



INFRASTRUCTURE
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Government of India

Projections in the Eleventh Five Year Plan Investment in Infrastructure





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Projections of Investment in Infrastructure during the Eleventh Plan

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Foreword

It is generally recognised that lack of infrastructure is one of the major constraints on India's ability to achieve 9 to 10% growth in GDP, which is the rate required to make a significant difference to living conditions in the country and achieve inclusiveness over the next ten years.

The Eleventh Five Year Plan has set an ambitious target of increasing total investment in infrastructure from around 5% of GDP in the base year of the Plan 2006-07 to 9% by the terminal year 2011-2012. This paper spells out the specific assumptions underlying this projection which result in a total investment requirement of Rs. 2,056,150 crore (\$ 514 billion) for ten infrastructure sectors over the five year period.

The paper also indicates the expected distribution of the investment between the Centre and the States and between the public and the private sectors. Achieving this level of investment presents many distinct challenges. The ability to finance infrastructure through the budget is limited given the many other demands on budgetary resources and it is expected that only about 30% of the infrastructure needs can be met directly from the budget as this would be directed largely to rural infrastructure and other selected projects that require budgetary support. About 40% of the total requirements are expected to be met from internal generation and market borrowings of public sector entities, which is possible only if their projects are financially viable. The remaining 30% have to come from private investment in infrastructure and this depends critically upon the creation of a supportive investor-friendly environment and the ability to roll out bankable projects of this magnitude in sectors which can attract private investment. Such private participation would not only provide the much needed capital, it would also help to lower costs and improve efficiencies in a competitive environment.

An important aspect of infrastructure development in India in the years ahead is that the manner of infrastructure development will be very different from the past with a much larger role for public private partnership. This will throw up new challenges and it will be necessary for policy to be responsive to these challenges and look for innovative ways of meeting them.

August 14, 2008

(Montek Singh Ahluwalia)

Executive Summary

This paper provides an assessment of the investment required by the Central and State Governments and the private sector in the ten major physical infrastructure sectors for sustaining a growth rate of 9 per cent in GDP over the Eleventh Plan (2007-08 to 2011-12).

Investments have been projected in two ways. The first is through a top-down ('order-of-magnitude') approach derived from the Government's growth targets and recent experiences of other emerging developing countries in investments in infrastructure as a share of GDP. The second is through a bottom-up exercise, based on sector-wise project plans in the pipeline. Sector-wise plans, corrected for past trends and synchronised with the outcome of the top-down approach, yield a projected total investment of Rs. 20,56,150 crore or US\$ 514.04 billion (at constant 2006-07 prices) in infrastructure during the Eleventh Plan. Of this, Rs. 4,35,349 crore (21 per cent of the total or 30.3 per cent of the public investment) would be spent exclusively towards improvement of rural infrastructure.

Reckoned against an investment level of Rs. 8,71,445 crore or US\$ 217.86 billion anticipated to be achieved in the Tenth Plan period, the expected infrastructure investment in the Eleventh Plan is 2.36 times the Tenth Plan level. These estimates imply that there is need for a significant increase in investments in infrastructure as compared to the log-linear 'business as usual' projection of Rs. 15,52,657 crore or US\$ 388.16 billion.

As in other countries, the public sector would continue to play a dominant role in investment for infrastructure. The total public sector

investment envisaged is Rs. 7,65,622 crore by the Centre and Rs. 6,70,937 crore by the States. Investment by the private sector, which includes Public-Private Partnership (PPP) projects, makes up the balance of Rs. 6,19,591 crore, which is 30 per cent of the required total investment during the Eleventh Plan, a much higher share than 20 per cent anticipated to be realised during the Tenth Plan.

Of the projected investment of Rs. 7,65,622 crore by the Central Government, Rs. 5,65,622 crore is likely to be funded out of Internal and Extra Budgetary Resources (IEBR). In the case of States, Rs. 4,44,671 crore is expected from budgetary resources while about Rs. 2,26,266 crore is expected from their IEBR. These investments would require a much higher scale of effort by the Public Sector Undertakings especially for raising debt on commercial terms.

The total requirement of debt by the public and private sectors is likely to be Rs. 9,88,035 crore or US\$ 247 billion. However, the availability of debt financing for infrastructure during the Eleventh Plan is estimated at Rs. 8,25,539 crore or US\$ 206 billion. There is, thus, a funding gap of Rs. 1,62,496 crore or US\$ 40.62 billion in the debt component.

The required investment in infrastructure would be possible only if there is a substantial expansion in internal generation and extra budgetary resources of public sector, in addition to a significant rise in private investment. As a pre-requisite, this would require large infrastructure projects to be structured on sound commercial principles in an enabling policy and regulatory environment.

Projections of Investment in Infrastructure during the Eleventh Plan

1. The Eleventh Plan (2007-08 to 2011-12) aims at a sustainable annual growth rate of 9 per cent with emphasis on a broad-based and inclusive approach that would improve the quality of life and reduce disparities across regions and communities. There is consensus that infrastructure inadequacies would constitute a significant constraint in realising this development potential. To overcome this constraint, an ambitious programme of infrastructure investment, involving both public and private sectors, has been developed for the Eleventh Plan. The programme ensures strengthening and consolidating recent infrastructure-related horizontal initiatives, such as Bharat Nirman for building rural infrastructure, as well as sectoral initiatives and strategies, such as the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), Accelerated Power Development and Reforms Programme (APDRP), Jawaharlal Nehru National Urban Renewal Mission (JNNURM), Accelerated Irrigation Benefit Programme (AIBP), National Highways Development Programme (NHDP), Financing Plans for Airports, Ports and Highways, and National Maritime Development Programme (NMDP).
2. This paper provides an assessment of the investment requirements of the infrastructure development strategy, identifying investments to be undertaken by the Central and State Governments as well as by the private sector in each of the infrastructure sectors. For the purpose of this Paper infrastructure has been defined to include electricity (including non-conventional energy), telecommunications, the transportation sectors of roads and bridges, railways (including Mass Rapid Transport Systems (MRTS)), ports and airports, irrigation (including watershed development (WD)), water supply and sanitation, storage and gas distribution sectors.
3. Projections of investment in infrastructure have been made in two ways. First, top-down ('order-of-magnitude') estimates of investment have been derived from the Government's GDP growth targets and estimates of the likely evolution of the share of Gross Capital Formation (GCF) in infrastructure as a proportion of Gross Domestic Product (GDP) consistent with those targets. Second, a bottom-up exercise has been undertaken based on a detailed analysis of past trends in combination with strategic and financing plans in the pipeline for various infrastructure sectors.
4. Section I of this paper describes the two projection exercises and presents Planning Commission's estimates of the most likely level of infrastructure investment. Section II provides details on sector-wise investment, its phasing over time, public-private mix, shares of Centre and States in public investment, changes in sectoral shares between the Tenth and Eleventh Plans, and on rural infrastructure. Section III compares the projected infrastructure investment in the Eleventh Plan with what would ensue under a 'business as usual' scenario. Section IV explores the sources of funds required for achieving a paradigm shift in infrastructure investment, and Section V concludes by broadly setting out the policy imperatives that must support infrastructure planning and development.

I. Alternative Investment Projections

(i) Projection of GCF based on growth targets

5. India's GDP is projected to grow annually at an average rate of 9 per cent over the Eleventh Plan period. Based on investment levels in infrastructure in several cross-country analyses of fast growing Asian economies, GCF in infrastructure may need to be accelerated to around 11 per cent by the terminal year of the Eleventh Plan to achieve this targeted annual growth in GDP of 9 per cent. Realistically, however, starting from the level of less than 5 per cent of GDP observed in 2004-05, such a rapid change in the structure of investments may not be feasible. Moreover, it may not be a necessary condition for achieving a 9 per cent growth since many East Asian countries may have invested more than what is essential, and although about 10 per cent investment is desirable, India could try to achieve it over a longer period. Taking these factors into account, a top-down target of GCF in infrastructure of around 9 per cent

of GDP by the end of the Eleventh Plan seems achievable. Applying the annual growth rate of 9 per cent to GDP at market prices for 2006-07, the evolution of GDP over the Eleventh Plan would be as projected in Table 1. It is assumed that total GCF in infrastructure as a share of GDP increases from 5.75 per cent to 9 per cent over the Plan period. Applying these percentages to the estimated GDP, GCF in infrastructure is estimated to rise from Rs. 2,59,839 crore or US\$ 64.96 billion in 2007-08 to Rs. 5,74,096 crore or US\$ 143.52 billion in 2011-12.

6. As shown in Table 1, total GCF in infrastructure during the Eleventh Plan is thus projected to amount to **Rs. 20,11,521 crore (at 2006-07 prices) or US\$ 502.88 billion** (at an exchange rate of Rs. 40/US\$). This amounts to an average of 7.44 per cent of GDP (at market prices) over the Plan period.

Table 1: GCF in infrastructure based on growth targets (Top-down Estimates)

(Rs. crore at 2006-07 prices)						
	Base Year	Eleventh Plan				
Year	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12
GDP (market prices)	4,145,810	4,518,933	4,925,637	5,368,944	5,852,149	6,378,843
Rate of growth of GDP (%)	9.00	9.00	9.00	9.00	9.00	9.00
GCF in infrastructure as % of GDP	5.00	5.75	6.50	7.25	8.00	9.00
GCF in infrastructure						
(Rs. crore)	207,291	259,839	320,166	389,248	468,172	574,096
(US\$ billion)	51.82	64.96	80.04	97.31	117.04	143.52
XI Plan total GCF in infrastructure		Rs. 2,011,521 crore or US\$ 502.88 billion				

(ii) Sectoral investment projections (Bottom-up Estimates)

7. To supplement the aforementioned estimated aggregate capital formation in infrastructure, an alternative estimate has been derived taking into account the historic evolution of Plan expenditures and actual sector-wise development patterns, as well as strategic and associated financing plans developed for the Eleventh Plan by sector Working Groups constituted by the Planning Commission or by inter-ministerial committees under the aegis of the Committee on Infrastructure. Broad assumptions underlying the projections for each sector are in **Appendix 1** to **Appendix 10**.
8. This ‘bottom-up’ exercise (details in Section II) yields total investment in

infrastructure during the Eleventh Plan of **Rs. 20,56,150 crore or US\$ 514.04 billion** (at Rs. 40/US\$). Table 2 presents the sectoral breakdown of projected investment, which corresponds to quantitative targets for the Eleventh Plan as presented in Box 1.

9. A detailed breakdown of this investment by sector and its phasing over the Plan period are provided in Table 3 and Figure 1. As may be seen, the results of the two projection exercises are of the same order of magnitude. Further, the total investment projected through the bottom-up exercise as a percentage of GDP at market prices rises from 5.98 per cent in 2007-08 to 9.34 per cent in 2011-12, which results are comparable and consistent with 5.75 per cent and 9.00 per cent, respectively, assumed in the top-down estimates reflected in Table 1.

Table 2: Infrastructure Investment in the Eleventh Plan based on Sectoral Analysis (Bottom-up Estimates)			
(Rs. crore at 2006-07 prices)			
Sectors	Rs. crore	US\$ billion @ Rs. 40/\$	Sectoral shares (%)
Electricity (incl. NCE)	666,525	166.63	32.42
Roads and bridges	314,152	78.54	15.28
Telecommunications	258,439	64.61	12.57
Railways (incl. MRTS)	261,808	65.45	12.73
Irrigation (incl. WD)	253,301	63.33	12.32
Water supply and sanitation	143,730	35.93	6.99
Ports	87,995	22.00	4.28
Airports	30,968	7.74	1.51
Storage	22,378	5.59	1.09
Gas	16,855	4.21	0.82
Total	2,056,150	514.04	100

Box 1 : Some Physical Targets for Infrastructure in the Eleventh Plan

- **Power**

- o Additional power generation capacity of about 78,577 MW*

- o Reaching electricity to all un-electrified hamlets and providing access to all rural households through Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY)*

- **National Highways**

- o Six-laning 6,500 km of Golden Quadrilateral and selected National Highways*

- o Four-laning 6,736 km on North-South and East-West Corridors*

- o Four-laning 20,000 km of National Highways*

- o Widening 20,000 km of National Highways to two lanes*

- o Developing 1,000 km of Expressways*

- o Constructing 8,737 km of roads, including 3,846 km of National Highways in the North East*

- **Rural Roads**

- o Constructing 1,29,707 km of new rural roads, and renewing and upgrading existing 1,77,726 km covering 60,638 rural habitations*

- **Ports**

- o Capacity addition of 485 million MT in Major Ports, 345 million MT in Minor Ports*

- **Airports**

- o Modernisation and redevelopment of 4 metro and 35 non-metro airports*

- o Constructing 3 greenfield airports in North East*

- o Constructing 7 other greenfield airports*

- o Upgrading CNS/ATM facilities*

- **Railways**

- o Constructing Dedicated Freight Corridors between Mumbai-Delhi and Ludhiana-Kolkata*

- o 8,132 km of new railway lines; gauge conversion of 7,148 km*

- o Modernisation and redevelopment of 22 railway stations*

- o Introduction of private entities in container trains for rapid addition of rolling stock and capacity*

- **Telecommunications and Information Technology**

- o Achieving a telecom subscriber base of 600 million, with 200 million rural telephone connections*

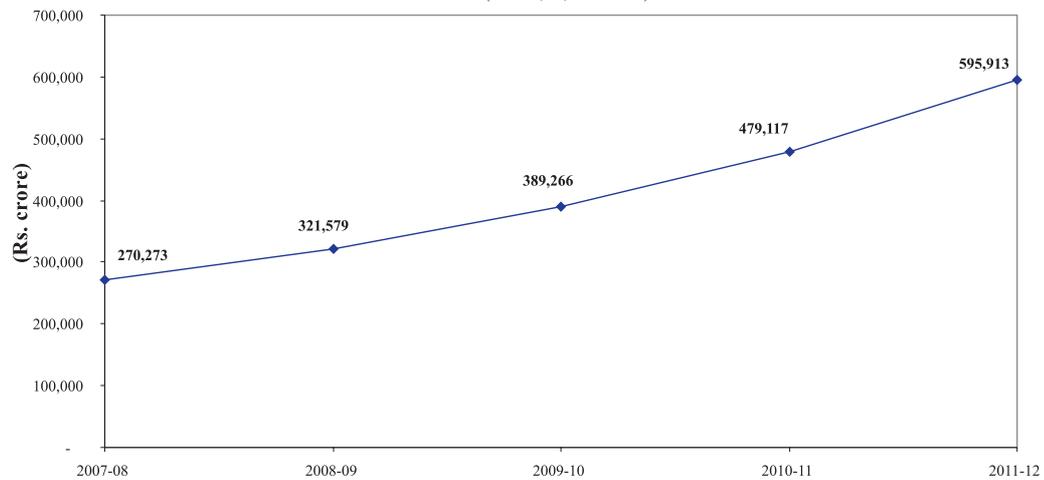
- o Achieving a broadband coverage of 20 million and 40 million internet connections*

- **Irrigation**

- o Developing 16 million hectares through major, medium and minor irrigation works*

Table 3: Year-wise Projected Investment during the Eleventh Plan (Bottom-up Estimates)						
(Rs. crore at 2006-07 prices)						
Sectors	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Electricity (incl. NCE)	81,954	101,553	126,380	158,027	198,611	666,525
Roads and bridges	51,822	54,789	59,200	68,370	79,971	314,152
Telecommunications	31,375	38,134	48,593	61,646	78,690	258,439
Railways (incl. MRTS)	34,225	40,964	49,525	60,393	76,701	261,808
Irrigation (incl. WD)	27,497	35,916	47,189	62,266	80,433	253,301
Water Supply and Sanitation	19,298	22,781	27,323	33,266	41,063	143,730
Ports	12,409	14,822	17,374	19,980	23,410	87,995
Airports	5,208	5,520	5,904	6,646	7,690	30,968
Storage	3,777	4,098	4,446	4,824	5,234	22,378
Gas	2,708	3,003	3,332	3,700	4,111	16,855
Total Investment						
(Rs. crore)	270,273	321,579	389,266	479,117	595,913	2,056,150
(US \$ bn)	67.57	80.39	97.32	119.78	148.98	514.04
As % of GDP	5.98	6.53	7.25	8.19	9.34	7.60

**Fig 1 - Projected Investment in Infrastructure during the Eleventh Plan
(Rs. 20,56,150 crore)**



II. Details of the Projections

10. This section compares projections for the Eleventh Plan with investment levels anticipated to be achieved during the Tenth Plan. It also details out changes in sectoral shares between these Plans, phasing of projected investment over time and the public-private mix.
11. Total investment in infrastructure during the Tenth Plan is anticipated to amount to Rs. 8,71,445 crore or US\$ 217.86 billion.¹ Against this, based on sector-specific projections, investment in the Eleventh Plan would amount to **Rs. 20,56,150 crore or US\$ 514.04 billion**, which is 2.36 times the amount anticipated to be achieved during the Tenth Plan. The investment projections are broadly consistent with the Eleventh Plan quantitative targets in **Box 1**.
12. Between the Tenth and Eleventh Plans, the shares of different sectors in total infrastructure investment are largely unchanged as may be seen in Table 4. In the transport sector, shares of ports and airports have increased in line with the policy thrust on removing transport bottlenecks to trade and the emphasis on attracting private investment through Public Private Partnerships (PPPs). Although relative sector shares of roads and railways are projected to decrease slightly, the volumes of projected investments in these sectors in the Eleventh Plan would more than double as compared to the expenditure anticipated in the Tenth Plan. Political economy and performance issues in water supply and sanitation have historically slowed the pace of investment in the sector. In view of the

Table 4: Sector-wise Investment Anticipated in the Tenth Plan, Projections for the Eleventh Plan and Changes in Sectoral Shares

(Rs. crore at 2006-07 prices)						
Sectors	Tenth Plan (Anticipated investment)			Eleventh Plan (Projected investment)		
	Rs. crore	US\$ bn.	Shares (%)	Rs. crore	US\$ bn.	Shares (%)
Electricity (incl. NCE)	291,850	72.96	33.49	666,525	166.63	32.42
Roads and Bridges	144,892	36.22	16.63	314,152	78.54	15.28
Telecommunications	103,365	25.84	11.86	258,439	64.61	12.57
Railways (incl. MRTS)	119,658	29.91	13.73	261,808	65.45	12.73
Irrigation (incl. WD)	111,503	27.88	12.80	253,301	63.33	12.32
Water Supply and Sanitation	64,803	16.20	7.44	143,730	35.93	6.99
Ports	14,071	3.52	1.61	87,995	22.00	4.28
Airports	6,771	1.69	0.78	30,968	7.74	1.51
Storage	4,819	1.20	0.55	22,378	5.59	1.09
Gas	9,713	2.43	1.11	16,855	4.21	0.82
Total	871,445	217.86	100	2,056,150	514.04	100

¹ Actual Plan expenditures have been used for 2002-03 to 2005-06 (Actual/RE), but government estimates for 2006-07. Likewise, actual data on GCF by the private sector was available from the CSO for 2002-03 to 2004-05, but for 2005-06 the data is provisional and has been estimated for 2006-07 based on a linear projection of past trends. Data of private investment (provisional) in ports has been obtained from the Ministry of Shipping.

pressing need to increase coverage, a renewed thrust to investment in water supply and sanitation, particularly in urban areas, is being given under the Eleventh Plan. Even so, although the share of water supply and sanitation in total infrastructure investment would decrease slightly, the projected amount is more than double the expenditure anticipated in the Tenth Plan. The growth in private investment in telecommunications is expected to continue and underscores the significant increase in the share of the sector.

13. The relative share of irrigation (incl. WD) in total infrastructure investment has also come down slightly, although projected investment is 2.3 times the anticipated expenditure during the Tenth Plan. Limited absorptive capacity of the sector has been adduced as the reason for the decline in its share of total investment. These allocations, however, should be viewed along with the significant increase proposed for investment in agriculture as per cent of GDP during the Eleventh Plan.
14. The share of the electricity sector in total investment in infrastructure has declined significantly in the Eleventh Plan. Difficult decisions would need to be taken before increased investment comes forth in the electricity sector. Moreover, since investment targets for the Tenth Plan were not reached, an element of lowered expectations is also reflected in the projections for the Eleventh Plan. The need for investment in the electricity sector is

greater than what has been projected in this paper. However, a realistic assessment suggests that even the projections made in this paper would pose serious policy and implementation challenges. If these challenges can be overcome in time, actual investments could exceed these projections.

Enhanced role of private sector investment in infrastructure

15. Table 5 breaks down the investment in each sector into public and private components. It presents the public-private shares of investment in each infrastructure sector anticipated during the Tenth Plan as well as projections for the Eleventh Plan, which are based on the detailed sectoral projections exercise reported in **Appendix 1 to Appendix 10**. The Central and States' contributions are shown separately within the public sector component.
16. The private sector category includes PPP projects as well as pure private sector projects. While the former must be based on a concession agreement with the government such as for toll roads, ports, and airports, the latter are market-based such as in telephony and merchant power stations. Investment in irrigation, rural roads, other roads in backward and remote areas, and in the water supply and sanitation sector will be undertaken almost entirely by the public sector. However, in telecom, ports and airport sectors, private investment is expected to constitute more than 61 per cent

**Table 5: Public Investment by the Centre and the States and Private Investment Projections during the Eleventh Plan
(Bottom up Estimates)**

(Rs. crore at 2006-07 prices)								
Sectors	X Plan (Ant. Exp.)	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan	Share (%)
Electricity (incl. NCE)	291,850	81,954	101,553	126,380	158,027	198,611	666,525	
Centre	102,463	37,808	43,469	49,989	57,631	66,420	255,316	38.31
States	97,553	20,978	29,729	41,357	56,670	76,963	225,697	33.86
Private	91,834	23,168	28,355	35,034	43,726	55,228	185,512	27.83
Roads and Bridges	144,892	51,822	54,789	59,200	68,370	79,971	314,152	
Centre	71,534	18,318	19,446	20,673	22,618	26,304	107,359	34.17
States	66,354	17,534	18,150	18,889	20,613	24,815	100,000	31.83
Private	7,004	15,970	17,193	19,638	25,140	28,852	106,792	33.99
Telecommunications	103,365	31,375	38,134	48,593	61,646	78,690	258,439	
Centre	49,013	13,525	14,037	16,061	17,728	19,401	80,753	31.25
Private	54,352	17,850	24,098	32,532	43,918	59,289	177,686	68.75
Railways (incl. MRTS)	119,658	34,225	40,964	49,525	60,393	76,701	261,808	
Centre	108,950	25,925	31,176	37,974	46,685	59,693	201,453	76.95
States	10,402	1,575	1,788	1,979	2,170	2,489	10,000	3.82
Private	307	6,725	8,000	9,572	11,537	14,519	50,354	19.23
Irrigation (incl. WD)	111,503	27,497	35,916	47,189	62,266	80,433	253,301	
Centre	13,617	3,367	4,006	4,782	5,726	6,879	24,759	9.77
States	97,886	24,130	31,911	42,407	56,540	73,554	228,543	90.23
Water supply and sanitation	64,803	19,298	22,781	27,323	33,266	41,063	143,730	
Centre	42,316	5,152	6,411	7,991	9,976	12,474	42,003	29.22
States	21,465	13,500	15,558	18,308	21,995	26,945	96,306	67.00
Private	1,022	646	812	1,024	1,295	1,645	5,421	3.77
Ports	14,071	12,409	14,822	17,374	19,980	23,410	87,995	
Centre	2,185	4,898	5,698	6,243	6,350	6,700	29,889	33.97
States	1,530	598	658	724	796	850	3,627	4.12
Private	10,356	6,913	8,466	10,407	12,833	15,860	54,479	61.91
Airports	6,771	5,208	5,520	5,904	6,646	7,690	30,968	
Centre	3,823	1,146	1,369	1,894	2,205	2,674	9,288	29.99
States	12	50	-	-	-	-	50	0.16
Private	2,936	4,012	4,151	4,010	4,441	5,016	21,630	69.85
Storage	4,819	3,777	4,098	4,446	4,824	5,234	22,378	
Centre	577	755	820	889	965	1,047	4,476	20.00
States	866	1,133	1,229	1,334	1,447	1,570	6,713	30.00
Private	3,377	1,888	2,049	2,223	2,412	2,617	11,189	50.00
Gas	9,713	2,708	3,003	3,332	3,700	4,111	16,855	
Centre	8,713	1,714	1,874	2,049	2,240	2,450	10,327	61.27
Private	1,000	995	1,129	1,283	1,460	1,661	6,528	38.73
Total (Rs. cr.)	871,445	270,273	321,579	389,266	479,117	595,913	2,056,150	
Centre	403,189	112,608	128,305	148,545	172,123	204,041	765,622	37.24
States	296,068	79,499	99,022	124,998	160,232	207,186	670,937	32.63
Private	172,188	78,166	94,252	115,724	146,762	184,687	619,591	30.13
Total (US\$ bn)	217.86	67.57	80.39	97.32	119.78	148.98	514.04	
Centre	100.80	28.15	32.08	37.14	43.03	51.01	191.41	37.24
States	74.02	19.87	24.76	31.25	40.06	51.80	167.73	32.63
Private	43.05	19.54	23.56	28.93	36.69	46.17	154.90	30.13
Total (Rs. cr.)	871,445	270,273	321,579	389,266	479,117	595,913	2,056,150	
Public	699,257	192,107	227,327	273,543	332,355	411,226	1,436,559	69.87
Private	172,188	78,166	94,252	115,724	146,762	184,687	619,591	30.13
Total (US\$ bn)	217.86	67.57	80.39	97.32	119.78	148.98	514.04	
Public	174.81	48.03	56.83	68.39	83.09	102.81	359.14	69.87
Private	43.05	19.54	23.56	28.93	36.69	46.17	154.90	30.13

of total investment during the Eleventh Plan. For the electricity sector, it would rise to 28 per cent and for the road sector to 34 per cent. The shares of public and private investment in total infrastructure investment during the Eleventh Plan are projected to be about 70 per cent and 30 per cent respectively; in contrast with 80 per cent and 20 per cent respectively, anticipated during the Tenth Plan. However, if we focus on the increment in investment in the Eleventh Plan over the Tenth Plan, increased private investment is expected to provide 37.96 per cent of the increase.

Public-Private Balance and Centre-States' Shares

17. The Tenth Plan anticipated public sector share of investment across the ten sectors as 80 per cent and the balance 20 per cent was to be contributed by the private sector. In the Eleventh Plan, private sector's contribution would grow to 30 per cent or Rs. 6,19,591 crore (US\$ 154.90 billion). Roads, telecom, ports, airports, storage and gas sectors are projected at higher than the average private sector contribution, ranging upwards of 30 per cent, with nearly 70 per cent in airports

and telecommunications. Private sector participation in asset creation in electricity is somewhat lower at 28 per cent. The Central share in the overall infrastructure investment would decline from 46 per cent in the Tenth Plan to 37.2 per cent in the Eleventh Plan and the States' share would slightly decline to 32.6 per cent as compared to 34 per cent in the Tenth Plan.

18. As shown in Table 6 below, overall the States would contribute 47 per cent of public investment, with the 53 per cent Central share varying from over 95 per cent in sectors such as railways, telecom, airports and gas to a low of 10 per cent in irrigation.

Projected Investment as Percentage of GDP

19. The projected investment as percentage of GDP by public and private sectors given in Table 7 below reaffirms the consistent growth of investment by both the public and private sectors. The share of investment in GDP for the year 2006-07 is based on BE where RE were not available, and will, therefore, need to be revised as the estimates are firmed up by the relevant bodies in due course.

Table 6: Projected Shares of the Centre and States in Public Investment (%)

	Centre	States	Total Public Sector
Electricity (incl. NCE)	53	47	100
Roads and Bridges	52	48	100
Telecommunications	100	0	100
Railways (incl. MRTS)	95	5	100
Irrigation (incl. Watershed)	10	90	100
Water Supply and Sanitation	30	70	100
Ports	89	11	100
Airports	99	1	100
Storage	40	60	100
Gas	100	0	100
Total	53	47	100

Table 7: Projected Investment in Infrastructure as Percentage of GDP (Bottom-up Estimates)

(Rs. crore at 2006-07 prices)							
Years	Base year (2006-07) of X Plan (BE/RE)	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
GDP	4,145,810	4,518,933	4,925,637	5,368,944	5,852,149	6,378,843	27,044,506
Public Investment	175,388	192,107	227,327	273,543	332,355	411,226	1,436,559
Private Investment	49,858	78,166	94,252	115,724	146,762	184,687	619,591
Total investment	225,246	270,273	321,579	389,266	479,117	595,913	2,056,150
Infrastructure Investment as Percentage of GDP (%)							
Public	4.23	4.25	4.62	5.09	5.68	6.45	5.31
Private	1.20	1.73	1.91	2.16	2.51	2.89	2.29
Total	5.43	5.98	6.53	7.25	8.19	9.34	7.60

Investment in Rural Infrastructure

20. Improvement in rural infrastructure is crucial for broad-based inclusive growth of the economy and for bridging the rural-urban divide. The special programme, Bharat Nirman for upgradation of rural infrastructure, launched in 2005, aims to provide electricity to the remaining 1,25,000 villages and to 23 million households; to connect the remaining 66,802 habitations with all weather roads; to construct 1,46,185 km of new rural roads network; to provide

drinking water to 55,067 uncovered habitations; to provide irrigation to an additional 10 million hectares; and to connect the remaining 66,822 villages with telephones. Under the since strengthened programme, it is estimated that out of the total projected investment of Rs. 14,36,559 crore to be incurred by the Centre and the States in the Eleventh Plan, Rs. 4,35,349 crore (or 30.3 per cent) would be spent exclusively towards improvement of rural infrastructure. The distribution across sectors is indicated in Table 8 below.

Table 8: Projected Investment in Rural Infrastructure	
(Rs. crore at 2006-07 prices)	
Sectors	Projected Investment
Electricity	34,000
Rural roads	41,347
Telecommunications	16,000
Irrigation (incl. Watershed Development)	253,301
Water supply and sanitation	90,701
Total	435,349

Investment requirement during the Twelfth Plan

21. It is obvious that the thrust for development of infrastructure would need to continue during the Eleventh Plan and beyond into the Twelfth Plan if the economy is to maintain the growth achieved in the recent past. Projections for the Twelfth Plan have

been made assuming that GCF in infrastructure as percentage of GDP would rise from 9 per cent in 2011-12 to 10.25 per cent in 2016-17 and that GDP would continue to grow at 9 per cent per annum. Based on the above the required GCF in the infrastructure sector during the Twelfth Plan would be order of Rs. 40,74,977 crore or US\$ 1,018.74 billion as shown in Table 9 below.

Ten Year Vision

22. Aggregating the top-down projected investments for the Eleventh and Twelfth Plans to arrive at a ten-year plan for investment in infrastructure yields a required total investment in terms of GCF of Rs. 60,86,498 crore or US\$ 1,521.62 billion.

Table 9: Projected GCF in Infrastructure based on Growth Targets (Twelfth Five Year Plan)						
(Rs. crore at 2006-07 prices)						
Year	Base Year (2011-12)	2012-13	2013-14	2014-15	2015-16	2016-17
GDP at market prices (Rs. crore)	6,378,843	6,952,938	7,578,703	8,260,786	9,004,257	9,814,640
Rate of growth of GDP (%)	9.00	9.00	9.00	9.00	9.00	9.00
Infrastructure GCF % of GDP	9.00	9.25	9.50	9.75	10.00	10.25
Infrastructure GCF (Rs. crore)	574,096	643,147	719,977	805,427	900,426	1,006,001
Infrastructure GCF (US\$ bn)	143.52	160.79	179.99	201.36	225.11	251.50
Total GCF in the XII Plan		Rs. 40,74,977 crore or US\$ 1,018.74 billion				

III. Business as usual

23. The 'business as usual' scenario at constant 2006-07 prices is estimated based on log-linear projections of public sector plan investment and private investment in some sectors. As trend projections, the scenario is heavily influenced by past patterns of growth, investment and capital formation - which have historically been substantially lower than is envisaged for the Eleventh Plan.
24. Annual Plan expenditures from 2002-03 to 2006-07 have been used as a proxy for public investment spending in all sectors. Private investment projections are identical to those undertaken for GCF projections with CSO estimates as the only credible source of data.
25. Log-linear projections of private investment in non-conventional energy and public investment in MRTS, ports, roads and bridges are judged to be too high, and the projections are based on linear estimates only. Private investment in ports has been projected based on provisional data obtained from Ministry of Shipping. A declining public GCF in storage was observed during 2004-06. Using the mean GCF in 2002-06, a growth rate of 5 per cent has been assumed to project investment in the Eleventh Plan in the sector.
26. The 'business as usual' projection of total investment in infrastructure during the Eleventh Plan is, thus, Rs. 15,52,657 crore or US\$ 388.16 billion. This projection is 1.78 times the anticipated Tenth Plan spending on infrastructure. The bottom-up projection of Rs. 20,56,150 crore or US\$ 514.04 billion is almost 1.32 times this 'business as usual' projection. The share of public and private investments in total investment is 74 per cent and 26 per cent, respectively, in contrast with 80 per cent and 20 per cent, respectively, expected to be realized in the Tenth Plan. Table 10 below summarizes this projection exercise.

Table 10: Log-Linear Projections of Investment during the Eleventh Plan							
(Rs. crore at 2006-07 prices)							
Sectors	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan	Share (%)
Electricity (incl. NCE)	76,539	83,717	91,466	99,844	108,913	460,479	
Public	49,440	53,178	57,206	61,548	66,228	287,600	62.46
Private	27,099	30,539	34,260	38,295	42,685	172,879	37.54
Roads and bridges	42,368	46,831	51,294	55,757	60,221	256,471	
Public	41,056	45,548	50,041	54,534	59,026	250,205	97.56
Private	1,312	1,283	1,253	1,224	1,194	6,267	2.44
Telecommunications	29,251	32,590	35,963	39,368	42,801	179,974	
Public	6,914	6,430	5,981	5,563	5,174	30,062	16.70
Private	22,338	26,160	29,983	33,805	37,627	149,913	83.30
Railways (incl. MRTS)	35,499	40,647	46,553	53,340	61,152	237,190	
Public	35,377	40,542	46,462	53,262	61,085	236,727	99.80
Private	122	105	91	78	67	463	0.20
Irrigation (incl. WD)	30,047	33,335	36,983	41,032	45,526	186,923	
Public	30,047	33,335	36,983	41,032	45,526	186,923	100
Water supply and sanitation	19,555	22,666	26,284	30,490	35,374	134,369	
Public	19,482	22,611	26,243	30,458	35,351	134,145	99.83
Private	73	55	42	31	24	225	0.17
Ports	5,618	7,211	9,394	12,439	16,739	51,400	
Public	779	793	807	821	836	4,035	7.85
Private	4,839	6,418	8,588	11,618	15,903	47,365	92.15
Airports	3,292	4,011	4,773	5,586	6,460	24,121	
Public	1,242	1,473	1,748	2,074	2,460	8,996	37.30
Private	2,050	2,537	3,025	3,513	4,000	15,125	62.70
Storage	947	1,056	1,177	1,313	1,466	5,958	
Public	277	319	367	422	485	1,869	31.36
Private	670	737	811	892	981	4,090	68.64
Gas	2,286	2,655	3,084	3,583	4,163	15,770	
Public	1,954	2,258	2,609	3,015	3,484	13,321	84.47
Private	332	397	474	568	679	2,449	15.53
Total (Rs. crore)	245,401	274,718	306,973	342,752	382,813	1,552,657	
Public	186,567	206,487	228,447	252,728	279,653	1,153,882	74.32
Private	58,835	68,231	78,525	90,023	103,160	398,775	25.68
Total (US \$ bn)	61.35	68.68	76.74	85.69	95.70	388.16	
Public	46.64	51.62	57.11	63.18	69.91	288.47	74.32
Private	14.71	17.06	19.63	22.51	25.79	99.69	25.68

IV. Financing of the Projected Investment in Infrastructure

27. The public sector, including the public corporate sector, would continue to play a dominant role in investment for infrastructure. The total public sector investment envisaged is Rs. 7,65,622 crore by the Centre and Rs. 6,70,937 crore by the States. Investment by the private sector, which includes PPP projects, makes up the balance of Rs. 6,19,591 crore, which is 30 per cent of the required investment during the Eleventh Plan, a much higher share than 20 per cent anticipated during the Tenth Plan.
28. Of the projected investment of Rs. 7,65,622 crore by the Centre, Rs. 5,65,622 crore is likely to be funded out of Internal and Extra Budgetary Resources (IEBR). In the case of States, Rs. 4,44,671 crore is expected to be funded from budgetary resources while about Rs. 2,26,266 crore is expected to be contributed from their IEBR, as per details in Table 11. These investment levels would require a much higher scale of effort by the Public Sector Undertakings especially for raising debt on commercial terms.

The need for debt financing

29. A source-wise estimation of the likely debt resources has been made and is summarized in Table 12. Using RBI's estimations on increase in outstanding domestic credit to the corporate sector in 2006-07, and the assumption that 8 per cent of the outstanding balances are disbursed by way of additional credit, it has been estimated that Rs. 39,312 crore was the domestic bank credit disbursed to infrastructure projects in 2006-07. Applying the annual growth rate of 26.8 per cent on this base, it is estimated that approximately Rs. 4,23,691 crore would be available as domestic bank credit over the entire Eleventh Plan. Credit from non-Bank Financial Companies (NBFCs) has been estimated to be Rs. 18,070 crore in 2006-07.² Credit from NBFCs to infrastructure projects in 2006-07 was slightly more than double that in 2005-06, a peak growth rate. Although credit from NBFCs grew by 38 per cent achieved over the Tenth Plan, the cumulative total credit available from NBFCs in the

Table 11. Projected Investment in Infrastructure: Source-Wise Financing

	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
	(Rs. crore at 2006-07 prices)					
Centre	112,608	128,305	148,545	172,123	204,041	765,622
Central Budget	29,416	33,517	38,804	44,963	53,301	200,000
Internal Generation (IEBR)	24,958	28,437	32,922	38,148	45,222	169,687
Borrowings (IEBR)	58,234	66,352	76,819	89,012	105,518	395,936
States	79,499	99,022	124,998	160,232	207,186	670,937
States Budgets	52,689	65,628	82,844	106,195	137,315	444,671
Internal Generation (IEBR)	8,043	10,018	12,646	16,211	20,961	67,880
Borrowings (IEBR)	18,767	23,376	29,508	37,826	48,910	158,386
Private	78,166	94,252	115,724	146,762	184,687	619,591
Internal Accruals/Equity	23,450	28,276	34,717	44,029	55,406	185,877
Borrowings	54,716	65,976	81,006	102,733	129,281	433,713
Total Projected Investment	270,273	321,579	389,266	479,117	595,913	2,056,150
Non-Debt	138,555	165,875	201,933	249,546	312,205	1,068,114
Debt	131,718	155,704	187,333	229,571	283,709	988,035

² Estimated by IDFC from the balance sheets of NBFCs.

Eleventh Plan is estimated as Rs. 2,24,171 crore applying a more likely annual growth rate of 32 per cent. Resources of an estimated Rs. 8,251 crore in 2006-07³ from pension and insurance companies are projected to grow annually at 10 per cent, cumulating in turn to Rs. 55,414 crore over the Eleventh Plan.

30. External Commercial Borrowings (ECBs) by the corporate sector for infrastructure projects in 2006-07 were estimated at Rs. 17,635 crore, after discounting short-term loans, trade credits of 1-3 year maturities, and disbursements to non-infrastructure corporates. Although the total disbursements grew by 42 per cent in 2006-07, for the purpose of estimating the availability of external debt funds for infrastructure, the trend rate of growth of 11.1 per cent in disbursements of long-term debt over the Tenth Plan was used to yield a total availability of Rs. 1,22,263 crore through the ECB route. Table 12 above provides the details of the likely sources of debt against the estimated requirements of debt during the Eleventh Plan.
31. The total requirement of debt by the public and private sectors is likely to be Rs. 9,88,035 crore or US\$ 247.01 billion.

However, the availability of debt financing for infrastructure during the Eleventh Plan is estimated at Rs. 8,25,539 crore or US\$ 206.38 billion. There is, thus, a funding gap of Rs. 1,62,496 crore or US\$ 40.62 billion in the debt component, the details of which are given in Table 12. Measures would have to be taken to bridge this gap to ensure enhanced long term bank credit, external commercial borrowings, pension and insurance and other debt funds on commercially viable terms to infrastructure projects.

32. The required investment in infrastructure would be possible only if there is a substantial expansion in internal generation and extra budgetary resources of public sector, in addition to a significant rise in private investment. The share of the private sector in total infrastructure investment of around 30 per cent overall, is far higher in some sectors, as for instance in telecommunications, ports and airports where over 60 per cent of the investments would have to come from the private sector. As a pre-requisite, this would require large infrastructure projects to be structured on sound commercial principles in an enabling policy and regulatory environment.

Table 12: Likely Sources of Debt Financing for the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Domestic bank credit	49,848	63,207	80,147	101,626	128,862	423,691
Non-Bank Finance Companies (NBFCs)	23,852	31,485	41,560	54,859	72,415	224,171
Pension/Insurance companies	9,077	9,984	10,983	12,081	13,289	55,414
External Commercial Borrowings (ECB)	19,593	21,768	24,184	26,868	29,851	122,263
Likely Total Debt Resources	102,370	126,444	156,874	195,435	244,416	825,539
Estimated Debt Requirement	131,718	155,704	187,333	229,571	283,709	988,035
<i>US \$ bn</i>	32.93	38.93	46.83	57.39	70.93	247.01
Gap between Estimated Debt Requirement and Likely Debt Resources	29,348	29,260	30,460	34,136	39,292	162,496
<i>US \$ bn</i>	7.34	7.31	7.61	8.53	9.82	40.62

³ Estimated by IDFC from IRDA reports.

Conclusion

33. It is evident that in order to deliver on the minimum physical targets needed to achieve 9 per cent broad-based and inclusive growth, establishing the enabling conditions for raising the requisite resources and sustaining these large investments remains very challenging. For the public sector to be able to raise the estimated IEBR of about Rs. 7,91,888 crore (US\$ 197.97 billion), its reliance on debt would rise significantly, besides the need to generate internal resources to fund the equity component of these investments. Such large debt-based investments will involve significant debt service obligations which cannot be serviced out of budgetary subvention. It would, therefore, be essential to bring about operational and commercial efficiency improvements, cost reductions, and timely completion of projects in the public sector, and also to ensure rational user charges for improving revenue streams. Inadequate attention to these aspects would seriously restrict the ability of the public sector to raise resources for such investments, thereby shrinking the programme of asset creation in infrastructure with its consequential impact on GDP growth. Increasing budgetary outlays to meet shortfalls on these accounts does not seem a feasible option in view of competing demands from rural infrastructure, agriculture and social sectors.
34. Even if the public sector is able to achieve its ambitious targets, the required investment in infrastructure is only possible if there is a substantial expansion in private sector investment. The share of the private

Box 2: Financing the Projected Investment in Infrastructure

Financing of the proposed investment of Rs. 20,56,150 crore over the Eleventh Plan relies only to the extent of Rs. 6,44,671 crore (31.35%) on budgetary support. The remaining Rs. 14,11,479 crore is expected from private sector and from IEBR of public sector. The budgetary support to physical infrastructure is limited because of the large requirements of agriculture, health and education. Even what is available will be directed largely towards rural infrastructure and the North-East, leaving little room for budgetary funding of other infrastructure projects.

The large volumes of investment required

for projects in power, telecom, railways, highways, ports, and airports, therefore, would have to be funded either from internal generation and extra budgetary resources of public sector or from pure private investment and PPP projects. The ability to attract these investments depends critically on a regime where there are reasonable and predictable user charges and risk allocation is clearly defined. Investment in large infrastructure projects would, therefore, need to be structured on sound commercial principles and legal structures combined with competition to ensure transparency of project choice and a credible regulatory structure.

sector in total infrastructure investment has to be around 30 per cent. In some sectors, the private sector's contributions would have to be far higher, as for instance in telecommunications, ports and airports where over 60 per cent of the investments have to come from the private sector. If these initiatives succeed, India would deliver a large programme of PPPs even by international standards. The enormity and complexity of this effort would have to be recognised and addressed on an urgent

footing and for this purpose, the policies and measures initiated so far would have to be consolidated and carried forward with outcome-based enhancements.

35. An implication of the strategy outlined in this paper is that infrastructure services would have to be provided on commercial principles, with particular attention to the electricity sector. This is necessary to ensure viability of both the public and private sector targets.

Appendix 1 - 10

Appendix 1

Projections for Electricity (including Non-Conventional Energy) Sector

The Working Group on Power has estimated an investment requirement of Rs. 10,31,600 crore for the Eleventh Plan with contribution by the Centre of Rs. 2,99,396 crore, by the States of Rs. 5,14,167 crore and by the private sector of Rs. 2,18,037 crore. While this could well be the investment needed, the absorption capacity, availability of financial resources and the viability of utilities may constrain its realization. The Working Group's projections are as much as 3.5 times the expenditure anticipated to be realized in the sector in the Tenth Plan, details of which are in Table 1.1.

In this paper, total investment in the electricity sector (including non-conventional energy) during the Eleventh Plan is projected at Rs. 6,66,525 crore at 2006-07 prices or US\$ 166.63 billion as per details indicated in Table 1.2. This investment would be about 2.3 times the investment anticipated in the Tenth Plan in the

electricity sector, and is comparable to the overall average of projected infrastructure investment for the Eleventh Plan of 2.36 times the anticipated level in the Tenth Plan.

The projections assume that Central investment in the Eleventh Plan will grow at a CAGR of 15 per cent and States' investment at 38 per cent in view of the thrust on augmenting distribution systems and rural electrification. Private investment is expected to grow at 24 per cent in the backdrop of the focus particularly on the upcoming nine Ultra Mega Power Projects each with a capacity of 4,000 MW whose implementation is planned to be initiated in the Eleventh Plan.

The total public investment of Rs. 4,81,013 crore implies a share in total likely investment of 72.2 per cent, with the private sector contributing the balance investment of Rs. 1,85,512 crore or 27.8 per cent.

Table 1.1: Anticipated Public and Private Investment in Electricity (incl. NCE) during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	14,219	17,336	19,708	22,867	28,332	102,463
States	20,467	20,566	18,819	18,329	19,372	97,553
Private	12,926	15,583	18,428	21,071	23,825	91,834
Total	47,612	53,485	56,956	62,268	71,529	291,850

Table 1.2: Projected Public and Private Investment in Electricity (incl. NCE) during the Eleventh Plan

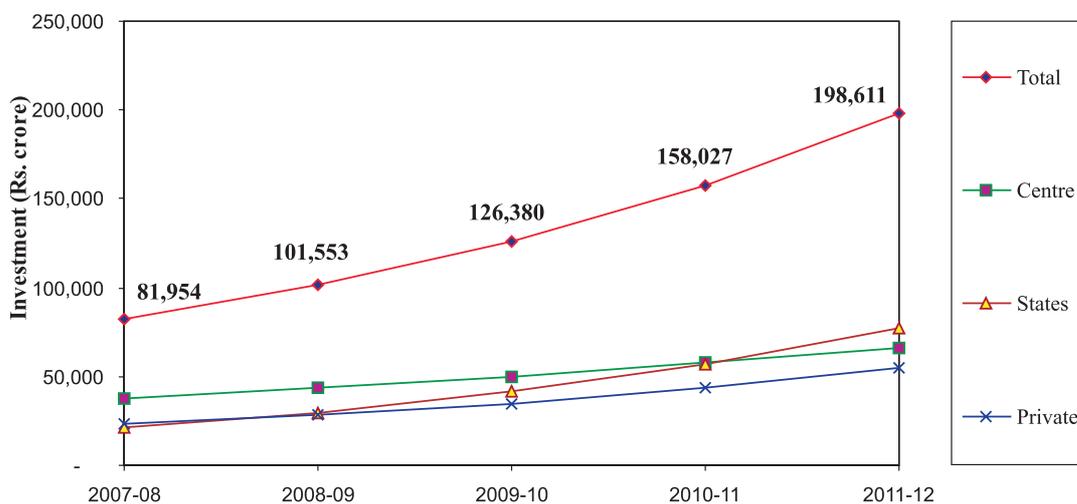
(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Centre	37,808	43,469	49,989	57,631	66,420	255,316
States	20,978	29,729	41,357	56,670	76,963	225,697
Private	23,168	28,355	35,035	43,726	55,228	185,512
Total	81,954	101,553	126,380	158,027	198,611	666,525

By activity, the investment on generation, transmission and distribution of power by the Centre, States and private sector has been estimated in consultation with the Ministry of Power. Total investment across the Eleventh

Plan in generation would amount to Rs. 3,77,349 crore, in transmission Rs.1,40,423 crore and distribution of power Rs. 1,48,753 crore, as per details shown in Table 1.3.

Table 1.3: Activity-wise investment in Electricity during the Eleventh Plan				
(Rs. crore at 2006-07 prices)				
Activity	Generation	Transmission	Distribution	Total XI Plan
Centre	1,43,976	61,637	49,703	2,55,316
States	91,525	44,825	89,347	2,25,697
Private	1,41,848	33,961	9,703	1,85,512
Total	3,77,349	1,40,423	1,48,753	6,66,525

Projected Investment in Electricity (including NCE) during Eleventh Plan
(Rs. 6,66,525 crore)



Appendix 2

Projections for the Roads and Bridges Sector

The Working Group on Roads has estimated an investment requirement of Rs. 2,09,493 crore in National Highways during the Eleventh Plan, with the public sector contributing Rs. 1,21,758 crore and the private sector Rs. 87,735 crore. It estimated a requirement of Rs. 1,00,000 crore on States' roads, including those in the North-East region, with a private sector component of Rs. 32,000 crore. The Working Group on Rural Roads estimated an investment requirement of Rs. 79,000 crore. Aggregating, the total investment in roads and bridges was estimated to be Rs. 3,88,493 crore. In the Tenth Plan the anticipated expenditure on roads and bridges is Rs. 1,44,892 crore or US\$ 36.22 billion, as per details in Table 2.1. The estimates by the concerned Working Groups are, thus, 2.7 times the realized investment in the Tenth Plan.

In this paper, the investment in roads sector during the Eleventh Plan is projected at Rs. 3,14,152 crore or US\$ 78.54 billion, which is 2.2 times the Tenth Plan investment. Its breakup by public sector (Rs. 2,07,359 crore) and private sector (Rs. 1,06,792 crore) is depicted in Table 2.2, and that by type of roads is in Table 2.3.

The detailed distribution across National Highways (NH) under the NH Development Programme (NHDP) and other NH, State roads (highways, major district roads and other roads), rural roads and the roads of the North East is depicted in Table 2.4. Approximately, Rs. 1,45,853 crore is projected to be invested in NH, Rs. 1,26,952 crore in States' roads, Rs. 36,582 crore in rural roads, and Rs. 4,765 crore in roads in the North-East.

Projected investment on NH was split into investment under NHDP and spending on other NH as well as highways that fall under the Border Roads Development Board (BRDB). NHDP investment has been taken from the financing plan for NHDP, converted to constant 2006-07 prices, but re-phased (within the same total envelope) to permit a graded increase for both public and private contributions to the programme. Since most of the investment in 'other' NH has now been brought under the ambit of the NHDP, such growth in spending is already accounted for under the NH investment through the NHDP. Residually, it is anticipated that spending on "other NH" will not grow at the same pace as in previous years.

State highways' public investment in the

Table 2.1: Anticipated Public and Private Investment in Roads and Bridges during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	15,869	8,761	8,442	17,509	20,953	71,534
States	9,724	9,693	11,321	16,083	19,534	66,354
Private (NHDP)	1,013	2,111	1,616	686	1,578	7,004
Total	26,605	20,564	21,379	34,278	42,065	144,892

Eleventh Plan is projected at 1.69 times the public investment in NHDP, in line with the average ratio of 1.7 of State to Central Plan spending on the roads sector during the first three years of the Tenth Plan, with base year values of State public investment derived from the historical evolution of spending under State

under Bharat Nirman.

Investment in highways and roads in the North East will be taken up under the Special Accelerated Road Development Program for the North East (SARDP), which assumes an expenditure of Rs. 12,000 crore over ten years

Table 2.2: Projected Public and Private Investment in Roads and Bridges during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Centre	30,330	32,357	35,382	41,373	47,756	187,199
Public	18,318	19,446	20,673	22,618	26,304	107,359
Private	12,012	12,911	14,709	18,755	21,452	79,840
States	21,491	22,431	23,817	26,998	32,216	126,952
Public	17,534	18,150	18,889	20,613	24,815	100,000
Private	3,957	4,281	4,928	6,385	7,401	26,952
Total	51,822	54,789	59,200	68,371	79,971	314,152
Public	35,852	37,596	39,562	43,231	51,118	207,359
Private	15,970	17,193	19,638	25,140	28,852	106,792

Table 2.3: Projected Investment by Type of Roads during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
National Highways	23,271	24,698	27,118	32,510	38,257	145,853
State Roads	21,491	22,431	23,817	26,998	32,215	126,952
Rural Roads	6,341	6,851	7,276	7,784	8,330	36,582
NE Roads	719	809	989	1,079	1,169	4,765
Total	51,822	54,789	59,200	68,371	79,971	3,14,152

Plans. Private spending on State roads (through PPPs) is projected at 34 per cent of private investment attracted to NHDP (under NHDP financing plan).

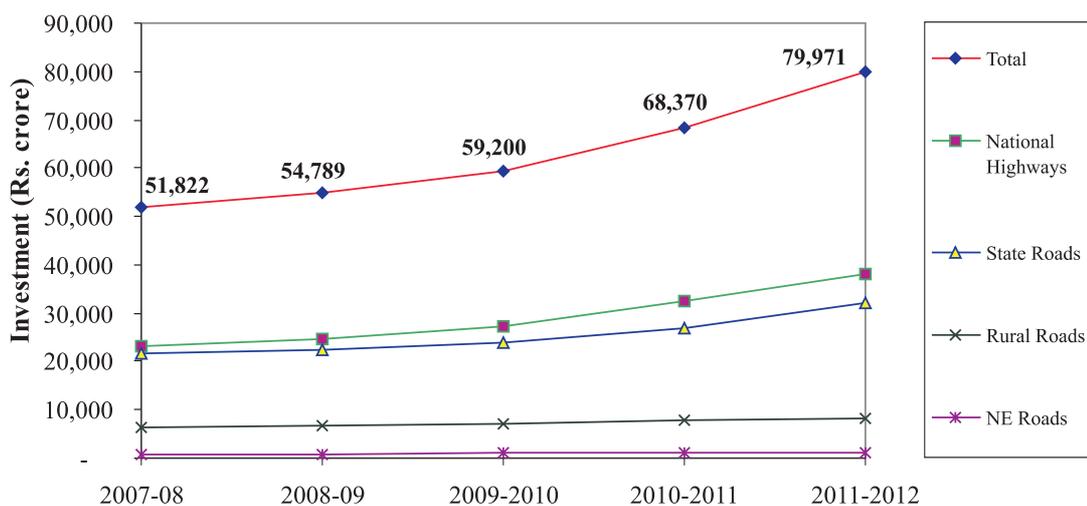
Investment on rural roads is sourced from the Pradhan Mantri Gram Sadak Yojana (PMGSY)

from 2005-06 to 2014-15. Since spending has been around Rs. 500 crore each year in 2005-06 and 2006-07, it is estimated that spending under SARDP will be around Rs. 4,765 crore during the Eleventh Plan period.

Table 2.4 Detailed Projections on Investment in Roads and Bridges during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
National Highways	23,271	24,698	27,118	32,510	38,257	145,853
NHDP Public	10,077	10,513	11,038	12,282	15,233	59,143
Other NH (Public)	1,181	1,273	1,371	1,473	1,572	6,869
NHDP Private	12,012	12,911	14,709	18,755	21,452	79,840
State Roads (Highways, major District Roads, Others)	21,491	22,431	23,817	26,998	32,215	126,952
Public	17,534	18,150	18,889	20,613	24,815	100,000
Private	3,957	4,281	4,928	6,385	7,401	26,952
Rural Roads: Bharat Nirman	6,341	6,851	7,276	7,784	8,330	36,582
North East Roads: SARDP	719	809	989	1,079	1,169	4,765
Total (Rs. crore)	51,822	54,789	59,200	68,371	79,971	314,152
Total (US\$ bn)	12.96	13.7	14.8	17.09	19.99	78.54

**Projected Investment in Road Sector during the Eleventh Plan
(Rs. 3,14,152 crore)**



Appendix 3

Projections for the Telecommunications Sector

The Working Group on Telecommunications for the Eleventh Plan has projected public sector investment (through BSNL and MTNL) at Rs. 1,21,630 crore for the Eleventh Plan. It did not estimate the likely investment by the private sector. The historical evolution of such expenditures in the Tenth Plan is given in Table 3.1.

average rate of 35 per cent per annum, starting from Rs. 17,850 crore in 2007-08, as also detailed out in Table 3.2, which is comparable with Rs. 17,762 crore (provisional) average gross capital formation reported by the CSO in 2005-06 and 2006-07. Total private investment over the Eleventh Plan is projected at Rs. 1,77,686 crore.

Table 3.1: Anticipated Public and Private Investment in Telecommunications during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual) *	2005-06 (Actual) *	2006-07 (Actual)	Total X Plan (Anticipated)
Centre	15,690	8,649	9,508	7,957	7,208	49,013
Private	5,954	4,274	8,600	16,642	18,882	54,352
Total	21,644	12,924	18,108	24,599	26,090	103,365

*Note: *For private investment, the provisional estimates of gross capital formation have been used.*

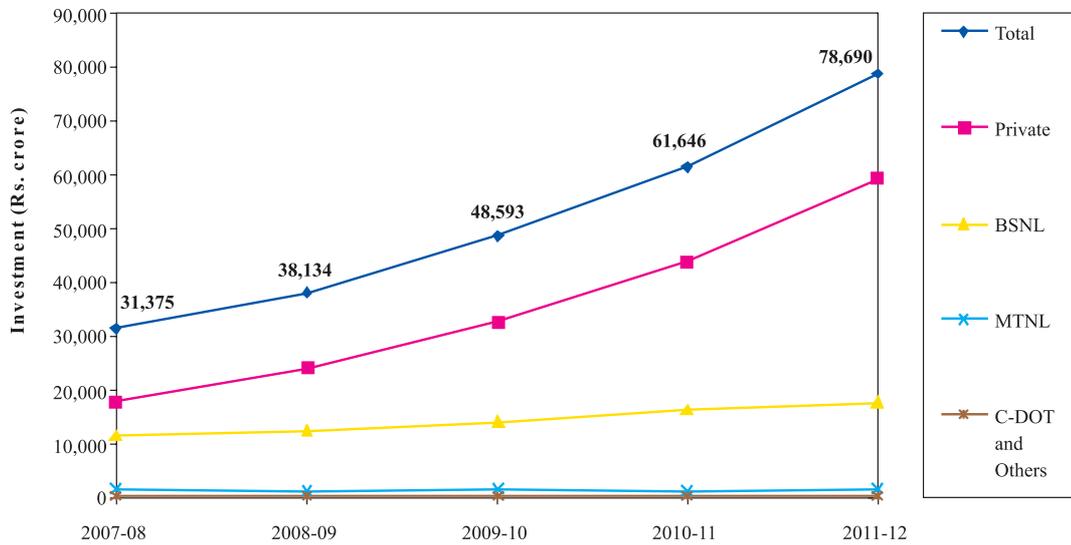
In light of the low public investment in the Tenth Plan and the declining capital costs of telecom equipment, the estimated public investment by the Working Group has been scaled down to Rs. 80,753 crore. It is also assumed that private investment will grow at an

Thus, of the total investment of Rs. 2,58,439 crore or US\$ 64.61 billion in the sector during the Eleventh Plan, 68.75 per cent would come from the private sector and 31.25 per cent from the public sector.

Table 3.2: Projected Public and Private Investment in Telecommunications during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Public	13,525	14,037	16,061	17,728	19,401	80,753
BSNL	11,636	12,465	14,142	16,180	17,491	71,914
MTNL	1,625	1,287	1,611	1,215	1,551	7,290
C-DOT and Others	264	285	308	333	359	1,549
Private	17,850	24,098	32,532	43,918	59,289	1,77,686
Total	31,375	38,134	48,593	61,646	78,690	258,439

**Projected Investment in Telecommunications during the Eleventh Plan
(Rs. 2,58,439 crore)**



Appendix 4

Projections for Railways (including MRTS)

The Working Group on Railways (excluding Metro Rail Projects (MRTS)) for the Eleventh Plan has estimated likely public investment of Rs. 2,51,000 crore, with an additional private sector investment of Rs. 66,000 crore. This

by the Centre and Rs. 10,000 crore each by the respective State(s) and private sector. Total investment of Rs. 2,61,808 crore or US\$ 65.45 billion is 2 times the anticipated Tenth Plan expenditure.

Table 4.1: Anticipated Public and Private Investment in Railways (incl. MRTS) during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	16,644	18,671	20,362	23,626	29,647	108,950
States (MRTS)	1,616	1,695	1,964	2,327	2,800	10,402
Private	-	-	-	165	142	307
Total	18,260	20,366	22,327	26,117	32,589	119,658

amounts to 2.65 times the anticipated realised investment in railways (but including MRTS) in the Tenth Plan of Rs. 119,658 crore, details in respect of which are in Table 4.1.

In this paper, public investment in Indian Railways is projected at Rs. 2,34,617 crore during the Eleventh Plan. An additional Rs. 27,191 crore is likely to be invested in MRTS, of which Rs. 7,191 crore would be contributed

As disaggregated in Table 4.2, the Eleventh Plan investment in Railways consists of investment in rolling stock of Rs. 45,729 crore, in capacity augmentation and development works of Rs. 58,870 crore, in safety and other works of Rs. 95,129 crore, in rail PSUs of Rs. 9,390 crore and in dedicated freight corridors of Rs. 25,500 crore.

The projections assume annual growth rates of investment of 15 per cent in rolling stock, 33 per

Table 4.2 Projected Investment in Railways during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Rolling stock*	6,755	7,786	8,971	10,316	11,901	45,729
Capacity augmentation and development	6,582	8,506	11,009	14,266	18,506	58,870
Safety and other works	13,874	16,053	18,597	21,570	25,035	95,129
Investment in PSUs	1,601	1,729	1,867	2,016	2,178	9,390
Dedicated freight corridors	1,131	2,046	3,704	6,294	12,325	25,500
Metro Rail Projects	4,282	4,843	5,378	5,931	6,757	27,191
Total	34,225	40,964	49,525	60,393	76,701	2,61,808

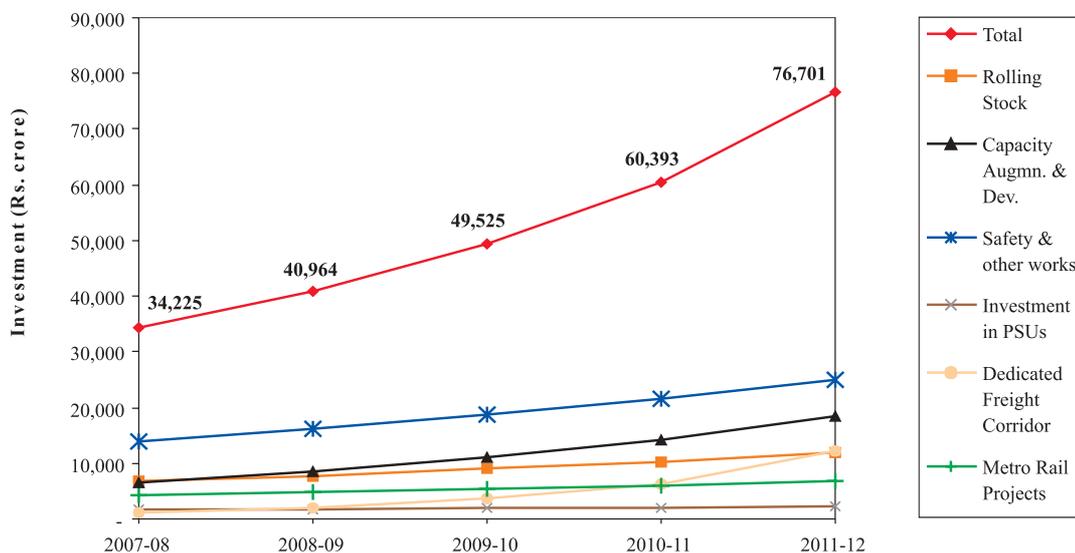
* CSO and Ministry of Railways both account rolling stock in infrastructure.

cent in capacity augmentation, 10 per cent in development works, 20 per cent in rail safety, and 8 per cent in PSUs. The estimated investment of Rs. 25,500 crore in dedicated freight corridors and the projected allocation of Rs. 27,191 crore for investment in metro rail projects have separately been phased over the Eleventh Plan with a gradual increase in investment over time.

It is assumed that about 17.2 per cent of railway investment will come through PPPs. Thus, of

the total investment of Rs. 2,34,617 crore in the Indian Railways, approximately Rs. 1,93,263 crore will be invested by the public sector and Rs. 40,354 crore by the private sector. Taking into consideration the projected private investment of Rs.10,000 crore in metro rail projects also, overall private investment in the sector comes to Rs. 50,354 crore.

**Projected Investment in Railways during the Eleventh Plan
(Rs. 2,61,808 crore)**



Appendix 5

Projections for Irrigation Sector (including Watershed Development)

The Working Group on Irrigation (excluding Watershed Development (WD)) for the Eleventh Plan has estimated public investment of Rs. 2,31,800 crore, with a Central contribution of Rs. 49,750 crore and of States of Rs. 1,82,050 crore. This amounts to 2.1 times the anticipated Tenth Plan investment (but including WD) of Rs. 1,11,503 crore, as per details in Table 5.1.

In this paper, reflecting the thrust on realising the irrigation potential, irrigation sector investment during the Eleventh Plan is projected at Rs. 2,53,301 crore or US\$ 63.32 billion, which is 2.27 times the anticipated Tenth Plan expenditure. In terms of its distribution, about Rs. 1,73,960 crore is projected to be invested in Major and Medium Irrigation, Rs. 33,355 crore in Minor Irrigation, Rs. 10,763 crore in Command Area Development (CAD), Rs. 8,215

crore in Flood Control, and Rs. 27,009 crore in Watershed Development, as detailed in Table 5.2 below.

Since substantial investments have been planned for Bharat Nirman programme under the States sector and taking into account the thrust on irrigation sector during the Eleventh Plan, particularly on Major and Medium Irrigation and Minor Irrigation, States' spending on Major and Medium Irrigation has been assumed to grow annually at about 37 per cent, on Minor Irrigation at 27 per cent, on CAD at 21 per cent, and on Flood Control at 15 per cent. States' investment in Watershed Development Programmes is envisaged to grow at the rate of 24 per cent per annum during Plan period. Under these assumptions, projected spending by the States on Major and Medium Irrigation

Table 5.1: Anticipated Public and Private Investment in Irrigation (incl. Watershed) during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	2,303	2,318	2,911	2,884	3,200	13,617
States	15,163	16,333	21,859	22,663	21,868	97,886
Total	17,467	18,651	24,770	25,548	25,068	111,503

Table 5.2 Projected Investment in Irrigation (incl. Watershed) by Category during the Eleventh Plan

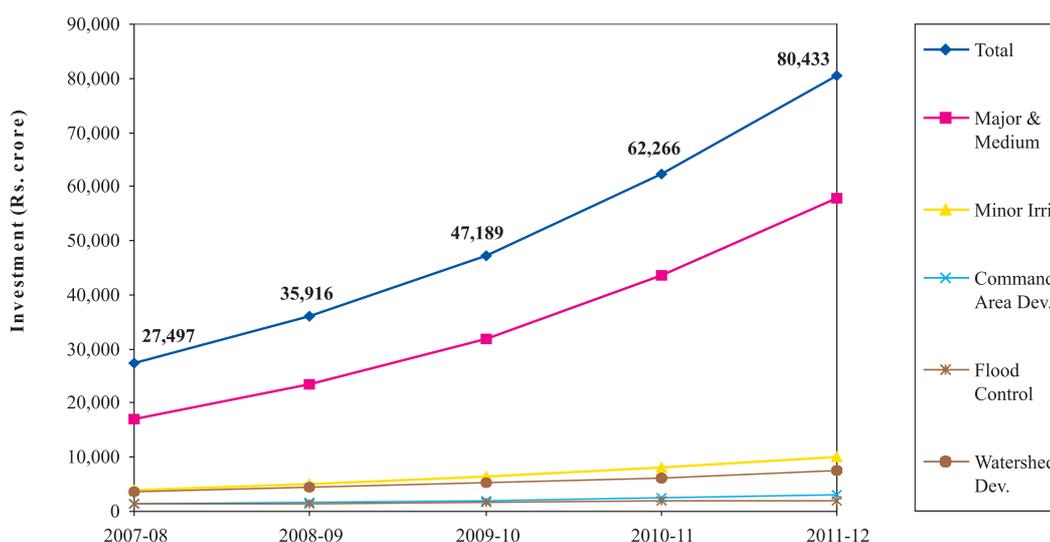
(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Major and Medium Irrigation	17,073	23,354	31,957	43,742	57,834	173,960
Minor Irrigation	3,938	4,983	6,309	7,992	10,133	33,355
Command Area Development	1,485	1,758	2,086	2,480	2,954	10,763
Flood Control	1,258	1,424	1,614	1,832	2,087	8,215
Watershed Development	3,743	4,398	5,223	6,220	7,426	27,009
Total	27,497	35,916	47,189	62,266	80,433	253,301

works out to Rs. 1,73,338 crore, and on Minor Irrigation to Rs. 32,939 crore. Adding to this spending by States of Rs. 9,806 crore on CAD, Rs. 7,339 crore on Flood Control and another Rs. 5,120 crore on Watershed Development, yields a total of States' investment in irrigation

basically research and investigation oriented. It is assumed that during the Eleventh Plan, Central spending will grow annually at a rate of around 5 per cent for Major and Medium Irrigation. Minor Irrigation and CAD are projected to grow at 3 per cent and 2 per cent

Table 5.3: Projected Investment in the Eleventh Plan in Irrigation (including Watershed Development) by States and Centre						
(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Centre	3,367	4,006	4,782	5,726	6,879	24,759
States	24,130	31,911	42,407	56,540	73,554	228,543
Total	27,497	35,916	47,189	62,266	80,433	253,301

Projected Investment in Irrigation (incl. Watershed) Sector during Eleventh Plan (Rs 2,53,301 crore)



of Rs. 2,28,543 crore over the Eleventh Plan. The break-down by States and Central spending is depicted in Table 5.3.

In the Central sector, most of the schemes are

respectively. Central spending on Flood Control is projected to grow at a rate of 2 per cent annually. Watershed Development, being a focus area, is envisaged to grow at about 22 per cent per annum. Thus, total Central spending on

irrigation (including Watershed Development), amounts to Rs. 24,759 crore over the Eleventh Plan. Table 5.4 below provides detailed

projections across Central and States spending by irrigation categories.

Table 5.4 Projected Investment for the Eleventh Plan in Irrigation (including Watershed) by the States and the Centre						
(Rs. crore at 2006-07 prices)						
Year	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Central Investment	3,367	4,006	4,782	5,726	6,879	24,759
Major and Medium Irrigation	113	118	124	130	137	622
Minor Irrigation	78	80	83	85	90	416
Command Area Development	180	185	191	197	203	956
Flood Control	168	172	175	178	182	875
Watershed Development	2,828	3,450	4,209	5,135	6,267	21,889
States' Investment	24,130	31,911	42,407	56,540	73,554	228,543
Major and Medium Irrigation	16,961	23,236	31,833	43,612	57,697	173,338
Minor Irrigation	3,860	4,903	6,226	7,907	10,042	32,939
Command Area Development	1,305	1,572	1,895	2,283	2,751	9,806
Flood Control	1,090	1,252	1,439	1,653	1,905	7,339
Watershed Development	915	948	1,014	1,085	1,159	5,120
Total	27,497	35,916	47,189	62,266	80,433	253,301

Appendix 6

Projections for Water Supply and Sanitation Sector

The Working Group on Urban Development for the Eleventh Plan has estimated an investment of Rs. 1,27,025 crore for urban water supply and sanitation. Similar estimates for rural water supply and sanitation were not made. The historical evolution of such expenditures can be gleaned from the anticipated Tenth Plan expenditures on urban and rural water supply and sanitation, details of which are in Table 6.1.

Increasing urbanisation of the country has led to a renewed focus on addressing the backlog in

formation in the sector in the past and the need to urgently increase coverage in both rural and urban areas, the total investment during the Eleventh Plan is projected to amount to Rs. 1,43,730 crore or US\$ 35.93 billion, of which Rs. 42,003 crore or about 29.2 per cent would be Central spending and Rs. 96,306 crore or 67 per cent of total spending by States. The private sector is expected to invest Rs. 5,421 crore or 3.8 per cent. Table 6.2 details out the phasing of this expenditure, as well as of the sub-sectoral breakup between water supply and sanitation.

Table 6.1: Anticipated Public and Private Investment in Water Supply and Sanitation during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (BE)	Total X Plan (Anticipated)
Centre	6,936	7,292	8,470	8,370	11,248	42,316
States	2,520	3,391	3,925	5,217	6,411	21,465
Private (Tirupur project)	159	357	286	162	57	1,022
Total	9,616	11,040	12,681	13,749	17,716	64,803

investment in urban water and sanitation infrastructure through the JNNURM. Under the JNNURM, major contributions would be made by the Central Government in investment in urban water and sanitation through Urban Local Bodies (ULBs). In addition, counterpart funding from State Governments would result in a significant increase in States' expenditure in urban water supply and sanitation.

In this paper, in view of the low levels of capital

of the total public sector spending in the sector, approximately 70 per cent is allocated to water supply and 30 per cent to sanitation. The private sector is projected to invest 80 per cent in water supply and 20 per cent in sanitation. The rural-urban shares of expenditure on water supply and sanitation are presented in Table 6.3. Of the total investment projected, 63 per cent is allocated to rural water supply and sanitation and 37 per cent to urban water supply and sanitation.

Table 6.2: Projected Investment in the Eleventh Plan in Water Supply and Sanitation by the Centre and States

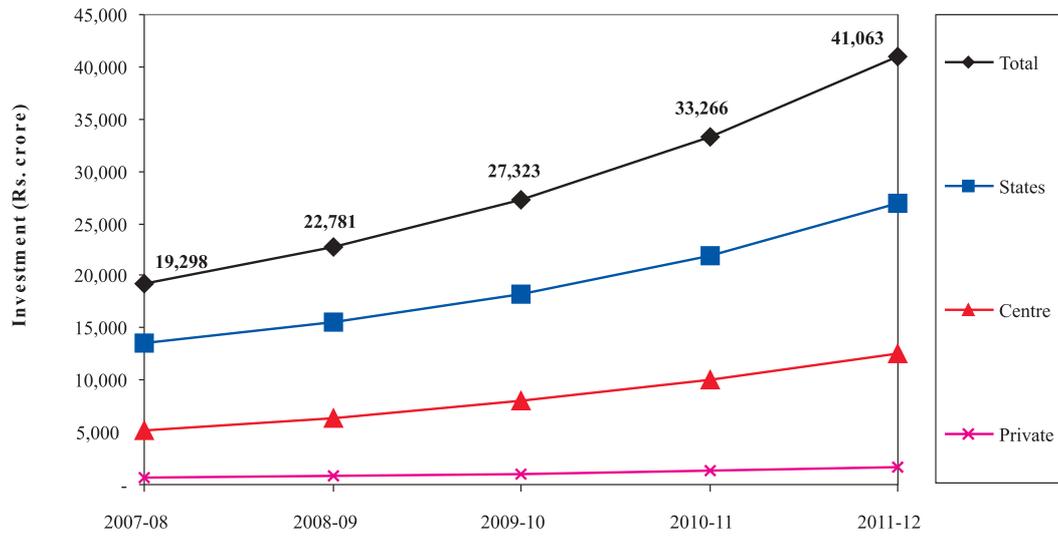
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Centre	5,152	6,411	7,991	9,976	12,474	42,003
Water supply	3,606	4,488	5,594	6,983	8,731	29,402
Sanitation	1,546	1,923	2,397	2,993	3,742	12,601
States	13,500	15,558	18,308	21,995	26,945	96,306
Water supply	9,450	10,890	12,816	15,396	18,861	67,414
Sanitation	4,050	4,667	5,493	6,598	8,083	28,892
Private	646	812	1,024	1,295	1,645	5,421
Water supply	517	649	819	1,036	1,316	4,337
Sanitation	129	162	205	259	329	1,084
Total	19,298	22,781	27,323	33,266	41,063	1,43,730
Water supply	13,573	16,028	19,228	23,416	28,908	101,153
Sanitation	5,725	6,753	8,095	9,850	12,154	42,577

Table 6.3: Projected Investment in the Eleventh Plan in Rural and Urban Water Supply and Sanitation

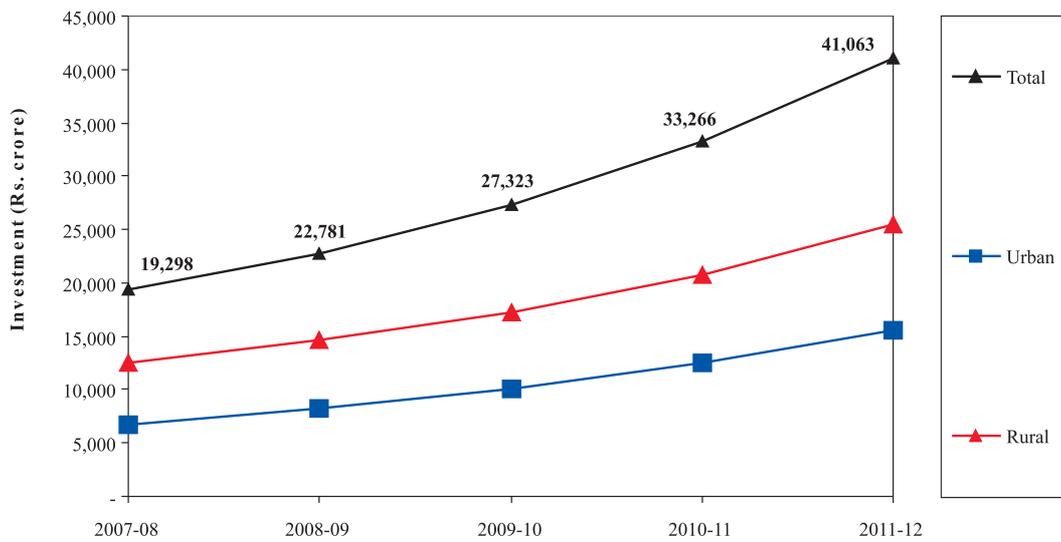
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Rural	12,567	14,577	17,244	20,791	25,521	90,701
Urban*	6,731	8,203	10,079	12,474	15,542	53,029
Total	19,298	22,781	27,323	33,266	41,063	1,43,730

* including investment through ULBs.

**Projected Investment in Water Supply and Sanitation during Eleventh Plan
(Rs. 1,43,730 crore)**



**Projected Investment in Water Supply and Sanitation during Eleventh Plan
(Rs. 1,43,730 crore)**



Appendix 7

Projections for the Port Sector

The Working Group on Ports for the Eleventh Plan has estimated an investment of Rs. 55,401 crore in major ports, comprising public investment of Rs. 18,533 crore and private investment of Rs. 36,868 crore. Estimation of the investment likely in minor ports was not made. The historical evolution of such expenditures shows that the anticipated expenditure in the Tenth Plan across all ports was Rs. 14,071 crore, details of which are in Table 7.1.

The government's strategy for the ports' sector, which is laid out in the Financing Plan for the Ports, is expected to lead to a quantum jump in capital formation in the sector under the Eleventh Plan, consistent with the sector's key role in international trade and its contribution to economic growth in the country. The Financing Plan for Ports estimated an investment of

Rs. 93,385 crore through 2006 to 2012, with Rs. 57,452 crore in major ports and Rs. 35,933 crore in non-major ports.

In this paper, taking into account also the anticipated investment in 2006-07, the investment likely to spillover to the Twelfth Plan and also the expected higher public investment in major ports and lower public investment in non-major ports, a total investment of Rs. 87,995 crore (US\$ 22 bn) is projected for the Eleventh Plan with Rs. 61,013 crore being invested in major ports and Rs. 26,982 crore in non-major ports, as depicted in Table 7.2 below.

The projections assume that about 49 per cent of total investment in major ports and 13 per cent of total investment in non-major ports would come from the public sector. The

Table 7.1: Anticipated Public and Private Investment in Ports during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	573	350	377	434	451	2,185
States*	250	280	300	340	360	1,530
Private*	-	749	3,336	3,742	2,529	10,356
Total	823	1,379	4,013	4,516	3,339	14,071

* Provisional expenditures.

Table 7.2 Projected Investment in Ports during the Eleventh Plan

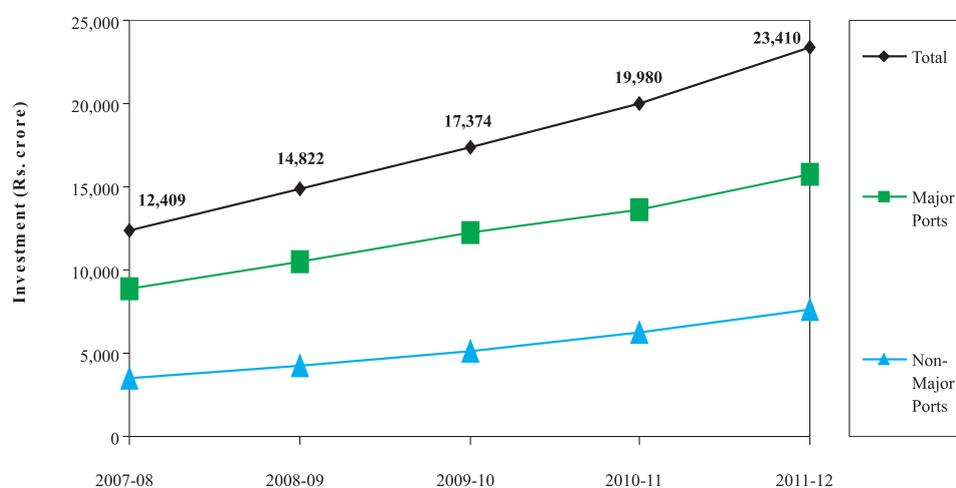
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Major Ports	8,847	10,535	12,189	13,682	15,761	61,013
Non-Major Ports	3,562	4,288	5,186	6,298	7,649	26,982
All Ports	12,409	14,822	17,374	19,980	23,410	87,995

phasing of investment reflects a CAGR of around 8 per cent in public investment in major ports and around 9 per cent in public investment in non-major ports. Private investment in major and non-major ports is assumed to grow at a CAGR of around 23 per

cent. Thus, total public investment in ports is projected at Rs. 33,516 crore and private investment at Rs. 54,479 crore during the Eleventh Plan, as depicted in Table 7.3. The overall ratio of public to private spending on investment in the sector is 38:62.

Table 7.3 Projected Investment in the Eleventh Plan in Ports by Category						
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Major Ports	8,847	10,535	12,189	13,682	15,761	61,013
Public	4,898	5,698	6,243	6,350	6,700	29,889
Private	3,949	4,837	5,946	7,332	9,061	31,124
Non-Major Ports	3,562	4,288	5,186	6,298	7,649	26,982
Public	598	658	724	796	850	3,627
Private	2,963	3,629	4,461	5,502	6,799	23,355
All Ports	12,409	14,822	17,374	19,980	23,410	87,995
Public	5,496	6,356	6,967	7,146	7,550	33,516
Private	6,913	8,466	10,407	12,833	15,860	54,479

Projected Investment in Ports Sector during Eleventh Plan
(Rs. 87,995 crore)



Appendix 8

Projections for the Airport Sector

The Working Group on Civil Aviation for the Eleventh Plan has estimated an investment of Rs. 9,207 crore by the Airports Authority of India (AAI) and did not provide any estimation on the likely private sector investment. The historical evolution of such expenditures shows that the anticipated expenditure in the Tenth Plan across all airports was Rs. 6,771 crore, details of which are in Table 8.1.

crore at 2006-07 prices during 2005-14.

Taking into account an anticipated investment of Rs. 4,887 crore in 2005-07 and spillover of about Rs. 3,880 crore to the Twelfth Plan, and with suitable re-phasing in light of the subsequent decision of the Government to implement modernisation of Kolkata and Chennai airports mainly through public sector,

Table 8.1: Anticipated Public and Private Investment in Airports during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	533	653	670	927	1,040	3,823
States	-	-	-	-	12	12
Private*	2	6	21	931	1,977	2,936
Total	535	659	691	1,858	3,029	6,771

* Provisional expenditures.

The government's strategy for the airports' sector, supported by the development of a detailed financing plan for airports, is expected to lead to a quantum jump in capital formation in the sector in the Eleventh Plan consistent with the sector's key role in promoting economic growth and the urgent need to address capacity constraints. The Financing Plan for Airports has estimated an investment of about Rs. 40,000

an investment of Rs. 30,968 crore is projected for the Eleventh Plan period. It comprises Rs. 13,097 crore to be invested in four Metro airports; Rs. 4,220 crore in 35 specific non-Metro airports; Rs. 10,573 crore in greenfield airports (including Bangalore and Hyderabad); Rs. 519 crore in airports in the North-East; and Rs. 2,559 crore in upgrading CNS-ATM and other equipment, as detailed in Table 8.2. The

Table 8.2 Projected Investment in Airports' Sector during the Eleventh Plan

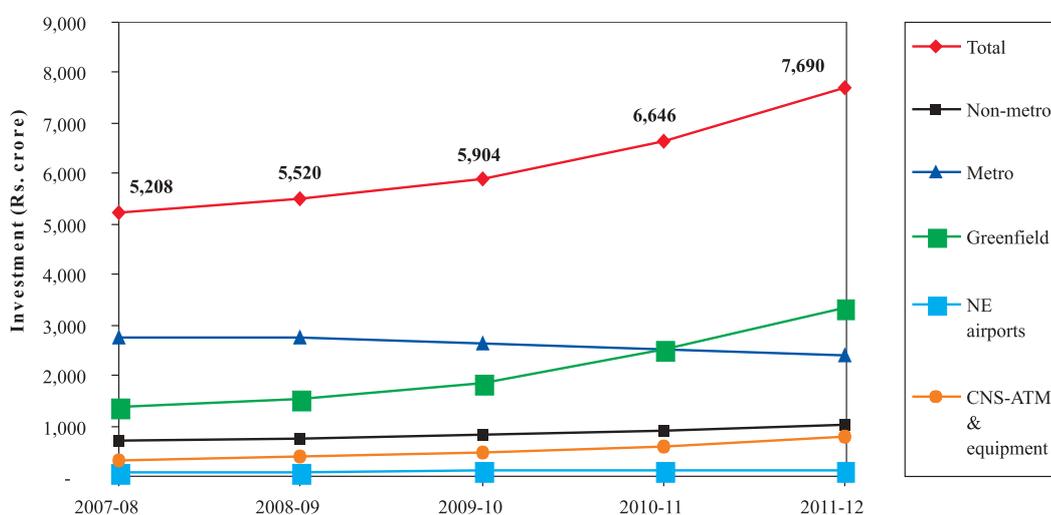
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Metro Airports	2,758	2,752	2,650	2,520	2,416	13,097
Non-Metro Airports	701	736	830	915	1,039	4,220
Greenfield Airports	1,366	1,539	1,834	2,508	3,327	10,573
NE Airports	85	94	103	113	124	519
CNS-ATM and Equipment	298	400	487	591	785	2,559
Total	5,208	5,520	5,904	6,646	7,690	30,968

public investment in 2007-08 also includes a provision of Rs. 50 crore as States' sector investment in non-Metro airports.

The projected share of public and private sector investment is depicted in Table 8.3 below.

Table 8.3 Projected Public-Private Investment in Airports during the Eleventh Plan						
(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Public	1,196	1,369	1,894	2,205	2,674	9,338
Private	4,012	4,151	4,010	4,441	5,016	21,630
Total	5,208	5,520	5,904	6,646	7,690	30,968

**Projected Investment in Airport Projects during the Eleventh Plan
(Rs. 30,968 crore)**



Appendix 9

Projections for the Storage Sector

The Eleventh Plan preparation process did not establish a Working Group on Storage to estimate the likely expenditure in the sector. The historical evolution of expenditures can be gauged from the gross capital formation in storage infrastructure reported by the CSO during the Tenth Plan, details of which are given in Table 9.1

In the paper, in view of the low levels of capital formation in the storage sector in the past and the need to significantly step up public investment in support of agricultural development and expansion in trade during the Eleventh Plan an average annual growth rate of 8.5 per cent has

been assumed on Rs. 3,777 crore. Investment by the public sector is, thus, projected at Rs. 11,189 crore, allocated among the Centre and States in the ratio of 2:3, as per details in Table 9.2.

In line with recent initiatives to improve the supply chain in logistics and to create large capacity in storage by the private sector, particularly in SEZs, private investment is projected at equal to public investment in the sector during the Eleventh Plan, which, thus, also amounts to Rs. 11,189 crore. Total investment in storage over the period is thus projected at Rs. 22,378 crore or US\$ 5.59 billion at 2006-07 prices.

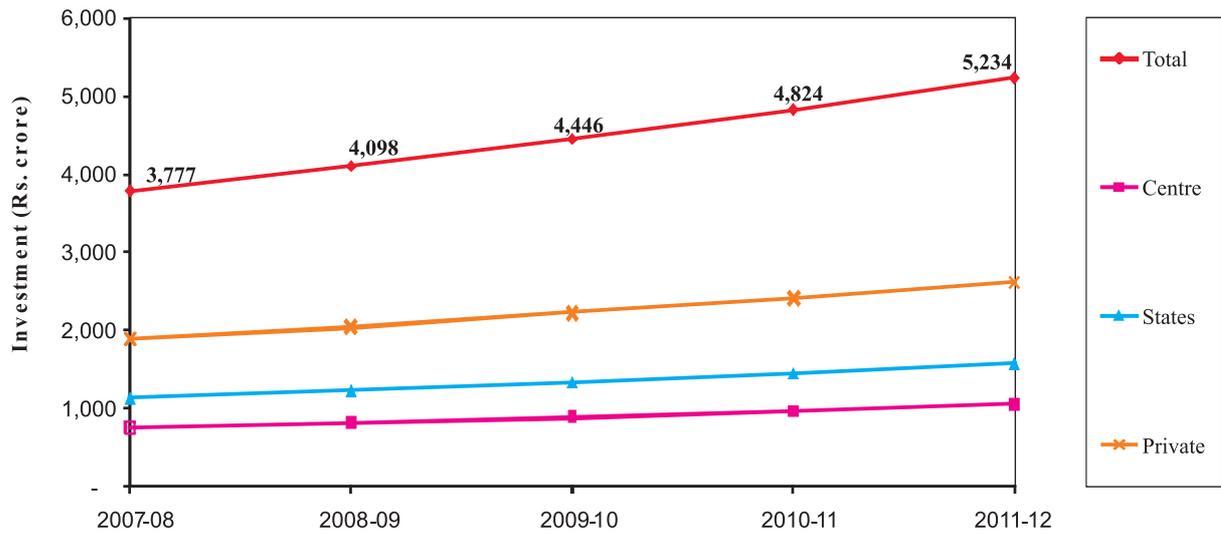
Table 9.1: Anticipated Public and Private Gross Capital Formation in Storage during the Tenth Plan

(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (Prov.)	2006-07 (Projected)	Total X Plan (Anticipated)
Centre	511	240	(-) 143	(-) 128	96	577
States	767	360	(-) 214	(-) 192	144	866
Private	574	1,305	421	469	609	3,377
Total	1,851	1,906	64	149	850	4,819

Table 9.2 Projected Investments in Storage during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
Centre	755	820	889	965	1,047	4,476
States	1,133	1,229	1,334	1,447	1,570	6,713
Private	1,888	2,049	2,223	2,412	2,617	11,189
Total	3,777	4,098	4,446	4,824	5,234	22,378

**Projected Investment in Storage during the Eleventh Plan
(Rs. 22,378 crore)**



Appendix 10

Projections for the Gas Sector

The Working Group on Petroleum and Gas has estimated that an investment of Rs. 39,626 crore will be required in the Eleventh Plan in gas distribution infrastructure, comprising Rs. 9,220 crore in LNG terminals, Rs. 11,121 crore investments by GAIL and Rs. 10,000 crore by other entities, including the private sector, in gas transmission lines, and Rs. 9,000 crore in city gas distribution infrastructure. The historical evolution of such expenditures shows that the anticipated expenditure in the Tenth Plan across all gas distribution networks was Rs. 9,713 crore, details of which are in Table 10.1.

In this paper, scaling down the Working Group's estimates in light of the delays in setting up LNG terminals and the demand for gas from the fertilizer and power sectors crowding out city gas distribution, a total investment of Rs. 16,855 crore (or US\$ 4.21 billion) is projected to be

required in the Eleventh Plan. Investment in LNG terminals is projected to grow annually at 8 per cent from a base of Rs. 566 crore to a total of Rs. 3,321 crore in the Eleventh Plan. Investment in gas transmission lines is projected to grow at a CAGR of 12.2 per cent from Rs. 1,998 crore to Rs. 3,167 crore, resulting in a total investment of Rs. 12,737 crore in the Eleventh Plan. This includes an annual growth of 10 per cent in transmission lines and related infrastructure spending by GAIL and others in public sector and of 15 per cent by private entities. Infrastructure in city gas distribution pipelines is projected to grow at 5 per cent per annum, leading to a total investment of Rs. 797 crore in the Eleventh Plan. The annual flows of such investment are depicted in Table 10.2.

Table 10.1: Anticipated Public and Private Investment in Gas Distribution during the Tenth Plan

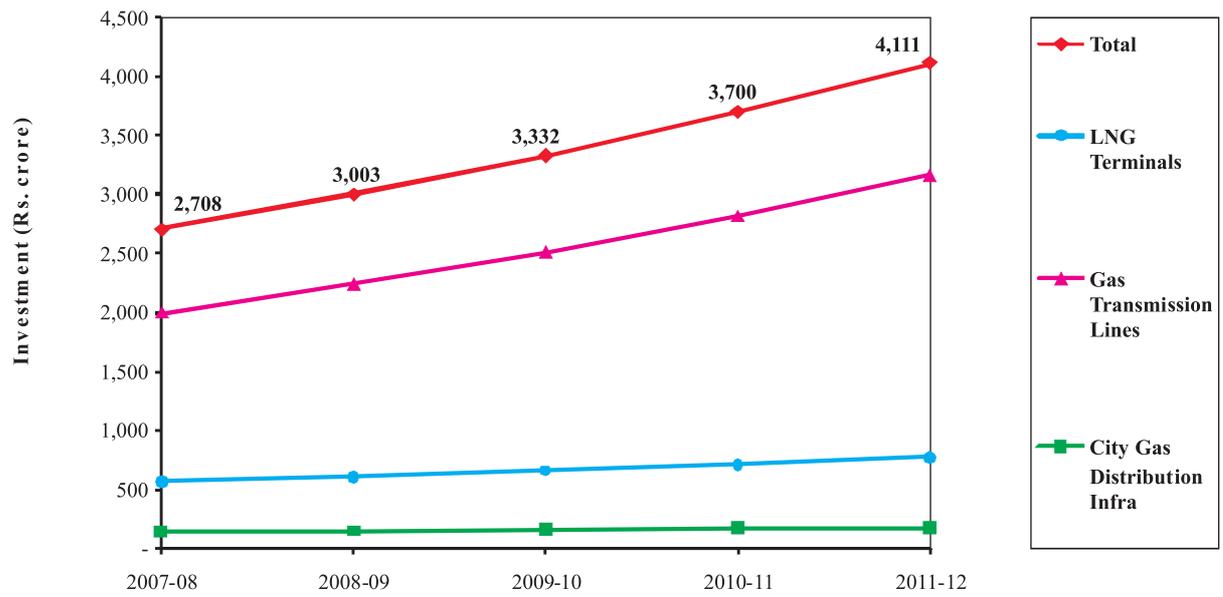
(Rs. crore)						
Year	2002-03 (Actual)	2003-04 (Actual)	2004-05 (Actual)	2005-06 (RE)	2006-07 (RE)	Total X Plan (Anticipated)
Centre	921	3,239	254	1,586	2,712	8,713
Private*	130	160	210	240	260	1,000
Total	1,051	3,399	464	1,826	2,972	9,713

* Provisional expenditures.

Table 10.2 Projected Investment in Gas Distribution Infrastructure during the Eleventh Plan

(Rs. crore at 2006-07 prices)						
	2007-08	2008-09	2009-10	2010-11	2011-12	Total XI Plan
LNG Terminals	566	611	660	713	770	3,321
Transmission Lines	1,998	2,240	2,513	2,820	3,167	12,737
City Gas Distribution	145	152	159	167	174	797
Total	2,708	3,003	3,332	3,700	4,111	16,855

**Projected Investment in Gas Distribution Sector during Eleventh Plan
(Rs. 16,855 crore)**



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