respect of NLDS license reduced in June 2004 from Rs. 100 crore to Rs. 50 crore for each phase
- License for Infrastructure Provider-II reduced in June 2004 from 15% to 6% of the AGR
- ISPs permitted to use underground copper cable for establishing their own last mile linkages
- In Budget 2004-05 —
  - — Benefits under Section 80-IA provided for companies starting after May 31, 2005
  - — Customs duty exemptions provided on mobile switching centres for Unified Access Service Providers, optical fibre cable and raw materials required for optical fibre
- Bank Guarantee for IP-II category reduced in March 2004 from Rs. 100 crore to Rs. 5 crore
- The operation of Automated spectrum management system has commenced
- National Internet Exchanges set up during September 2003 – February 2004
- Guidelines issued for intra-circle mergers of licenses in January 2004
- After the introduction of Unified Access Service regime, all the Basic Service licensees have migrated to UASL.

Table 9.10 : The Telecom Industry—Firm level data

Company Name	Year	Sales	Profit after tax	Gross fixed assets	Gross value added	Market Cap on NSE as on 27th Jan., 2005
Bharat Sanchar Nigam Ltd.	2002-03	27,492	1,444	94,678	20,177	
Mahanagar Telephone Nigam Ltd.	2003-04	6,370	1,150	14,072	3,966	9,047
Videsh Sanchar Nigam Ltd.	2003-04	3,164	378	2,463	1,861	5,801
Bharti Cellular Ltd.	2003-04	2,187	137	3,652	879	
Bharti Infotel Ltd.	2003-04	2,114	341	3,058	800	
Bharti Mobile Ltd.	2003-04	1,179	182	1,535	568	
Idea Cellular Ltd.	2003-04	1,166	-207	2,388	426	
B P L Mobile Communications Ltd.	2002-03	453	-25	946	210	
Aircel Ltd.	2003-04	247	23	598	205	
Reliance Telecom Ltd.	2002-03	357	-299	522	197	
Escotel Mobile Communications Ltd.	2003-04	421	-105	935	197	
Fascel Ltd.	2002-03	363	11	507	153	
Tata Teleservices (Maharashtra) Ltd.	2003-04	598	-270	2,258	117	4,089
Aircel Cellular Ltd.	2003-04	153	19	280	85	
Hexacom India Ltd.	2002-03	115	13	133	66	
B T A Cellcom Ltd.	2003-04	131	-15	274	44	
Bharti Tele-Ventures Ltd.	2003-04	30	0	32	40	38,847
Aircel Digilink India Ltd.	2001-02	93	-2	262	33	
Comsat Max Ltd.	2003-04	45	3	58	16	
Shyam Telelink Ltd.	2003-04	95	-94	583	12	
Tata Teleservices Ltd.	2003-04	800	-786	3,519	-141	
Aggregate for 21 firms		**46,736**	**2,683**	**129,234**	**30,047**	**57,783**

9.37 The growth of tele-density has required substantial financial investment. One important source for this investment has been FDI. From August 1991 to August 2004, 926 proposals of FDI of Rs. 41,368 crore were approved. The actual FDI inflow of approximately Rs.5,763 crore between January 2001 and August 2004 alone was about 56 per cent of the total FDI flow in telecom since its inception in 1991. In terms of approval of FDI, the telecom sector is the second largest, after power and oil refineries. While the prices of telecom equipment have fallen sharply, India's push from below 100 million lines to the region of 250 million lines will also involve substantial investment.

9.38 Analysis of firm-level data for the latest available year – 2003-04 for most, except some – show that industry as a whole contributes roughly Rs.30,000 crore per year to GDP, or around 1 per cent of GDP (Table 9.10). This value addition is generated by using Rs.129,234 crore of fixed assets. Some of the firms are now listed on the stock market, and have a market value of Rs.57,783 crore. This market value understates the size of the industry, as many of the firms including BSNL and Reliance Infocomm, are not accounted for because of their unlisted status.

The next frontier: broadband

9.39 Indian telecom is set for high growth rates embracing the wider population, when it comes to ordinary voice telephony. While India's tele-density lags behind the world, present trends suggest that catching up is presently underway. India also lags behind the world to a considerable extent in the field of broadband telecom. At end-December, 2003, penetration of Broadband, Internet and Personal Computer (PC) in the country was 0.02 per cent, 0.4 per cent and 0.8 per cent respectively. As per the Broadband Policy announced on October 14, 2004, broadband has been defined as an "always-on" data connection supporting interactive services including Internet access with minimum download speed of 256 Kbps per subscriber. The broadband policy aims to target three million broadband subscribers and six million Internet subscribers with a timeframe of December 2005. Further, it is targeted that, by 2007, the broadband subscribers would be 9 million. By the end of the year 2010, the policy aims to target 20 million broadband subscribers and 40 million Internet subscribers.

9.40 The prime consideration guiding the policy includes affordability and reliability of broadband services, incentives for creation of additional infrastructure, employment opportunities, induction of latest technologies, national security and bringing in a competitive environment to reduce regulatory interventions. The new policy encourages creation and growth of infrastructure through various access technologies which can mutually co-exist like optical fibre technologies, digital subscriber lines on copper loop, cable TV network, satellite, and terrestrial wireless technologies. The choice is left to the service provider.

9.41 Ability to emulate the success of many other Asian countries in the broadband area will have major implications for smoothing intra-India commerce and industry, knowledge flows into India, e-governance, greater integration into the world economy through international voice and videoconferencing traffic and lower prices for NLD and ILD traffic, and services exports such as software and "business process outsourcing".

9.42 Of the more than 40 million copper loops in the country available with BSNL and MTNL, 14 million loops are in the rural areas. Taking into account the condition/life of copper cable and demand potential, around 7 million loops can be leveraged for broadband service by BSNL and MTNL. BSNL and MTNL have decided to provide 1.5 million connections by the end of 2005. The corporate/work plans of these PSUs have been drawn up for this purpose. The core network for 71 cities throughout the country has been set up by BSNL/MTNL. Broadband services have already been launched by BSNL and MTNL on January 14, 2005. They propose to cover 198 cities in addition to Delhi and Mumbai by April 2005.

9.43 The broadband services have been launched only recently and, with the increase in volume and competition, the cost of these

services are likely to decrease. One international comparision, showed in Box 9.5, suggests the opportunities for lower prices in this area. Internet bandwidth will become cheaper to the extent that domestic traffic is switched within the country, and servers accessed by Indian users are located within the country. The National Internet Exchange of India (NIXI) has been set up by DIT to ensure that Internet traffic, originating and destined for India, is routed within India.

Universal Service Obligation Fund

9.44 A challenge common to most infrastructure services is the need to undertake special efforts to ensure coverage in rural areas. The traditional strategy in India has consisted of using cross-subsidies, charging urban consumers more and rural consumers less. The Universal Service Obligation Fund (USOF) in India's telecom sector is a unique institutional innovation which ensures provision of services at minimum cost in rural areas through a system of open bidding. At present, USOF is funded by imposing a levy of 5 per cent of adjusted gross revenue of telecom companies.

9.45 Rural telephony services provided under the aegis of USOF involve payments from the fund for both capital cost and maintenance and operational costs, through an open and transparent bidding system. Through USOF, fiscal support is delivered to pay phones and individual household phones in rural areas and in remote areas where producing telecom services is costly. It endeavours to implement universal public access broadband through installation of High Speed Public Telecom Information Centres at Block headquarters and in villages, with population of more than 2000. Provision of Village Public Telephones (VPTs) in all villages and provision of additional Rural Community Phones (RCPs) in nearly 46,000 villages with population more than 2000 are also covered. From 2002-03 to 2004-05 about Rs.6,696 crore are estimated to have been collected for the USO Fund. The entire budgetary provision of Rs.1700 crore allocated for the financial years 2002-03, 2003-04 and 2004-05 has been fully utilised.

Box 9.5 : Price of Broad band connectivity — one international comparison

	MTNL	UK Online
Bandwidth speed Upload/ Download	512/ 512 kbps	400/ 8192 kbps
Free download (monthly)	2.5 GB	500 GB
Price (monthly)	Rs. 2,399	Rs. 3,239

Note: UK Policy framework uses local loop unbundling.

The Electromagnetic Spectrum

9.46 The electromagnetic Spectrum is a scarce natural resource, which needs to be allocated in ways that maximize its economic value. The trend in modern telecommunications is towards mobility, for which radio frequency spectrum is one of the essential ingredients. Government policies on spectrum allocation are a major factor in shaping the future of the telecom industry. Government has adopted a technology neutral policy in the telecom sector.

9.47 Efforts are being made for introduction of newly emerging radio communication technologies, without unduly constraining the other existing operations. There has been an ongoing process of addressing bottlenecks in spectrum availability as and when they are encountered. In this regard, automated spectrum management system has been commenced in January, 2005.

Trends in Telecom Tariff

9.48 There has been a dramatic fall in the tariffs due to increased competition. The tariffs for local calls have fallen considerably in recent months particularly for cellular and WLL (Table 9.11) The peak long distance tariff between

Table 9.11 : Tariff for local calls

	Mar. 03	June 03	Sept. 03	Dec. 03	Mar. 04	June 04	Sept. 04
Fixed	0.69	0.78	0.78	0.78	0.78	0.65	0.65
Cellular	1.63	1.12	0.77	0.77	0.77	0.77	0.77
WLL(M)	0.71	0.67	0.67	0.57	0.44	0.44	0.44

Table 9.12 : Tariff for long distance calls						
Distance	**1999-2000**	**2001**	**2002**	**March 2003 onwards**	**April 10-Sept. 09, 2004**	**With effect from Sept.10, 2004**
Upto 50 Kms	1.20	1.20	1.20	1.20	1.20	1.20
Above 50 Kms and uto 200 Kms.	6.00	4.80	4.80	2.40	2.40	2.40
Above 200 Kms and upto 500 Kms.	15.60	12.00	4.80	4.80	3.60	2.40
Above 500 Kms. And upto 1000 Kms.	21.60	18.00	9.60	4.80	3.60	2.40
Above 1000 Kms.	30.00	24.00	9.60	4.80	3.60	2.40

Delhi and Mumbai has come down from Rs. 30 per minute in 2000 to less than Rs. 2.40 per minute in 2004 (Table 9.12). In the same fashion, international call charges have also come down drastically from Rs. 61.20 per minute in 2000 to Rs. 7.20 per minute in 2004 for the American continent (Table 9.13). Mobile telephony prices have dropped from Rs. 16 per minute to Re. 1 to Rs. 2 per minute.

9.49 In countries like the U.S., mobile telephony subscription packages typically bundle airtime with national long distance (NLD) consumption into a single price per minute of airtime, where the consumer does not differentiate between local calls and NLD calls. This is in sharp contrast to India, given the tradition of very high NLD rates in the country. However, given the introduction of competition in NLD and the consequent drop in prices, tariff packages, which are competitive by world standards, may now appear in India.

Table 9.13 : Recent changes in ILD Tariff			
Country	**From Oct. 2003 to 9th April 2004**	**With effect from 10th April to 20th Oct. 2004**	**With effect from 21st Oct. 2004**
United Kingdom	7.20	7.20	7.20
USA and Canada	9.60	7.20	7.20
Rest of Europe	9.60	9.60	9.60
South East Africa	12.00	9.60	9.60
SAARC countries	21.18	18.00	18.00
Sri Lanka	21.18	18.00	12.00
Rest of the World	24.00	18.00	18.00

Rural telephony

9.50 As on November 30, 2004, more than 5,20,000 villages were connected using a Village Public Telephone (VPT). The remaining 66,822 villages, excluding around 22,000 villages with population less than 100, in insurgency - prone areas or thick forests will be covered in a phased manner in the next three years. More than 2 lakh Public Call Offices (PCOs) are also providing community access in the rural areas. So far, 129 lakh phones have been provided in the rural areas. A pilot program using mobile phones to run a mobile PCO with 2,592 “Gramin Sanchar Sewaks” serving 11,013 villages, was in operation on November 30, 2004.

Posts

9.51 The Indian postal network is among the largest networks in the world in terms of area covered and population served, and constitutes an important mechanism of achieving transportation and communication (Table 9.14). The Indian Postal System currently provides 38 services which can broadly be divided into four categories: Communication services (Letters, Post Cards etc.), Transportation services (Parcel), Financial services (Savings Bank, Money Order, Postal Life Insurance) and Premium Value Added Services (Like Speed Post, Business Post). The Post Office Savings Bank is the largest bank in India in terms of network, accounts and annual deposits.

9.52 As on March 31, 2004, there were 1,55,669 post offices or outlets, of which roughly 89 per cent were outside cities. On

Table 9.14 : Postal network — International Comparisons				
Country	**Permanent post office**	**Population served per post office**	**Average served area (sq. km)**	**Employee per 1000 population**
China*	76,358	16,851	125.68	0.38
India**	**1,55,618**	**6,602**	**21.13**	**0.56**
Indonesia***	19,881	10,806	95.80	0.12
Malaysia*	1,207	19,085	273.20	0.62
Sri Lanka*	4,638	4,158	14.15	1.17
U.K.*	17,243	3,460	14.16	3.55
USA *	37,683	7,657	248.72	2.96

Source : Dept. of Posts.

*** All figures pertain to the year 2002 and have been drawn from the UPU publication on Statistics, December, 2003.**

**** As on 31.3.2003.**

***** All figures pertain to the year 2001 and have been drawn from the UPU publication on Statistics, December, 2003.**

an average, a Post Office serves an area of 21.11 square km, and a population of 6,592.

9.53 User charges in the postal system cover only 78.3 per cent of costs. There is a significant subsidy element (Table 9.15). The revenue deficit dropped from Rs.1,550 crore in 2000-01 to Rs.1,354 crore in 2003-04. However, with the merger of 50 per cent of Dearness Allowance (DA) with basic pay last year and related enhancement, the deficit is likely to increase to Rs. 1,628 crore in 2004-05 (projection). Clarifying the rationale, the mechanism and the size of the subsidy constitutes an important policy question at this juncture.

Table 9.15 : Subsidy on Postal Services			
Service	**Subsidy per unit (Rs.)**	**Traffic (in million)**	**Total deficit (Rs. crore)**
Post Card	6.1	255.1	156.6
Printed Post Card	0.7	43.6	2.9
Letter Cards	4.1	327.5	135.4
Registration	16.0	223.3	357.9
Money Order	28.5	116.5	331.5
Reg. Newspaper (Single)	7.9	59.3	46.6
Reg. Newspaper (Bundle)	12.2	3.6	4.4
Printed books	9.2	2.5	2.3
Parcel	12.1	5.3	6.5
Others	NA	NA	160.0
Total	**NA**	**NA**	**1,203.0**

Source : Department of Posts.

9.54 The advent of computers and communications has had profound implications for the postal system. In some countries, more letters are sent by e-mail than by post. The postal systems world over, including India Post, have been able to respond to these changes by redefining their roles, optimizing their traditional strengths, developing and expanding their core competencies, and even harnessing the very technologies that have challenged them, to provide value added services to their customers. In its programme for upgradation of services offered, the Postal Department has worked on induction of new technology, modernising processes, and improving the customer experience. Presently, there are 839 Head Post Offices and 1,448 other Departmental Sub-post offices which are computerised for both counter and back office works. In addition, Multi-Purpose-Counter Missions (MPCM) are also available in 1,007 Sub Post Offices. A VSAT network with 150 High Speed VSAT stations which are further connected to 1,327 Extended Satellite Money Order (ESMO) stations located in the Post Offices have been set up for quick transmission of money orders across the country. The Department is transmitting about 60,000 money orders every day through this VSAT network. Process enhancement using IT is being continued on a large scale during the Tenth Five Year Plan. Automatic Mail

Processing Centres (AMPC) have been set up at Mumbai and Chennai for faster processing of mail, especially business mail.

9.55 Two internet based initiatives of the Department are 'e-Post' and 'e-Bill Post'. Under e-Post, e-mail messages can be booked at any post office and the messages are transmitted electronically, downloaded and printed at identified post offices and physically delivered to the recipient as hard copy. Thereby, e-Post service connects individuals who may or may not have access to PC/ Internet and thus bridges the digital divide. Under e-Bill Post, customers are able to pay multiple utility bills at post office counters.

9.56 Several measures have been introduced to optimize retailing capacity and reach out to provide services that are relevant to the needs of customers. Retail Post services offering sale of applications forms for entrance examinations and facility to remit fees are now widely available in post offices. The postal network is being used for helping the Election Commission in revising the electoral rolls. The Department of Posts will be also introducing "Logistics Post" shortly, to complement its existing range of parcel services for the high end customers.

9.57 Financial products and services are an important part of services provided by post offices in urban and rural areas. New initiatives have been taken up for facilitating, through its network, fund transfer for those customers who do not have the benefit of a vast retailing network. A strategic alliance with Western Union Financial Services has helped to strengthen the payment business by providing facilities for processing of in-bound international money transfers. Indian Post commands 23 per cent of the total South Asian market share of the international money transfers undertaken through Western Union Financial Services.

9.58 The Government of India has introduced a special high-yielding assured return scheme namely 'The Senior Citizen Savings Scheme (SCSS)- 2004' with effect from August 2, 2004. The scheme provides for a special rate of interest of nine per cent for depositors and is vended through post offices and Public Sector Banks. The Department, in September 2004, tied up with the UTI Asset Management Co. Ltd., for the retailing of five mutual fund schemes on a pilot basis from selected post offices. A new initiative for sale of non-life insurance products through post offices has been taken up from January 2004. Under this scheme, the Department of Posts will function as the marketing agent for M/s Oriental Insurance Company for sale of 16 of its products. These products are currently being made available through select post offices in some Circles and will be gradually extended to post offices throughout the country.

Roads

9.59 Indian roads carry 85 per cent of the passenger and 70 per cent of the freight traffic of the country. The highways, even though they make up only 2 per cent of the road network by length, carry 40 per cent of this traffic. For many years, India lagged behind many countries of the world which built expressways capable of sustained speeds of over 100 kilometer per hour (kph). In recent years, a concerted effort has been undertaken, through new institutional arrangements and improved highway engineering, founded on a revenue model comprising tolls and a cess on fuel, to build roads which deliver 80 kph sustained performance. Under the National Highways Development Project (NHDP) - the largest highway project ever undertaken by the country and with the shortest timespan for completion - 14,279 kilometer of National Highways are to be converted to 4/6-lanes, at a total estimated cost of Rs. 65,000 crore (at 2004 prices). The NHDP consists of the following components:

(i) The Golden Quadrilateral (GQ-5,846 kilometer) connecting the four major cities of Delhi, Mumbai, Chennai and Kolkata.

(ii) The North-South and East-West Corridors (NS-EW – 7,300 kilometer) connecting Srinagar in the North to Kanyakumari in the South and Silchar in the East to Porbandar in the West.

(iii) Port connectivity and other projects – 1,133 kilometer.

Table 9.16 : Progress of NHDP
(As on January 31, 2005)
(Kilometers)

Length	GQ	NS-EW	Port Connec-tivity & other Projects	Total
Total	5,846	7,300	1,133	14,279
Completed	4,480	675	263	5,418
Under implementation	1,366	857	455	2,678
Balance length to be awarded	Nil	5,768	415	6,183
Cumulative expenditure (in Rs. crore)	20,115	2,131	1,928	24,174

9.60 Current estimates suggest that the cost of a four-lane highway works out to roughly Rs.4.5 crore per kilometer, and the cost of a protected access, six-lane expressway works out to roughly Rs.8.5 crore per kilometer. Hence, great care is required in designing a framework for investment which avoids unnecessary strain on government finances. The funding of NHDP is based on a fuel tax and on tolls. A cess of Rs. 1.50 per litre is charged on the sale of petrol and diesel. A part of this (Rs.0.43 per litre against sale of high speed diesel oil and Rs.0.86 per litre against sale of petrol) goes to fund the NHDP.

9.61 As of January 31, 2005, 5,418 Kilometer of NHDP has been completed, the bulk of which (4,480 km) lie on the GQ (Table 9.16). The expenditure so far has amounted to Rs. 24,174 crore. There are 2,678 km. under construction. Contracts for 6,183 km are yet to be awarded. It is expected that the GQ would be substantially completed by December 2005, and the NS and EW corridors would be completed by December, 2007. There are constraints faced in timely completion of NHDP which include (i) delays in land acquisition and removal of structures, (ii) law and order problem in some States and (iii) poor performance of some contractors. With the completion of more than 75 per cent of the GQ, a substantial impact upon the economy is already visible. At this stage there is a need to focus attention on corridor management and road safety and NHAI has put in place a corridor management policy (Box 9.6).

Box 9.6 : Corridor management

Many parts of NHDP have been commissioned, and the focus needs to now shift from construction to "corridor management", i.e. the process of managing the highway so as to deliver maximal throughput in terms of velocity and number of vehicles, while minimizing the cost to the economy of accidents. Road safety is a particularly important area of focus, particularly given India's lack of experience with high velocity roads.

The maintenance of completed sections of the National Highways is being carried out by NHAI through short term improvement and road maintenance contracts and long term performance based maintenance contracts. The scope of work includes road maintenance, road property management, incident management, engineering improvement of toll-fee collection, traffic management, facility management, planning of operation and maintenance (O & M) center, training and road safety provisions.

In order to make the journey safe, under the corridor management policy, various safety measures are being provided on the National Highways:

(i) Provision of thermoplastic line marking on carriageway;

(ii) Provision of crash barriers at location of high embankments;

(iii) Provision of informatory, cautionary and mandatory sign boards;

(iv) Provision of declinators, studs and railing at the central median; and

(v) Provision of shrubs and plantation in the central median.

The annual expenditure of such safety measures is about Rs. 1 – 1.5 lakh per kilometer. About 1600 kilometer of highways are being maintained with an annual expenditure of about Rs. 20 crore for safety measures.

Table 9.17 : Financial structure of NHAI

(Rs. in crore)

Year	Cash flow		Expenses Including Maintenance Highways	Bonds/ Loans	
	Fuel Cess	Tolls		Issuance (Receipts) U/s 54 EC of Income tax Act, 1961	Service (Outgo) Repayment of Loan to GOI
1999-00	1,032	85	871	nil	nil
2000-01	1,800	134	1,404	657	nil
2001-02	2,100	192	4,189	804	nil
2002-03	2,000	252	6,785	5,593	450
2003-04	1,993	371	9,800	nil	115
2004-05*	1,848	360	5,604	nil	662

Source : NHAI. *** Upto January 31, 2005.**

9.62 NHAI's main source of finance is the fuel cess which is being leveraged for borrowings in the domestic market. There has been a rapid growth in tolls, from Rs.85 crore in 1999-2000 to Rs.371 crore in 2003-04, which is likely to rise to Rs.434 crore in 2004-05 (Table 9.17).

9.63 The capital expenditure undertaken through NHAI rose sharply, from Rs.746 crore in 1999-00 (0.04 per cent of GDP) to Rs.9,525 crore in 2003-04 (0.33 per cent of GDP). As an example, the total expenditure of NHAI in 2003-04 was Rs. 9,800 crore (Table 9.17) of which Rs. 9,525 crore was capital expenditure (Table 9.18). If highway construction is to achieve a capital expenditure of 0.5 per cent of GDP, then by 2005-06, the annual capital expenditure will need to cross Rs.18,000 crore.

Table 9.18 : Capital Expenditure through NHAI

Year	Capital expenditure (Rs. crore)	Percent to GDP
1999-00	746	0.04
2000-01	1,261	0.06
2001-02	3,997	0.18
2002-03	6,584	0.21
2003-04	9,525	0.33
2004-05 (Projected)	9,000	0.29

Source : NHAI.

9.64 NHAI has exploited a variety of con-tractual structures in moving towards 'public- private partnerships'. Projects costing over Rs.5,797 crore are being implemented through such contracts, which include Rs.2,354 crore in Build, Operate and Transfer (BOT) annuity projects and Rs.3,443 crore in toll-based annuity projects. In Phase II of NHDP, public-private partnership projects would account for around Rs.7,000 crore.

9.65 One of the approaches adopted to finance highways construction is through establishment of Special Purpose Vehicles (SPVs). 12 projects covering a length of 407 kilometer at an estimated cost of Rs. 2,266 crore have been identified under SPV funding. Out of these, 5 projects amounting to Rs. 923 crore have been completed and 7 projects amounting to about Rs. 1,343 crore are in progress.

Rural roads

9.66 The Pradhan Mantri Gram Sadak Yojana (PMGSY) was launched in December 2000 as a 100 per cent Centrally Sponsored Scheme to provide rural connectivity to unconnected habitations with population of 500 persons or more (250 in case of hilly, desert and tribal areas) in the rural areas by the end of the Tenth Plan period. It is funded by the diesel cess in the Central Road Fund, and

through borrowing from domestic financial institutions and multilateral funding agencies. Augmenting and modernizing rural roads has been included as an item of the NCMP. Thus, the scope of PMGSY has been expanded to include both construction of new links and upgradation of existing through routes associated with such link routes to form one complete sub-network, for providing connectivity between the village and the market.

9.67 A survey undertaken to identify the "core network" as part of the PMGSY showed that over 1.70 lakh unconnected habitations needed to be taken up under the PMGSY. This would require new construction of 3.69 lakh kilometer and upgradation of 3.68 lakh kilometers of rural roads, at a total cost of Rs.1,33,000 crore as against earlier estimates of Rs.60,000 crore. This does not include the cost of 5 - year maintenance of link routes and 10 - year maintenance of through routes taken up under PMGSY.

9.68 Project proposals amounting to Rs.14,789 crore have been cleared upto November, 2004 for 35,296 road works covering 103,010 kilometers. Rs.10,207 crore have been released to States/UTs. In terms of outcomes, 22,930 road works adding up to 60,024 km of roads have been completed, and expenditure of Rs.7,866 crore has been incurred by States/UTs up to October 2004. The National Rural Roads Development Agency (NRRDA), an agency of the Ministry of Rural Development registered under the Societies Registration Act, provides operational and technical support for the programme.

9.69 The World Bank supports the Rural Connectivity Programme through a series of tranches of IBRD loans/IDA credit. An agreement for the first tranche of US $400 million was signed on November 8, 2004. The beneficiary States for the first tranche of World Bank funding are Rajasthan, Uttar Pradesh, Jharkhand and Himachal Pradesh with the option of adding Bihar, once implementation arrangements are put in place. This is to be the first in a series of loans and the Project Appraisal Document provides for a second loan/credit for US $500 million. The Asian Development Bank (ADB) has agreed to support the Rural Roads Sector Development Programme; the States of Madhya Pradesh and Chhattisgarh have been identified as recipient States for the first tranche of the ADB loan of US $400 million, for which the loan agreement was signed on November 19, 2004. Three other States, namely Assam, Orissa and West Bengal have been identified for the second tranche of ADB assistance, which is likely to be around US $ 500 million. The overall ADB assistance is likely to be of the order of US $1.15 billion in three tranches.

9.70 In order to improve the absorption capacity of the States where the performance has been poor, initiatives have been taken for special interventions like involving Central Agencies for implementation of PMGSY, on the request of such States.

Next steps for NHDP

9.71 Under NHDP Phase-III, it is proposed to take up rehabilitation and upgradation of about 10,000 kilometers of existing national highways to 4 - lane dual carriageway configurations under a BOT basis. The programme generally comprises stretches of national highways carrying a high volume of traffic, connecting State capitals with the NHDP Phase I & II network and providing connectivity to places of economic, commercial and tourist importance. Preparation of Detailed Project Reports for these segments has begun. During the remaining period of the Tenth Plan, about 7,000 km will be taken up.

9.72 Accelerated North-East Road Development Project is being proposed for the development of the roads in this region, mainly to provide connectivity to all the State capitals and district headquarters in the North-Eastern Region including 4 –laning of the 315 kilometers of National Highways between Nagao and Dibrugarh and 2/4 laning of 288 kilometers of National Highways in Meghalaya, Nagaland and Sikkim. The proposal includes upgradation of other stretches of national highways and State-highways considered critical for economic development of the North-East region.

9.73 NHDP Phase IV is a new initiative proposed with a view to provide balanced and equitable distribution of improved/widening highway network throughout the country by upgrading 21,000 kilometer of single - lane roads to 2-lane roads with paved shoulders, and for strengthening of 17,000 kilometer of the existing 2-lane highways and construction of paved shoulders.

Ports

9.74 Ports are a crucial part of the transportation infrastructure of the country. The international experience with economic development has emphasized the development that has taken place near the coast through "gains from trade".

9.75 India has around 6,000 km of natural peninsular coastline. There are 12 major ports and 185 minor ports. Ports in India are divided into "major ports" (a list of named ports where the central government plays policy and regulatory functions) and "minor ports" (which are guided by state governments). As of today, the 12 major ports of the country handle about 75 per cent of the traffic. They are Chennai, Cochin, Ennore, Jawaharlal Nehru (Mumbai), Kandla, Kolkata, Mormugao, Mumbai, New Mangalore, Paradip, Tuticorin and Visakhapatnam. There are 185 minor ports, with a pronounced accent on the west coast. The minor ports are located in Gujarat (40), Maharashtra (53), Goa (5), Daman & Diu (2), Karnataka (9), Kerala (13), Lakshadweep (10), Tamil Nadu (14), Pondicherry (1), Andhra Pradesh (12), Orissa (2), West Bengal (1) and Andaman and Nicobar Islands (23).

9.76 Ports are focal points of convergence for several contending and competing business interests namely, shipping lines, port authorities, individual terminal operators to freight forwarders, inland logistics agencies and shippers whose cargo is being transported. Transportation by ship is highly energy - efficient. It can be increasingly used for intra-India traffic, and it is obviously essential for international trade. There can be a further expansion of transportation by ship to include inland water transport (IWT). These alternatives – intra-India shipping on the coastline and along rivers – can become important new alternatives in the Indian transportation scenario. IWT today only accounts for 0.15 per cent of domestic transportation, and there are opportunities for considerable growth.

9.77 In 2004-05 (upto December, 2004), cargo handled by major ports registered a 10.9 per cent growth, compared with the 9.9 per cent growth seen in 2003-04. (Table 9.19).

Table 9.19 : Trends in traffic at major ports

			April-December		Change over previous year	
	2002-03	2003-04*	2003	2004	2003-04	2004-05@
			(Million Tonnes)		(Per cent)	
POL	109.6	122.2	88.1	90.9	11.5	3.2
Iron Ore	50.6	58.8	39.9	47.4	16.2	18.8
Fertiliser & raw materials	8.6	7.5	5.6	7.2	-12.8	28.6
Foodgrains	8.5	6.8	5.2	3.1	-20.0	-40.4
Coal	48.2	48.8	36.5	39.5	1.2	8.2
Vegetable oil	3.3	3.8	2.9	2.8	15.2	-3.4
Other liquids	8.7	8.9	6.7	7.6	2.3	13.4
Containerised cargo	43.7	51.0	37.4	40.9	16.7	9.4
Others	32.4	37.0	26.6	36.6	14.2	37.6
Total	**313.6**	**344.8**	**248.9**	**276.0**	**9.9**	**10.9**

*** Provisional @April-December**
Source : Department of Shipping.

About 80 per cent of total volume of port traffic handled was in the form of dry and liquid bulk, while the remaining 20 per cent consisted of general cargo including containers. There has been an impressive growth of container traffic in the last few years with growth of over 15 per cent per annum during the five years up to 2003-04.

9.78 While container traffic has grown well in India, there is still a considerable lag when compared with the larger international ports. The largest port in the world in 2003, Hong Kong, processed 20.1 million TEUs (20-foot equivalent units). The 10th largest port, Antwerp, processed 5.4 million TEUs. In contrast, Jawaharlal Nehru Port (JNPT), India's largest container port, handled roughly 2 million TEUs in 2002-03 and 2.3 million TEUs in 2003-04.

9.79 The annual aggregate cargo handling capacity of major ports increased from 363.75 MMT to 389.50 MMT during 2003-04, and the average turnaround time came down further from 3.7 days in 2002-03 to 3.5 days in 2003-04 (Figure 9.1). The average output per ship-berth-day went up from 8,455 tonnes in 2002-03 to 9,080 tonnes in 2003-04. The pre-berthing time at major ports on port account dropped from 6.9 hours in 2002-03 to 4.9 hours in 2003-04. But wide variation in pre-berthing and turnaround times continue to persist (Table 9.20 and 9.21). A worrisome aspect of this data is the decline in performance of JNPT, India's most important container terminal. JNPT has experienced a worsening of both the average pre-berthing time and the average turnaround time.

9.80 The pre-berthing waiting time at JNPT is a particularly important problem, given the fact that JNPT accounts for over half of India's container traffic. The recent difficulties appear to have been primarily caused by the poor road and rail container evacuation infrastructure from the port to its hinterland.

9.81 In order to help strengthen its capacity, JNPT, has signed an agreement on August 10, 2004 with Gateway Terminals India Pvt. Ltd. for the development of the third container terminal which will result in addition of 1.3 million TEUs container handling capacity of the port. JNPT is also taking preparatory action for setting up a fourth container terminal. While increasing the throughput of JNPT by 1.3 million TEUs per year is useful, it will still not place JNPT in the ranks of the top 10 ports of the world.

Fig 9.1 **Average turnaround time and of pre-berth waiting time**

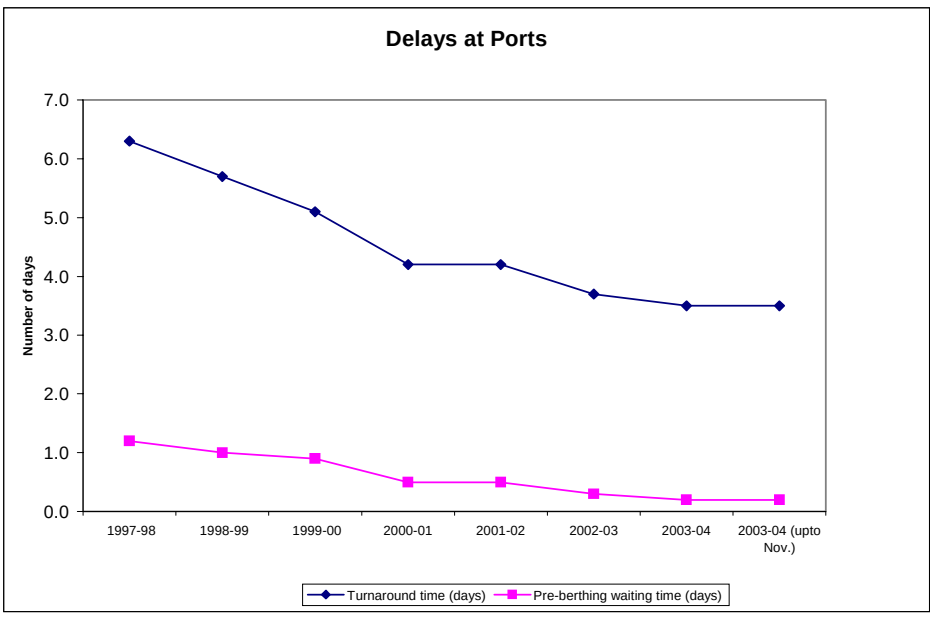


Table 9.20 : Selected performance indicator for major ports

Sl.	Name of the Port	Average pre-berthing time (hours) – on Port A/c			Average turnaround time (days) – on Port A/c		
		2002-03	2003-04	2004-05 (upto Dec.)	2002-03	2003-04	2004-05 (upto Dec.)
1(a)	Kolkata (Kolkata Dock Systems)	0.07	0.07	0.00	4.47	4.29	2.69
(b)	Kolkata (Haldia Dock Complex)	3.51	3.36	6.05	3.02	2.87	3.02
2	Mumbai	3.60	3.60	5.73	5.06	4.10	4.37
3	Jawaharlal Nehru	11.45	9.36	10.56	2.28	2.04	2.32
4	Chennai	1.30	0.90	0.90	3.70	4.60	3.90
5	Cochin	1.67	4 .04	4.69	2.19	2.22	2.54
6	Vizag	3.16	1.18	0.96	3.72	3.33	3.25
7	Kandla	16.80	10.80	15.60	5.94	5.06	4.65
8	Mormugao	19.92	26.64	30.23	3.86	4.47	4.71
9	Paradip	10.32	5.14	1.68	3.37	3.42	3.46
10	New Mangalore	4.32	3.12	3.12	1.90	2.35	2.90
11	Tuticorin	7.20	1.64	1.68	3.59	2.59	2.69
12	Ennore	1.56	1.66	0.24	2.24	1.94	1.60

Source: Department of Shipping.

Table 9.21 : Performance indicators of ports in India: for containers (2003-04) (Provisional)

	JNPT	Chennai	Kandla	Kolkata
Average pre-berthing time on port account (hours)	9.36	0.70	0.48	0.07
Average turnaround (days)	1.84	1.40	1.11	3.04

Source: Department of Shipping.

9.82 Given JNPT's experience with bringing in specialized firms to operate port services, a series of similar contracts are either under negotiation or under implementation at many ports across the country (Box 9.7). This includes the award of contract for the third container terminal at Jawaharlal Nehru Port. The Government has also approved the award of contract for development, management and operation of the International Container Transhipment Terminal (ICTT), Vallarpadam at Cochin to Dubai Ports International, Dubai,

Box 9.7 : Jawaharlal Nehru Port Trust—P&O Australia Experience

- Jawaharlal Nehru Port Trust, Navi Mumbai, signed an agreement with P&O Australia, for development of a two berth container terminal of 600 meter quay length on "Build, Operate and Transfer" (BOT) basis for a period of 30 years in July 1997. M/s P&O completed the project ahead of the schedule and commenced operations in April 1999. The total investment on this project was about Rs.900 crore. The new terminal was named as Nhava Sheva International Container Terminal (NSICT).
- The private terminal was expected to handle a minimum of 0.175 million twenty feet equivalent units (TEUs) of containers in the first year of operations, reaching a minimum of 0.5 million TEUs in the sixth year of operations. However, NSICT surpassed this figure and handled 0.342 million TEUs of containers during the first year of operations (April 1999 to March 2000). The container Traffic handled by NSICT during the last financial year (2003-04) was 1.23 million TEUs compared to 1.2 million TEUs in 2002-03.

UAE on BOT basis and the License Agreement between Cochin Port Trust and the BOT operator has been signed.

9.83 Investments in the ports sector, which continue to take place on a substantial scale, will be further spurred by institutional reforms in the coming years. In the recent period, 13 private or captive projects with a annual capacity addition of about 47.40 MMT and an investment of about Rs.2,597 crore have been completed/operationalised, while 23 others with a annual capacity addition of around 89.29 MMT and an investment of Rs.7,108 crore are at various stages of evaluation and implementation.

9.84 The central focus of policy in the ports area must remain maximization of intra-port and inter-port competition. An increasing shift towards a model where the port is a landlord, and multiple port operators in place to compete within the port, may be the way forward. The ports sector already has significant heterogeneity in institutional mechanisms. There is Ennore (a major port under the Companies Act) operating in tandem with other major ports (under the Major Port Trusts Act). There are minor ports complementing major ports, within which there are further differences across States. There are multiple berths run by various port operators. There are private ports. This heterogeneity is a major strength of India's ports sector. It improves the extent to which policy innovations are attempted, and the learning that comes from the varied experience that are continually in operation. At the same time, the recent experience with JNPT has highlighted the importance of modernising the rail and road connectivity between the port and the hinterland. Weaknesses in these aspects can significantly negate the benefits to the economy of investments in port infrastructure.

Civil Aviation

Airports

9.85 Efforts to restructure and modernise the Mumbai and Delhi airports through the joint venture route are underway. To assist in the restructuring process, M/s ABN-AMRO Asia Corporate Finance (I) Pvt. Limited and Air Plan Australia have been appointed as financial Consultant and Global Technical Advisor, respectively. An Empowered Group of Ministers has been constituted to oversee the process of restructuring. A Request for Proposal (RFP) document is expected to be released shortly to pre-qualified bidders for selection of the joint venture Partner. Two new greenfield airports with private sector participation are proposed at Bangalore and Hyderabad. In these greenfield airports, private partners will hold 74 per cent equity in the joint venture and State Governments and Airport Authority of India (AAI) will together hold the balance 26 per cent. The State Governments of Andhra Pradesh and Karnataka have selected the private sector partners for Hyderabad and Bangalore airports, respectively. The Bangalore and Hyderabad International Airports and Airports Authority of India have signed the respective shareholders agreements. The two joint ventures are Bangalore International Airport Ltd. (BIAL) and Hydrabad International Airport Ltd. (HIAL).

9.86 The new greenfield airport at Devanahalli near Bangalore is to be implemented on a Build Own Operate and Transfer (BOOT) basis. AAI's investment in the equity is capped at Rs.50 crore. The strategic joint venture partner consists of Siemens Germany, Unique Zurich Switzerland and Larsen and Turbo India Ltd. The approximate cost of the project is Rs.1,300 crore. Financial closure is expected to be achieved shortly. The target opening date for the airport is 33 months from the date of financial closure. The Concession Agreement between the Government of India and BIAL was executed on July 5, 2004.

9.87 The strategic joint venture partner for the greenfield airport at Shamshabad near Hydrabad is a consortium led by M/s GMR Infrastructure Limited with Malaysian Airport Holding Berhard (MAHB). The Concession Agreement between the GOI & HIAL was executed on December 20, 2004. The approximate cost of the project is Rs.1,300 crore. The target opening date of the airport is 36 months from the date of financial closure.

9.88 AAI is also considering development of non-metro airports. Indian Financial Consultants (IFC) and Global Technical Advisors (GTA) have been appointed for ten airports, namely Ahmedabad, Amritsar, Goa, Guwahati, Lucknow, Madurai, Jaipur, Mangalore, Trivandrum and Udaipur to assist AAI in identifying commercial activities to enhance non-aeronautical revenue including world class design for the terminal buildings. These consultants will carry out a detailed techno-economic feasibility study and prepare business and financial plans and models specific to each airport for adoption by AAI. Besides these 10 airports, AAI proposes to carry out similar studies for 15 more airports for which Notice Inviting Tenders (NIT) have been issued.

9.89 Due to the monopoly nature of the airports and their economic importance, efforts are afoot to set up an Independent Airport Economic Regulator responsible for tariff setting and monitoring of performance standards.

Regulatory framework governing the airline industry

9.90 Important policy changes to scale back entry barriers and increase competition in the airline industry have taken place during the year. During the year, Jet Airways and Air Sahara started operating flights to Sri Lanka and Nepal. Further, as a policy initiative to open up the air transport sector, the Government have decided to permit private airlines which have completed five years of domestic operation to operate to any destination in the world, excluding Gulf countries and West Asia.

9.91 Non-availability of seats to and from India during the peak winter season has been one of the major constraints faced by passengers. In order to ensure sufficient availability of seats, a limited open sky policy was adopted by Government for November 2004 to March 2005, under which designated airlines can operate additional services to/from India subject to the existing terms of commercial agreement with Air India/Indian Airlines. A number of airlines have responded to the offer and have requested for operation of over 2400 additional flights (equivalent to over 5 lakh seats) to different airports in the country during this five-month period. This will assist greater connectivity to/from India and easy availability of seats.

Air traffic

9.92 Policy initiatives have had a marked impact upon airline traffic. Domestic traffic grew by 24.7 per cent in calendar 2004 over calendar 2003. The international traffic saw a growth of 18 per cent in the same period. Private airlines now account for 61.1 per cent of domestic traffic.

Railways

9.93 Railways are an extremely efficient form of transportation. The energy consumption for freight movement on railroads, which is 440 Joules/KgKm, is about one quarter of the consumption of 1,836 Joules/KgKm required for trucks. In addition, the railways generate less pollution, and involve fewer accidents.

9.94 At end 2004, the network of Indian Railways (IR) was spread over 63,221 route kilometers (RKM), comprising broad gauge (46,807 RKM), metre gauge (13,290 RKm) and narrow gauge (3,124 RKm). Around 28 per cent of this network is electrified.

9.95 There has been significant effort at 'tariff rebalancing' and rationalization of fare and freight structures in the Railway Budgets for 2002-03 and 2003-04. These include reducing the number of classes for freight tariff from 59 to 27, and reducing the ratio between the highest and the lowest freight rates from 8.0 to 2.8 and reduction in freight rates for certain high-rated commodities such as petroleum products, iron, and steel and cement. There has been no across-the-board increase in freight rates during the last three years. To provide vital logistics support, the Ministry of Railways have signed a MOU with the Central Warehousing Corporation to develop a network of 22 freight terminals to provide single window service, including loading/unloading, storage and road-bridging, at the originating and destination points.

9.96 Rail Vikas Nigam Limited (RVNL) was setup in January 2003, as an effort to create a new institutional mechanism for implementing important and long-pending railway projects through a blend of budgetary support and non-budgetary initiatives. The projects form a part of the National Rail Vikas Yojana. An outlay of Rs. 717 crore has been provided for RVNL during the year 2004-05, to execute 38 projects, which form part of the Golden Quadrilateral and port connectivity routes.

9.97 Indian Railways, in partnership with State Governments of Andhra Pradesh, Jharkhand, Karnataka, Maharashtra, Tamil Nadu and West Bengal, is executing various projects in the respective States either through cost sharing or formation of joint ventures. A Special Purpose Vehicle (SPV) named Pipavav Railway Corporation Limited (PRCL) was formed with equal equity participation from the Ministry of Railways and Gujarat Pipavav Port Limited (GPPL) for construction, operation and maintenance of Surendranagar-Pipavav broad gauge line. The construction of this line has been completed and thrown open for goods traffic since March 2003.

9.98 Under public-private partnership scheme, an SPV named Hassan-Mangalore Rail Development Company (HMRDC)) has been formed, with participation of Government of Karnataka K-RIDE (Karnataka Rail infrastructure Development Company) and other strategic investors, for construction (gauge conversion), operation and maintenance of a broad gauge railway track, between Hassan and Mangalore connecting the New Mangalore Port. Similarly, an SPV named Kutch Railway Company Limited (KRCL) with participation of Government of Gujarat, Kandla and Mundra Ports, has taken over the gauge conversion work between Palanpur and Gandhidham providing a short route to Mundra and Kandla ports from the northern hinterland.

Table 9.22 : Performance of the Railways

			April-December		Change over previous year	
	2002-03	2003-04*	2003-04	2004-05	2003-04	2004-05@
					(per cent)	
1 Total revenue earning freight traffic (million tonnes)	518.7	557.4	407.2	438.4	7.5	7.7
(i) Coal	235.9	251.7	183.6	198.0	6.7	7.9
(ii) Raw Materials for steel plants (excl.coal)	41.0	44	32.4	31.8	7.3	-1.6
(iii) Pig iron & finished steel from steel plants	13.6	14.3	10.3	10.7	5.1	3.4
(iv) Iron ore for export	16.7	26.7	18.9	26.7	59.9	41.7
(v) Cement	46.20	49.50	35.6	39.5	7.1	10.8
(vi) Foodgrains	45.6	45.4	33.9	34.4	-0.4	1.5
(vii) Fertilizers	26.5	25.8	19.9	21.5	-2.6	8.2
(viii) POL	34.0	32	23.7	23.4	-5.9	-1.3
(ix) Balance (other goods)	59.2	68	48.9	52.3	14.9	7.0
2 Net tonne kilometers (billion)	353.2	381.2	278.5	301.2	7.9	8.2
3 Net tonne kilometers per wagon per day (broad gauge)	2,468	2,554	2,469	2,670	3.5	8.1
4 Passenger traffic originating (million)	4,971	5,112	3,896	4,125	2.8	5.9
5 Passenger kilometers (billion)	515	533	393	423	4.9	7.5

*** Provisional.** **@ April-December**

Source : Ministry of Railways.

9.99 The main index of rail safety, namely train accidents per million train Km, came down from 0.55 in 2001-02 to 0.44 in 2002-03, and further to 0.39 in 2003-04 (Provisional). The Corporate Safety Plan of Indian Railways (2003-2013) was formulated and presented in both the Houses of Parliament in August, 2003. It lists out the various works and programmes to be undertaken to achieve its various goals, involving an investment of Rs.31,385 crore over 10 years. A non-lapsable Special Railway Safety Fund (SRSF) of Rs. 17,000 crore was set up in 2001-02 to wipe out the arrears in renewal/replacement of over-aged assets within a time frame of six years. The expenditure under SRSF in the first three years was Rs.6,504 crore. For the year 2004-05, the total allocation for the SRSF is Rs.2,933 crore.

Urban infrastructure

9.100 Urban infrastructure consists of drinking water, sanitation, sewage systems, electricity and gas distribution, urban transport, primary health services, and environmental regulation. Many of these services are in the nature of 'local' public goods with the benefits from improved urban infrastructure in a given city limited to the citizens living in that city.

9.101 The empowerment of local governments to take economic and service delivery decisions requires a new framework for public finance, where urban expenditures are driven through urban local governments. To support greater urban local government oversight and accountability for urban and municipal functions, and to support control of service delivery investments, operations and financing to urban and municipal governments across functional urban areas, the current fragmentation of authority between State and local government needs to be resolved.

9.102 While urban infrastructure is important in its own right and is in the nature of a local public good, there are important urban-rural linkages and externalities. The organizational capacity, and professional staff, that comes about for urban infrastructure service provision can take on additional functions in a significant 'footprint' of outlying rural areas. This would harness economies of scale and scope. For example, a regional water utility for a cluster of small towns can also serve neighbouring rural communities – either directly as a service provider, or indirectly through technical inputs for panchayat-led delivery systems. Rural areas surrounding cities tend to indirectly derive significant income from the prosperity of the city, through sale of high value crops, through SMEs and through labour supply. Urban centers provide income diversification, as rural families often have some family members working in urban centers. Hence, improvements in local public goods in cities, which spur GDP growth in cities, help impact rural incomes in surrounding areas.

Institutional Changes at Local Level

9.103 Central government fiscal and regulatory incentives can catalyze institutional change at the State and local levels, support innovative institutional forms of effective service delivery at the local level, and support the development of credit worthy urban local governments. This requires proper implementation of Model Municipal Law (MML) by the State Governments, extending the Private Sector Participation (PSP) guidelines to cover services, and strengthening the statistical system so as to have better data about expenditures on producing public goods, and public outcomes. The existing schemes need to be consolidated and rationalized into a system of capital grants to local governments, to support institutional reform and poverty targeting.

Financing pattern

9.104 In terms of financing patterns, the foundation of urban infrastructure has to be user charges. It is possible for urban institutions to access resources from the capital markets to finance a large portion of urban capital expenditure, to be serviced by user charges in the future. This approach makes it possible to have a massive increase in capital expenditure on urban infrastructure without worsening the fiscal problem. In addition, the tariff restructuring or subsidy design in the context of a restructuring process allows for more efficient and targeted impact

on the poor. In this context, there have been municipal bond issues, but on a very limited scale (Table 9.23).

Scheme for Development of Urban Infrastructure

9.105 The ongoing schemes of Urban Infrastructure Development in the mega cities, and Integrated Development of Small and Medium Towns (IDSMT) do not meet the requirement of infrastructure development of all cities/towns in the country. There is, therefore, need to have a comprehensive scheme for infrastructure development of all cities/towns in the country. Other scheme like Urban Reforms Incentive Fund (URIF) also need to be subsumed in the said comprehensive scheme. Funding is linked to reforms which are classified into "mandatory" and "optional" as detailed below:

Mandatory Reforms—State level

- Repeal of Urban Land Ceiling and Regulation Act
- Reform of Rent Control Laws so as to stimulate private investment in rental housing schemes.
- Rationalisation of Stamp Duty to bring it down to no more than 5 per cent within the next five years.
- Introduction of independent regulators for urban services.

Mandatory Reforms –Core (at ULBs level)

- Double entry system of accounting for Urban Local Bodies
- Adoption of public disclosure law – disclosure of medium-term fiscal plan and quarterly performance reports.
- Passage of community participation law
- All special agencies currently involved in delivering urban civic services to be brought under the supervision of ULBs, thus creating a uniform accountability platform.
- A Bangalore Action Task Force (BATF) kind of citizens technical advisory group should be constituted for each city to guide the process of urban reforms.
- Urban development authorities discharging city Planning functions and the new city development function should associate the ULBs more closely
- Introduction of e-governance, Global Information System (GIS) and Monitoring Information System (MIS)
- Reform of Property Tax laws
- Levy of reasonable user charges

Table 9.23 : India's experience with tax free municipal bond issuance

Sl. No.	Name	Amount (Rs. in crores)	Date of gazette Notification
	2001-02		
1.	Ahmedabad Municipal Corporation	100.00	August 21, 2001
	2002-03		
2.	Hyderabad Municipal Corporation	82.50	March 4, 2002
3.	Nashik Municipal Corporation	50.00	March 7, 2003
	2003-04		
4.	Visakhapatnam Municipal Corporation	50.00	December 29, 2003
5.	Hyderabad Metropolitan Water Supply and Sewerage Board (HMWS&S Board)	50.00	December 29, 2003
6.	Ahmedabad Municipal Corporation	58.00	March 16, 2004
7.	Chennai Metropolitan Water Supply and Sewerage Board	42.00	March 24, 2004
	2004-05		
8.	Karnataka Water & Sanitation Pooled Fund Trust	100.00	

Source : Ministry of Urban Development.

Optional Reforms

- Revision of byelaws to streamline the approval process.
- Simplification of legal and procedural frameworks for conversion of agricultural land for non-agricultural purposes
- Introduction of Property Title Certification System in ULBs.
- Earmarking at least 20-25 per cent of developed land in all housing projects for the poor.
- Introduction of computerized process of registration of land and property
- Revision of bye-laws to make rain water harvesting mandatory
- Bye-laws for reuse of reclaimed water
- Administrative reforms, i.e. right sizing of the ULBs.

Urban Water Supply and Sanitation Sector

9.106 Water supply and sanitation are important basic needs affecting the quality of life and productive efficiency of the people. Provision of these basic services continue to be among the core activities of urban local bodies. The State Governments and ULBs are responsible for providing the services through proper planning, implementation, operation and maintenance, and monitoring through the funds available under State Plans, internal resource generation and by taking loans from financial institutions.

9.107 On the basis of information furnished by the different State Implementing Agencies, 89 per cent of the urban population is reported to have access to water supply and 63 per cent of the urban population access to sewage and sanitation facilities. The data only relate to access, which is different from quantity of water and quality of service. The quality of water and the service provided often fall short of the relevant norms. The Tenth Plan emphasizes provision of these important infrastructure facilities, and 100 per cent coverage of urban population with water supply facilities and 75 per cent of urban population with sewage and sanitation by the end of the Tenth Plan period, i.e. March 31, 2007. The funds required for this purpose is estimated at over Rs. 53,000 crore (Table 9.24).

Urban Transport

9.108 Urban transport is a key element of urban infrastructure. An effective urban transportation network not only enhances productivity and facilitates high growth of the economy, but also empowers the poor by increasing employment opportunities. Public transport is energy efficient and less polluting and helps maximizing urban – rural linkage with improved access of the peripheral population to the city centers without proliferation of slums in and around cities.

9.109 Two pioneering efforts in public transport in India have come about in Kolkata and Delhi. Delhi Mass Rapid Transit System (MRTS), a joint venture between Government of India and Government of National Capital Territory of Delhi, is being implemented by the Delhi Metro Rail Corporation (DMRC) (Box 9.8).

Table 9.24 : Funds requirement for water supply and sanitation in the Tenth Plan

(Rs. in crore)

Estimates requirement of funds		**Likely availability from different sources**	
Water Supply	– Rs. 28,240	Central Government	2,500
Sanitation	– Rs. 23,157	State Governments	20,000
Solid Waste Management	– Rs. 2,322	HUDCO	6,800
Total	– **Rs. 53,719**	LIC	2,500
		Other Public Financial Institutions and ExternalFunding Agencies	4,000
		Total	**35,800**

Box 9.8 : Delhi Metro Rail Transit System

- The Delhi Mass Rapid Transit System (MRTS) contemplates Metro Rail System in Delhi. Phase-I of this project consist of the following corridors:
  1. Shahdara – Rithala
  2. Vishwavidyalaya-Central Secretariat.
  3. Indraprastha-Dwarka-Dwarka sub-city (i.e Dwarka-Dwarka VI).
- The Phase-I of the project is scheduled to be completed by March 2006. The Shahdara-Rithala corridor was commissioned on March 31, 2004 and is operational. The Vishwavidyalaya-Kashmere Gate Section of the underground corridor from Vishwavidyalalya to Central Secretariat has been commissioned on December 19, 2004. The targeted completion date for other sections is:

1. Kashmere Gate-Central Sectt.	September 30, 2004	6.90 km
2. Barakhamaba Road-Kirti Nagar	September 30, 2005	8.41 km.
3. Kirti nagar-Dwarka	December 31, 2005	14.49km.
4. Indraprastha-Barakhamba Road	March 31, 2006	2.27 km.
5. Dwarka-Dwarka sub-city	March 31, 2006	6. 50 km.

- The Detailed Project (DPR) for Phase II of Delhi MRTS is under preparation.

9.110 For better connectivity within the National Capital Region, a commuter rail system, namely, Integrated Rail-cum-Bus Transit (IRBT) system is being contemplated. It comprises three corridors, namely (i) Shahdara-Ghaziabad (14.9 km); (ii)Sahibabad-Shivaji Bridge (17.4 km.); and (iii) Trinagar-Gurgaon) (30.4 km.). Two SPVs are to be formed, one for the UP corridors and another for the Haryana corridor with participation of the respective State Governments and the Government of India. The project proposal with an estimated cost of Rs. 2,239 crore has been referred to the Planning Commission for "in principle" approval.

9.111 The Government of Karnataka has proposed Bangalore MRTS with East-West (18.1 km.) and North-South (14.9 km.) metro corridors. The project proposal, with an estimated cost of Rs.5,605 crore, has been accorded 'in principle' approval by the Planning Commission.

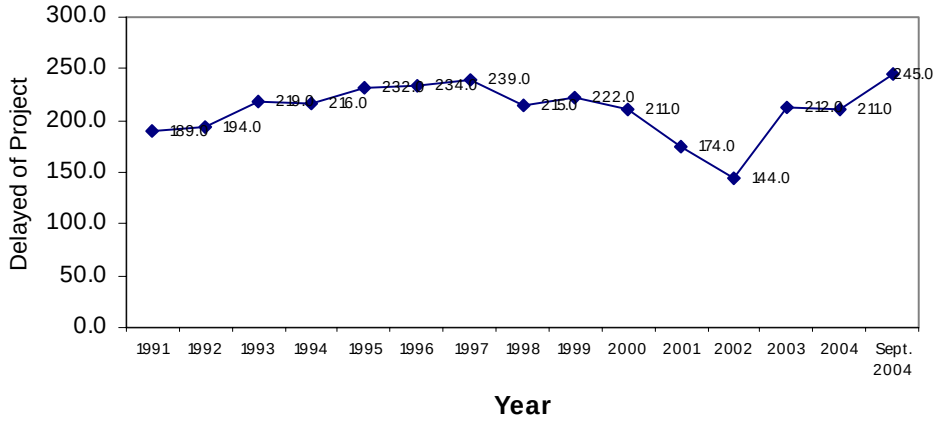
9.112 The Government of Maharashtra has proposed a MRTS for Versova-Andheri-Ghatkopar (appoximately 15 km.) corridor on the basis of the Metro Master Plan for Mumbai. The proposal is under examination.

Implementation of Central Sector Projects

9.113 At the end of September, 2004, there were 617 projects with an estimated cost of Rs.2,67,067 crore. These, 617 projects were in the 16 sectors namely, Atomic Energy, Civil Aviation, Coal, Fertilizers, Meteorology, Mines, Steel, Petroleum, Power, Health and Family Welfare, Shipping & Ports, Telecommunications, Urban Development and Water Resources. Of these 149 projects are faced with cost overruns amounting to 22.2 per cent with respect to their latest approved estimates. There are 237 projects which have a time overrun, ranging from 2 to 156 months.

9.114 An analysis of cost overruns of 246 delayed projects shows that only 20 projects are responsible for about 90 per cent of the cumulative cost overrun. Out of these 20 projects, 4 Hydro Electric Power Projects account for about 49 per cent of the total cost overrun. Out of these 4 projects, Nathpa Jhakri Project in Himachal Pradesh was completed in July, 2004 and the remaining three projects are likely to be completed by the middle of 2005. Most of the projects with large time overruns, which are few in number, had serious problems which have been overcome and these are now in fairly advanced stage of completion. The number of delayed projects

Fig 9.2 **Number of delayed projects w.r.t Original Schedule**



had drastically come down from 239 at the beginning of the Ninth Plan to 144 by the end of the Ninth Plan (Figure 9.2). However, the number of delayed projects increased slightly to 210 during the year 2002-03, mainly due to an increase in the number of total projects of NHDP, which have been broken down into about 135 small packages resulting in an increase in the number of total projects by more than a hundred.

9.115 Time and cost overruns have declined because of close monitoring and systems improvement brought out by the Ministries concerned with support from the Ministry of Statistics and Programme Implementation. An analysis of the trend in the last 13 years shows that the cost overrun has come down from 62 per cent in March, 1991 to 20.7 per cent in September, 2004 (Figure 9.3).

Viability gap funding for Infrastructure

9.116 Infrastructure projects have long gestation periods and, in most cases, are not financially viable on their own. It may not be possible to fund the very large investment requirements of these projects fully from the budgetary resources of the Government of India alone. In order to remove this shortcoming and to bring in private sector

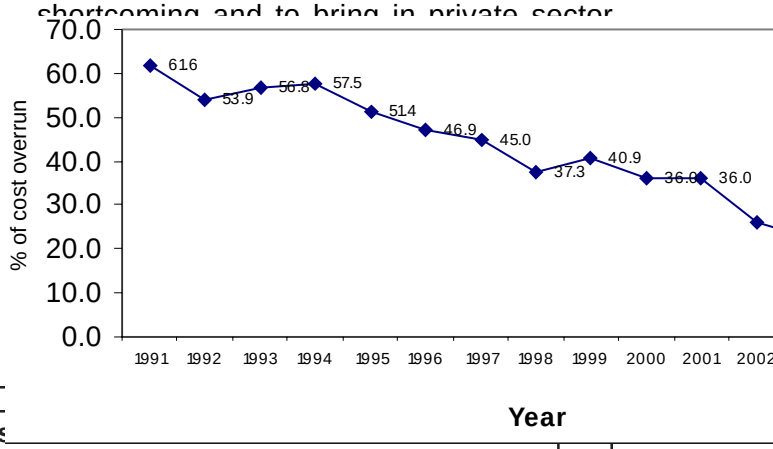


Fig 9.3 **Trends**

through supplementary grant funding. Provisions for this facility is made on an year to year basis.

Criteria

9.117 The criteria for eligibility for funding are:

(i) The project must be implemented, i.e. constructed, maintained and operated during the project term, by an entity with at least 40 per cent private equity.

(ii) The project must belong to one of the following sectors:
   a. Roads, railways, seaports, airports;
   b. Power;
   c. Water supply, sewerage and solid waste disposal in urban areas and
   d. International convention centers.

(iii) The projects should have been vetted/ endorsed by the concerned line ministries in the Government India.

(iv) All central projects should have received requisite Government approval at the appropriate level.

(v) The total Government support required by the project, including support from the Government of India under this facility, or any other sources of the Government of India and its agencies, must not exceed twenty per cent of the total project cost as estimated in the preliminary project appraisal, or the actual project cost, whichever is lower.

(vi) The implementing agency must be selected through a transparent and open competitive process. The main criterion for selection will be the extent of viability gap funding required by the private partner to successfully implement the project. The extent of viability gap funding shall be determined on the basis of the net present value of the actual viability gap funding required. For this purpose and for all calculations under these guidelines, the rate of discount shall be the rate of interest on 10-year gilts on the date of submission of the bid.

Funding

9.118 Viability gap funding can take various forms, including but not limited to capital grant, subordinated loans, O&M support grants or interest subsidy. A mix of capital and revenue support may also be considered.

— The funding is to be disbursed contingent on agreed milestones, preferably physical, and performance levels being achieved, as detailed in funding agreements.

— The funding is to be provided in installments, preferably in the form of annuities, and with at least 15 per cent of the funding to be disbursed only after the project is fully functional.

— In the first year of the facility, funding is to be allocated to projects on a first-come, first served basis subject to meeting the eligibility criteria.

Appraisal and approval procedures

9.119 An Empowered Committee has been set up in the Department of Economic Affairs under the Additional Secretary (EA) to consider and authorize sanction of funds up to Rs. 50 crore beyond which approval of the Finance Minster will be required. The projects may be posed by any (a) public agency at the center, state or urban local body which owns the underlying assets; (b) private agency, with sponsorship from the relevant central or state government agency. Project proposals must be accompanied by a preliminary project appraisal (covering (a) techno-economic viability of the project, (b) financial appraisal and project financing arrangements, and (c) extent and nature of viability gap funding proposed) and a commitment letter on behalf of the lending institutions. After approval of the project by the Committee within 30 days of submission, the project will be put to bid by the public agency concerned through transparent and open competitive bidding indicating the extent of viability gap funding that is actually required. The lead financial institution will present its detailed appraisal of the technical and economic viability of the project as proposed by the successful bidder, for the

consideration of the Committee. The transfer of viability gap funds and the schedule of such transfers will be approved by the Committee. The lead financial institution will undertake regular monitoring and evaluation of project compliance with agreed milestones and performance levels.

Infrastructure of contract enforcement

9.120 Modern concepts of regulation of contracts involved in infrastructure, and the complex contracts of the market economy, require a sound framework of law and enforcement. The public goods of law and order, and contract enforcement, are a central part of the infrastructure of a modern economy.

9.121 India started out with an English "common law" tradition, where laws were written in terms of general principles, and courts played a major role in interpreting principles in the light of contemporary issues. Over time, this common law heritage has become less important, and the structure of Indian law has moved closer to "civil law", where legislation contains explicit detail and extensive codification. This is more rigid, and gives courts less room to interpret general principles to reflect evolving conditions.

9.122 There are over 3,500 Central laws in force. There might be 25,000 to 35,000 laws of States. In addition, there is a substantial body of subordinate legislation. A single collection, putting all these together on one website, does not exist. The agenda for Indian legal reform comprises five aspects.

9.123 **Old laws:** There are laws which go as far back as 1836. Elements of legislation which play a major role in the economy go back to the 19th century, such as the Societies Registration Act (1860), the Indian Evidence Act (1872), the Indian Trusts Act (1882), and the Transfer of Property Act (1882). Old laws tend to have clauses that are incompatible with modern India. The Jain Commission (1998) identified 1300 out of roughly 3,500 statutes for outright repeal. Of these, roughly 350 were repealed in 2001 and 2002. The real complexities lie in the areas were outright repeal is not possible.

9.124 **Harmonisation and rationalisation:** As an example, there are 45 Central Acts which directly pertain to labour alone. Beyond this, there are other Acts which indirectly concern labour. Given this large body of law, many inconsistencies have crept in.

9.125 **Reducing over-legislation and state intervention:** As an example, the Weekly Holidays Act of 1942 requries that every shop must be closed for one day a week. This is inconsistent with the 24 hours a day, 365 days a year vision of modern retailing. The controls used by the State under the Essential Commodities Act (1955) are no longer relevant. The Factories Act requires that all inside walls be re-painted or re-varnished atleast once every five years. These kinds of detailed prescriptions are inconsistent with the economic reforms process, which requires the State to refocus on the provision of public goods.

9.126 **Administrative law reform:** Difficulties of transparency and public disclosure have been experienced in the context of rules, orders and regulations that form subordinate legislation. A related aspect is greater clarificiation and establishment of State liability when the State or agents of the State inflict damage upon any citizen.

9.127 **Speed of dispute resolution:** The number of judges in India is roughly 10 per million of the population, while OECD countries have 50 to 100 judges per million of population. There are 23 million cases pending in courts. From 1995 onwards, every year, the number of cases disposed of has been roughly 90 per cent of the new cases filed, so the backlog continues to steadily grow. After 1995, the backlog at the Supreme Court has dropped significantly, through IT-intensive productivity improvements. Comparable productivity improvements need to be implemented in all courts, so as to eliminate the backlog and speed up disposal of cases.

Outlook

9.128 There is considerable consensus that improvements in infrastructure will have a strong impact upon GDP growth and poverty alleviation. International experience shows that there are many subtle difficulties in finding the right infrastructure policy framework. A delicate system of checks and balances is required, with careful calibration of incentives, so as to give the private sector the right incentives to invest adequately while at the same time preventing it from extracting monopoly rents. A key part of this is establishing a framework of rules, and limiting arbitrary State power, to give the private sector confidence in embarking upon the multi-decade horizons of these projects.

9.129 The most striking success is visible in telecom. Tele-density has risen dramatically, an entire industry with private players has come about, privatisation has begun with VSNL, and new technologies have come about. Telecom, where competition has delivered benefits, can serve as a role model for most infrastructure sectors of the economy. Looking forward, the telecom sector will feature lively competition between multiple private firms, with a strong role for TRAI for establishing pro-competitive policies. The sharp drop in broadband telecom prices in late 2004 may represent the beginning of a phase of hectic expansion of the broadband telecom sector. This may have an even bigger impact upon the economy as compared with the growth in ordinary voice telephony. An important area requiring a fresh policy impetus is that of reducing the extent to which a State-led planning approach is used in the utilisation of the electromagnetic spectrum.

9.130 In the area of roads, substantial portions of the Golden Quadrilateral have been completed, and are already fueling the growth of productivity in the country. For completed stretches, the focus needs to shift from construction to corridor management, i.e. for optimally utilising the capital assets to deliver the maximum throughput and world class levels of road safety. At the same time, a continuous, competition driven process needs to be in place for upgradation from four-lane highways to expressways in high-density stretches, and for construction of new links, such as a highway from Mumbai to Kolkata.

9.131 The ports sector has obtained sharp improvements in efficiency parameters through new kinds of contracting. It has benefited from vigorous levels of inter-port and intra-port competition. However, as the recent problems at JNPT have demonstrated, much more work needs to be done in crafting an adequate policy framework. This requires a fresh examination of questions of port-connectivity through rail and road, and international benchmarking on performance parameters and price. India has experienced, and will continue to experience, high growth rates of international trade. The growth of ports needs to be planned in a futuristic way, reflecting projections for traffic rather than meeting existing needs, so as to ensure that India's needs are adequately met.

9.132 The railways remain an extremely important area, given the fact that transportation by rail has the highest energy efficiency as compared with the options. This suggests that if the institutional mechanisms come about, then the cost of transportation by rail could be much lower than that seen in the road sector. However, this will require substantial reforms in the functioning of the railways. The experiences with the transformation of telecom, roads and ports can serve as role models for the scale of transformation that may be required.

9.133 The civil aviation sector is an area where major progress has been achieved in 2004. It is increasingly clear that there are two very distinct aspects of the civil aviation sector. On one hand is the airline industry, which is analogous to the shipping industry, where the only goal of public policy is to have low entry barriers and high levels of competition. On the other hand are the airports, which have 'public goods' characteristics, and there is a case for a bigger role for the State. In recent months, limited progress has been obtained on both fronts. In particular, improvements in the degree of competition have helped deliver lower prices and a sharp increase in both domestic and international traffic.

9.134 In the area of power, there is clarity on the separate issues in generation, transmission and distribution. Generation does not pose problems of public goods, and it can be a normal private industry, provided the downstream buyers are operating in a sound institutional framework. Once reforms in transmission and distribution are in place, it will not be difficult to attract private investments in generation. The Electricity Act and recent reforms in distribution have served to revitalise investments in this area. The 'unscheduled interchange' (UI) market is a major advance in moving towards a normal spot market for electricity, comparable with spot markets for other commodities and financial products in the economy. However, policy bottlenecks continue to inhibit supply of power into the UI market from the private sector.

9.135 The losses in power distribution in the country are enormous. They are important from a different perspective: that of obtaining a fiscal correction. Improvements in distribution alone could account for over 1 percent of GDP of fiscal correction.

9.136 Finally, the most important frontier in Indian infrastructure consists of urban infrastructure. The techniques and strategies which worked for national public goods cannot be directly applied to local public goods. Here, the focus has to be on the 74th amendment to the Constitution, on empowering cities, on supporting institutional reforms at cities, and directing fiscal transfers for paying transition costs and poverty targeting.