

CHAPTER 3

INFRASTRUCTURE

The performance of the infrastructure sectors in the current year has been highly encouraging. This is in contrast to the experience of earlier droughts when performance of infrastructure was also badly affected. Thermal power, coal, saleable steel and cement have registered substantial increases in the production. The growth rate of 10.2 per cent in coal production during April—December 1987 has been the highest since 1981-82. But for the decline in hydel power generation due to successive drought conditions, the increase in electricity generation would have been still higher as thermal (including nuclear) power generation recorded an impressive increase of 15.7 per cent during April—December 1987. This is attributable to a higher plant load factor (PLF) of 55 per

cent and other measures like better plant management and streaming in of additional generating capacity.

3.2 Cargo handled at major ports during April—December 1987 recorded an impressive increase of 8.7 per cent over the corresponding period of 1986. Railways revenue earning goods traffic has increased by 5.4 per cent. The telecommunications sector has shown a considerable improvement in its performance in terms of growth, both of the infrastructure and of the traffic throughput during 1986-87 and 1987-88 so far. There was, however, a slight set-back in the production of telephone instruments by Indian Telephone Industries during April—December 1987.

TABLE 3.1  
Trends in the Performance of the Infrastructure Sectors

Item	Unit	1984-85	1985-86	1986-87	£		Percentage change			
					April—December		1985-86	1986-87	1987-88*	
					1986-87	1987-88	1984-85	1985-86	1986-87*	
1	2	3	4	5	6	7	8	9	10	
<b>A. Energy</b>										
1. Coal										
(a) Production . . . . .	Mn. Tonnes	147.4	154.2	165.8	112.9	124.4	4.6	7.5	10.2	
(b) Pit-head stocks (Year—end) . . . . .	„	29.2	26.6	29.4	21.9	26.3	—8.9	10.5	20.1	
(c) Despatches . . . . .	„	135.5	151.0	158.7	114.3	123.6	11.4	5.1	8.1	
2. Electricity Generated (Utilities only) . . . . .	Billion Kwh	156.9	170.3	187.6	138.6	149.1	8.5	10.2	7.6	
(a) Hydel . . . . .	„	53.9	51.0	53.7	41.4	36.6	—5.4	5.3	—11.6	
(b) Thermal (incl. nuclear) . . . . .	„	103.0	119.3	133.9	97.2	112.5	15.8	12.2	15.7	
3. Petroleum . . . . .	„									
(a) Crude oil production	Mn. Tonnes	29.0	30.2	30.5	23.0	22.6	4.1	1.0	—1.7	
(b) Refinery throughput	„	35.6	42.9	45.7	33.6	35.3	20.5	6.5	5.1	
<b>B. Transport and Communications</b>										
1. Railways										
Revenue earning goods traffic . . . . .	„	236.43	258.55	277.75	199.30	210.03	9.4	7.4	5.4	
2. Cargo handled at major ports . . . . .	„	106.7	120.0	124.2	88.1	95.8	12.5	3.5	8.7	
3. Telecommunications										
(a) Production of Tele- phone instruments	Thousand Nos.	637.8	710.7	751.9	488.6	501.1	11.4	5.8	2.6	
(b) (i) New Telephone connections pro- vided to moni- tored sector . . . . .	„	126.1	132.1	153.4	85.5	83.9	4.8	16.1	—1.9	
(ii) All—India . . . . .	„	229.5	267.8	324.2	134.6**	121.5**	16.7	21.1	—9.7**	

\* April—December

£ Provisional

\*\* Relates to April—November

3.3 The growth rate in production of six infrastructure sectors (electricity, coal, saleable steel, crude petroleum, petroleum refinery products and cement), which accounts for a total weight of 28.8 per cent in the index of industrial production, was 7.4 per cent in 1986-87 as against 8.1 per cent in 1985-86. During the first nine months (April—December) of the year 1987-88 these sectors, including hydel power, achieved an overall growth rate of 6.4 per cent as against 7.9 per cent during the corresponding period of 1986-87.

### Energy

#### Electricity

3.4 Power generation in the country during 1986-87 achieved a higher growth rate of 10.2 per cent as compared with the growth of 8.5 per cent recorded in 1985-86. However, total generation was 1.3 per cent below the target. The overall performance of the thermal units continued to be satisfactory during 1986-87. Thermal (including nuclear) generation recorded a growth of 12.2 per cent in 1986-87 on top of an increase of 15.8 per cent achieved during the year 1985-86 and hydro generation achieved a growth rate of 5.3 per cent over the year as against a decline of 5.4 per cent recorded in 1985-86. As

against the target of 127.8 billion kwh. of thermal generation, the actual generation during 1986-87 was 128.8 billion kwh. representing an increase of about 1 per cent over the target. However, in the case of hydel and nuclear power, the generation fell short of targets by 5.8 per cent and 1.9 per cent respectively. The shortfall in the achievement of the targeted level of hydel generation can be ascribed to inadequate or delayed monsoon leading to reduced inflows in the reservoirs, delays or slippages in the commissioning of some units and forced closure of some hydro power stations.

3.5 In 1987-88, with the anticipated fall in hydel electricity generation because of the substantial fall in water levels of major reservoirs caused by failure of monsoon, steps were taken to augment thermal power, expediting the commissioning and stabilisation of new plants and encouraging use of captive generation wherever possible. While there was a decline of 11.6 per cent in hydel generation during April—December, 1987 compared to the same period of 1986, thermal (including nuclear) generation increased substantially by 15.7 per cent. In aggregate the power generation during April—December 1987 recorded a growth of 7.6 per cent as compared to 10.3 per cent in corresponding period of 1986.

TABLE 3.2  
Trends in the Power Sector\*

Sl. No.	Item	1984-85	1985-86	£ 1986-87	£ April—December		Percentage change		
					1986-87	1987-88	1985-86	1986-87	1987-88**
							1984-85	1985-86	1986-87**
1	2	3	4	5	6	7	8	9	10
1.	Additional Capacity Commissioned/Rolled (MW)	3246	4184	2488	1492	2673	28.9	-40.5	79.2
2.	Power Generation (Billion Kwh)	156.9	170.3	187.6	138.6	149.1	8.5	10.2	7.6
	(i) Hydel	53.9	51.0	53.7	41.4	36.6	-5.4	5.3	-11.6
	(ii) Thermal (incl. nuclear)	103.0	119.3	133.9	97.2	112.5	15.8	12.2	15.7
3.	Plant Load Factor of Thermal Plants (per cent)	50.1	52.4	53.2	52.2	55.0	—	—	—
4.	Estimated Deficit in Power availability (per cent)	6.7	7.9	9.4	9.7	11.0	—	—	—

\* Utilities only

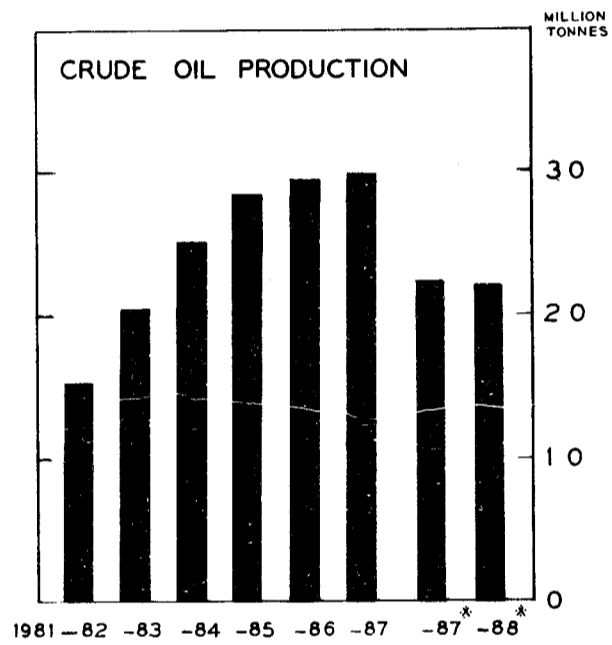
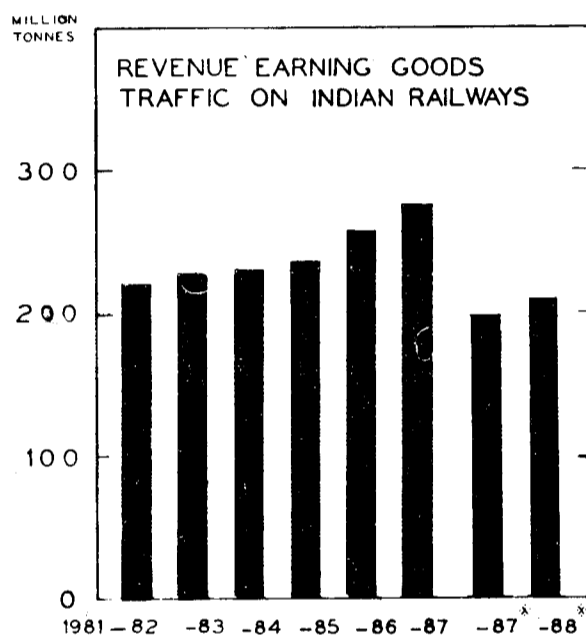
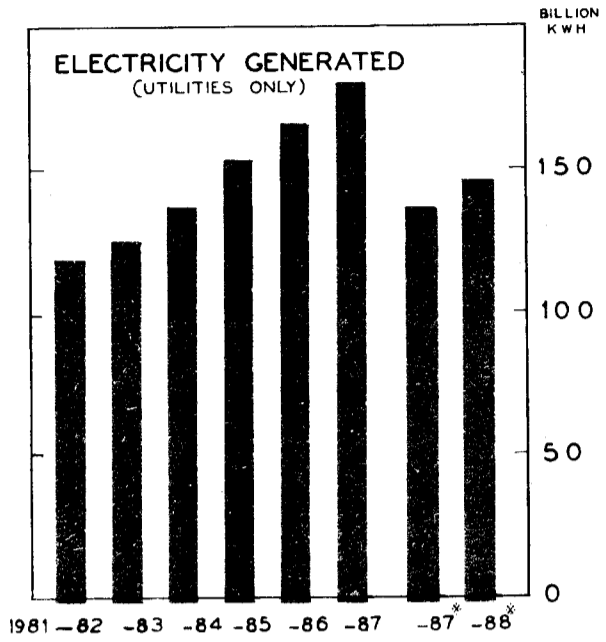
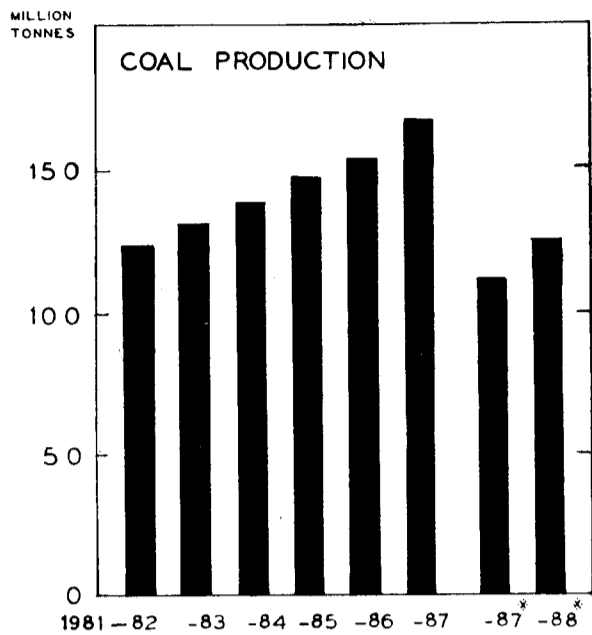
\*\* April—December

£ Provisional.

3.6 With the special measures taken to step up thermal generation in the current year, it is now expected to increase by about 2.7 billion kwh. over what was programmed at the beginning of the financial year (143 billion kwh.). In the context of the current drought, various measures like demand management, regulation of supply to different sectors and transfer of surplus power across States and regions have also been taken to even-out shortages to the extent possible.

3.7 The overall satisfactory performance of power generation during the first nine months of 1987-88 has been possible largely because of a progressive increase in the plant load factor (PLF) of thermal power stations. The all—India thermal plant load factor increased from 47.9 per cent in 1983-84 to 53.2 per cent in 1986-87 and further to 55.0 per cent during April—December 1987 as against the target of 53.5 per cent for the year 1987-88.

# PERFORMANCE OF INFRASTRUCTURE SECTORS

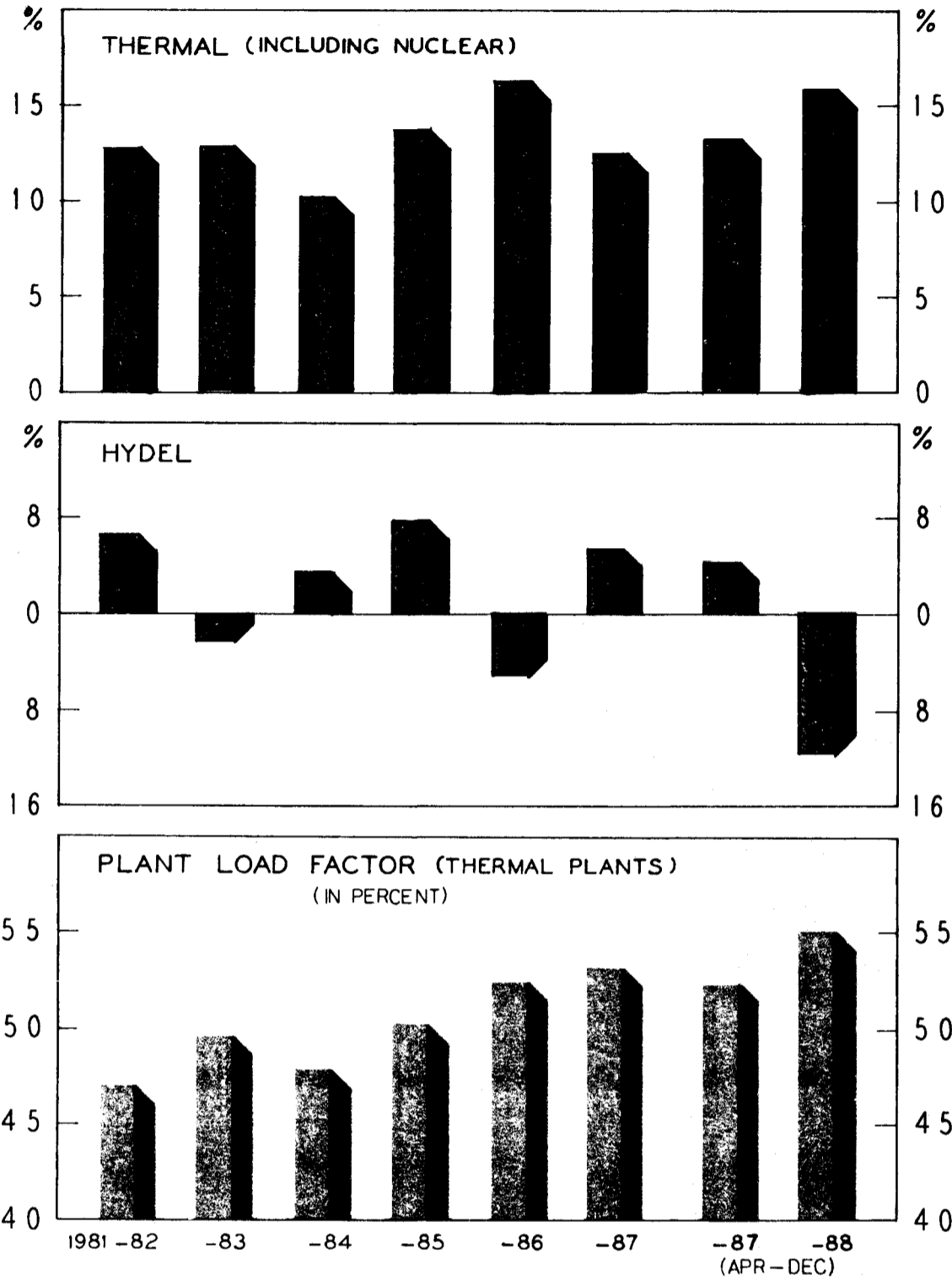


\* APRIL - DECEMBER

MINISTRY OF FINANCE, ECONOMIC DIVISION

MGIP (PLU)MEND-668/1/F/87-88

# GROWTH RATE IN POWER SECTOR



MINISTRY OF FINANCE, ECONOMIC DIVISION.

MGIP(PLU)MRND-668/1/F/87-88

3.8 The States where the Electricity Boards have increased the PLF beyond the actual achievement in 1986-87 and also exceeded the target for April-December 1987 include Andhra Pradesh, Tamil Nadu, Rajasthan, Punjab, Gujarat, Maharashtra, Uttar Pradesh and Orissa. The performance of the other State Electricity Boards has not been satisfactory. In the Central sector, the overall PLF achieved during April-December 1987 at 62.0 per cent was marginally higher than the target (60.0 per cent), although less than the actual PLF achieved in 1986-87 (65.0 per cent). The PLF of NTPC and NLC is far ahead of their targets but that of DVC is lagging behind. Private utilities achieved a PLF of 67.1 per cent during April-December 1987 as compared to a target of 65.0 per cent.

TABLE 3.3

Organisation-wise details of PLF Target/Actual Achievement during the year 1986-87 and April-December, 1987

Sl. No.	Board/undertaking/sector	PLF (Percentages)		
		Actual for 1986-87	April-December, 87	
			Target	Actual
1	2	3	4	5
<b>PLF above 50%</b>				
1.	Andhra Pradesh State Electricity Board . . . . .	69.7	62.7	75.8
2.	Tamil Nadu State Electricity Board . . . . .	64.7	55.2	65.4
3.	Punjab State Electricity Board . . . . .	68.3	64.4	68.8
4.	Rajasthan State Electricity Board . . . . .	54.8	52.8	68.1
5.	Gujarat State Electricity Board . . . . .	54.0	54.7	59.3
6.	Maharashtra State Electricity Board . . . . .	50.7	54.0	54.9
7.	Madhya Pradesh State Electricity Board . . . . .	53.8	48.5	51.3
<b>PLF 40% to 50%</b>				
1.	Delhi Electricity Supply Undertaking . . . . .	66.1	59.2	46.8
2.	Uttar Pradesh State Electricity Board . . . . .	40.8	43.4	45.6
3.	West Bengal State Electricity Board . . . . .	41.8	42.6	40.3
<b>PLF below 40%</b>				
1.	Haryana State Electricity Board . . . . .	33.8	42.1	38.9
2.	Orissa State Electricity Board . . . . .	31.7	32.8	33.2
3.	Assam State Electricity Board . . . . .	18.5	40.7	31.0
4.	Bihar State Electricity Board . . . . .	33.3	40.9	31.2
<b>PLF : Central Sector (Total)</b> . . . . .		65.0	60.0	62.0
1.	National Thermal Power Corporation . . . . .	71.5	64.4	70.2
2.	Neyveli Lignite Corporation . . . . .	74.6	60.7	67.3
3.	Damodar Valley Corporation . . . . .	44.7	48.7	39.3
<b>PLF : Private Utilities (Total)</b> . . . . .		61.2	65.0	67.1

3.9 Statewise details show that the PLF of a large number of States is much lower than the all-India average. The States where a low PLF is a chronic problem have not been able to achieve the target and in certain cases it is even less than what was actually achieved in 1986-87. This is a cause for great concern and efforts need to be directed towards the improvement of PLF especially in these States.

3.10 The additional power generation capacity rolled or commissioned during April-December, 1987 vis-a-vis the capacity scheduled is given in Table 3.4. It is observed that there have been considerable slippages in the implementation of both thermal and hydel projects. Such slippages have also contributed to the shortfall of 11.0 per cent in power supply as compared to requirements. Because of the severe shortage in power availability, a number of States continued to enforce power cuts and restrictions to bridge the gap between demand and availability and this has had an adverse impact on industry. The States which enforced major cuts in power supply to the industrial sector include Punjab, Haryana, U.P., Rajasthan, Tamil Nadu, Karnataka, Kerala and Orissa. A major thrust is, therefore, required for the speedy implementation of the projects as per schedule.

TABLE 3.4

Power Generation Capacity : Targets and Achievements

Sector	Scheduled during 1987-88		April-December 1987			
			Scheduled		Commissioned/Rolled	
	No.	Capacity (M.W.)	No.	Capacity (M.W.)	No.	Capacity (M.W.)
Thermal . . . . .	18	3682	10	1782	7	2050 (115.0)
Hydel . . . . .	45	1234	36	953	22	623 (65.4)
<b>TOTAL</b> . . . . .	<b>63</b>	<b>4916</b>	<b>46</b>	<b>2735</b>	<b>29</b>	<b>2673 (97.7)</b>

Note : Figures in brackets indicate percentages to the capacity scheduled during April-December, 1987.

#### Coal

3.11 Production of coal during the first nine months of 1987-88 recorded an increase of 10.2 per cent compared to the corresponding period of 1986-87, the total production going up from 112.9 million tonnes to 124.4 million tonnes. Singareni

Collieries Co. Ltd. (SCCL) recorded an increase of 8.4 per cent in coal production while Coal India Ltd. (CIL) increased its output by 10.8 per cent during the period. However, overall coal production is still marginally short of target. The performance of SCCL was affected by labour strikes, breakdown of machinery, absenteeism and power shortage problem. Pit-head stocks at the end of December 1987 increased by 20.1 per cent compared to end-December, 1986 and despatches increased by 8.1 per cent during April-December, 1987 over the corresponding period of 1986.

3.12 Taking into account the possible drawal from pit-head stocks and the need to import superior coking coal to meet the steel plants' requirements, the target for coal production in 1986-87 was fixed at 166.8 million tonnes. The actual production was

fairly close to this target at 165.8 million tonnes. While the overall performance of CIL has been satisfactory in 1986-87 in as much as it exceeded the target of production, SCCL and TISCO/IISCO/DVC group were behind the target. Except for North-Eastern Coalfields the production of all subsidiaries of CIL was as per or ahead of the target. Because of mismatch between movement and supply plans, pit-head stocks, which ought to have been reduced in order to meet the gap between demand and production, actually went up from 26.6 million tonnes at the end of 1985-86 to 29.4 million tonnes at the end of 1986-87. Coal movement by rail in 1986-87 was 118.1 million tonnes as against the planned level of 120 million tonnes. The daily average loading of wagons in 1986-87 was 13552 as against 12996 in 1985-86.

TABLE 3.5  
Trends in Coal Sector

Sl. No.	Item	(Million tonnes)							
		1984-85	1985-86	1986-87 £	April-December £		Percentage change		
					1986-87	1987-88	1985-86	1986-87	1987-88*
1	2	3	4	5	6	7	8	9	10
<b>1. Production</b>									
	(i) CIL . . . . .	130.8	134.1	144.8	97.7	108.3	2.5	8.0	10.8
	(ii) SCCL . . . . .	12.3	15.7	16.6	11.9	12.9	27.6	5.7	8.4
	(iii) Others . . . . .	4.3	4.4	4.4	3.3	3.2	2.3	..	-3.0
	<b>TOTAL . . . . .</b>	<b>147.4</b>	<b>154.2</b>	<b>165.8</b>	<b>112.9</b>	<b>124.4</b>	<b>4.6</b>	<b>7.5</b>	<b>10.2</b>
<b>2. Pit-head stocks (year-end) . . . . .</b>									
		29.2	26.6	29.4	21.9	26.3	-8.9	10.5	20.1
<b>3. Despatches . . . . .</b>									
		135.5	151.0	158.7	114.3	123.6	11.4	5.1	8.1

\*April-December. £—Provisional. ..No change

3.13 Based on the performance in 1986-87 and the demand for coal in 1987-88, the coal production target during the current year has been fixed at 183.5 million tonnes. Of this, the share of CIL is 158 million tonnes, SCCL 20 million tonnes and TISCO/IISCO/DVC 5.5 million tonnes. The total demand for coal during 1987-88 is estimated at 192.05 million tonnes. The share of power sector demand is more than half of this, the other major consumers being steel, cement, railways, etc. The demand-production gap is to be met through drawdown of stocks. The required rail movement of coal is estimated at 122.6 million tonnes.

3.14 As a consequence of the measures taken to improve the movement of coal by rail, the availabi-

lity of coal across the country has gone up. As much as 123.6 million tonnes of coal was despatched during April-December 1987 compared to 114.3 million tonnes during the corresponding period of 1986. The daily average coal loading in CIL during April-December 1987 was 11389 wagons per day as against 10909 wagons per day recorded in April-December 1986, thereby showing an increase of 480 wagons per day. The movement of coal from Singareni Collieries Co. Ltd. has improved considerably. Loading went up to 1401 wagons per day during April-December 1987 as compared to 1210 wagons per day during the corresponding period of 1986.

3.15 Production of metallurgical grade coking coal during April-December 1987 was of the order of

19.48 million tonnes as against 21.35 million tonnes achieved during the same period of 1986. This drop in production was wholly accounted for by a shortfall in medium coking coal output in Central Coalfields. Washed coal production in CIL washeries during April—December 1987 totalled 6 million tonnes as against 5.87 million tonnes during the same period last year. However, this was short of the target for the period by 14.9 per cent. Table 3.6 indicates the supply/demand position with regard to coking coal for steel plants.

TABLE 3.6

*Estimated Demand/Supply of Coking Coal for the Steel Industry*

Particulars	(Million tonnes)		
	1984-85	1985-86	1986-87
1. Total requirement	13.87	15.40*	17.62
2. Actual supplies (Domestic)	11.11	12.91	12.27
3. Imported coal received	0.66	2.45	2.56

\*This was subsequently reduced to 13.90 million tonnes.

3.16 In 1986-87, 2.56 million tonnes of coal was imported as against 2.45 million tonnes in 1985-86. Imports of coking coal during 1987-88 are likely to be around 2.5 million tonnes. Meanwhile, the average ash content of indigenous coal has declined marginally from 19.4 per cent in 1985-86 to 19.1 per cent in 1986-87. Even though the average ash level is slightly lower, the quality of coking coal supply varied from day-to-day, with ash content ranging from 17 to 26 per cent. This affects the smooth and efficient operation of blast furnaces and their production

### Lignite

3.17 Production of lignite from Neyveli Lignite Corporation in 1986-87 was recorded at 7.13 million tonnes from the first mine and 1.42 million tonnes from the second mine. This was higher than the targeted level of 6.5 million tonnes from the first mine and 0.9 million tonnes from the second mine. In addition, the lignite mines of the Gujarat Mineral Development Corporation produced 1.08 million tonnes in 1986-87 against 0.92 million tonnes in 1985-86. The target for lignite production at Neyveli during 1987-88 has been fixed at 9.15 million tonnes, 6.5 million tonnes from the first mine and 2.65 million tonnes from the second mine. The Gujarat Mineral Development Corporation is also expected to augment its production. The production of lignite from Neyveli Lignite Corporation during the first nine months of 1987-88 was 7.01 million tonnes as against the production of 5.72 million tonnes in the same period of previous year. This was higher than the target level of 6.47 million tonnes for the period, by 8.3 per cent.

### Petroleum

3.18 Production of crude oil in 1986-87 exceeded the targeted level of production—it was 30.48 million tonnes as against a target of 30.21 million tonnes. While ONGC's production at 27.86 million tonnes exceeded the target of 27.37 million tonnes, Oil India Ltd. produced 2.62 million tonnes as against a target of 2.84 million tonnes. Details of trends in production are given in Table 3.7.

TABLE 3.7

*Trends in Petroleum Sector*

Sl. No.	Item	(Million tonnes)								
		1984-85	1985-86	1986-87	£ April—December		Percentage change			
					1986-87	1987-88	1985-86	1986-87	1987-88*	
1	2	3	4	5	6	7	8	9	10	
1.	Crude oil production	29.0	30.2	30.5	23.0	22.6	4.1	1.0	-1.7	
	(i) On-shore	8.9	9.4	9.9	7.5	7.6	5.6	5.3	1.3	
	(a) ONGC	6.1	6.7	7.3	5.4	5.8	9.8	9.0	7.4	
	(b) OIL	2.8	2.7	2.6	2.1	1.8	-3.6	-3.7	-14.3	
	(ii) Off-shore (ONGC)	20.1	20.8	20.6	15.5	15.0	3.5	-1.0	-3.2	
2.	Refinery throughput	35.6	42.9	45.7	33.6	35.3	20.5	6.5	5.1	
3.	Natural Gas (Billion Cubic Metres)	7.2	8.1	9.8	6.6	7.7	12.5	21.0	16.7	

\*April—December £ Provisional

3.19 Production of crude oil during April—December 1987 amounted to 22.6 million tonnes as against 23.0 million tonnes achieved during the corresponding period of 1986. The decline of 1.7 per cent was on account of lower level of off-shore production of crude oil which recorded a fall of 3.2 per cent. The total on-shore area production, however, was 1.3

per cent higher. On the whole, crude oil production in 1987-88 is expected to exceed the target of 30.46 million tonnes. Refinery production (in terms of crude throughput) during April—December 1987 aggregated to 35.3 million tonnes representing 100.5 per cent achievement of the target and an increase of 5.1 per cent over the level of 33.6 million tonnes

achieved during the corresponding period of 1986. However, throughput achieved by the refineries at Guwahati, Barauni, Bombay (HPCL), Vizag (HPCL), Digboi and Madras fell short of the target. The overall refinery capacity utilisation during the period April—December 1987 was 96.5 per cent as against 93.7 per cent recorded during the corresponding period of 1986. Based on these results, the targeted refinery throughput of 46.95 million tonnes is likely to be exceeded during 1987-88. The production of natural gas, which has become an important source of energy and feedstocks, at 7.7 billion cubic metres during April—December 1987 registered a significant increase of 16.7 per cent over the same period last year. The production and exploratory activities during the year were further intensified by ONGC.

3.20 Production of LPG by gas fractionation both by ONGC and OIL during 1987-88 was targeted at about 5.6 lakh tonnes. This is likely to come down to 5.3 lakh tonnes primarily due to slippage at Hazira LPG plant and shortfall in LPG fractionation

plant at Ankleshwar. But production will still be higher than that achieved in 1986-87 by 7.5 per cent.

3.21 The consumption of petroleum products has been continuously increasing. In 1986-87 the consumption was 43.4 million tonnes as against 40.9 million tonnes in 1985-86, representing an increase of 6.1 per cent as compared to 5.4 per cent in 1985-86. The growth in the consumption of middle distillates consisting of kerosene, high speed diesel oil, etc. was 6.7 per cent as against 7.1 per cent recorded in 1985-86. Details are given in Table 3.8. While consumption of kerosene increased by 6.5 per cent that of H.S.D.O. increased by 7.4 per cent in 1986-87. As against the total production of petroleum products at 42.8 million tonnes, their consumption during 1986-87 was 43.4 million tonnes. The gap between production and consumption was met through a net import of 0.6 million tonnes. The consumption of LPG is likely to increase by a little over 16 per cent from 1.50 million tonnes in 1986-87 to 1.75 million tonnes in 1987-88.

TABLE 3.8  
Consumption of Petroleum Products\*

Sl. No.	Item	(Million tonnes)							
		1984-85	1985-86	1986-87	April—December		Percentage change		
					1986-87	1987-88	1985-86	1986-87	1987-88**
1	2	3	4	5	6	7	8	9	10
1.	Light Distillates	6.3	6.8	7.4	5.4	5.4	7.9	8.8	..
	of which : Naphtha	3.1	3.1	3.2	2.4	2.0	..	3.2	-16.7
2.	Middle Distillates	22.4	24.0	25.6	18.9	20.5	7.1	6.7	8.5
	of which (a) Kerosene	6.0	6.2	6.6	4.9	5.3	3.3	6.5	8.2
	(b) High Speed Diesel Oil	13.7	14.9	16.0	11.9	12.9	8.8	7.4	9.3
3.	Heavy Ends	10.1	10.1	10.4	7.7	7.9	..	3.0	2.6
	of which : Fuel Oil	7.9	7.9	7.9	2.8	2.9	..	..	3.6
	TOTAL	38.8	40.9	43.4	32.0	33.8	5.4	6.1	5.6

\*Excluding RBF.

\*\*April—December

£ Provisional

..No change

3.22 The Working Group on location of new gas-based fertilizer plants suggested the setting up of six new fertilizer plants in addition to the two gas-based plants in Maharashtra and Gujarat. Each of these plants will have a capacity of 1350 tonnes per day of ammonia, utilising 1.5 mmscmd of lean gas. In addition to these gas based fertilizer plants, it was also proposed to utilise gas for power projects.

3.23 In view of the emerging importance of gas in the national economic scene, an independent Authority called the "Gas Authority of India Limited" (GAIL) was set up in August 1986. The primary objective of GAIL is to deal with gas transportation and distribution. The immediate task before GAIL is to execute the HBJ pipeline project. The Govern-

ment of India had approved the implementation of the HBJ gas pipeline project in April 1984, at an estimated cost of Rs. 1700 crores, including a foreign exchange component of about Rs. 680 crores. The project contemplates laying of a 1730 kms. long pipeline with necessary facilities from Hazira in Gujarat through Madhya Pradesh, Rajasthan and Uttar Pradesh, to meet the feedstock requirement of six fertilizer plants (four in Uttar Pradesh and one each in M.P. and Rajasthan) and fuel requirement of two (one in Anta, Rajasthan and one in Auraiya, U.P.) of the three power plants, being set up along with pipeline. For the third power plant at Kawas gas is being offered only on a fallback basis. The initial capacity of the pipeline is 18.2 mmscmd. The project is scheduled to be completed in all respects



by July, 1989. The first section of the pipeline from Hazira to Bijaipur (640 kms.) was completed in August 1987 and supply of gas to Bijaipur fertilizer plant has started.

3.24 The total probable hydrocarbon reserves of the country are estimated at around 17 billion tonnes of oil or oil equivalent of gas, out of which about 75 per cent have already been established. Out of the established reserves, only about 25 per cent of oil reserves and a little over 50 per cent of the gas reserves are regarded as recoverable reserves. The position of balance recoverable reserves of oil and natural gas as on 1-1-87 was as follows :—

<i>Balance Recoverable Reserves as on 1-1-1987</i>	
Crude Oil	581 million tonnes.
Natural gas	541 billion cubic metres.

3.25 A three-pronged exploration strategy has been adopted during the Seventh Plan in order to significantly augment the established geological reserves and recoverable reserves of hydrocarbons :

- (i) the physical targets for exploration companies during the Seventh Plan vis-a-vis the Sixth Plan are significantly higher; as against 80 party years of geological and geo-magnetic survey in the Sixth Plan, a target of 112 party years has been set for the Seventh Plan. Exploratory drilling, both onshore and offshore, is proposed to be increased from an actual achievement of 9.6 lakh metres in the Sixth Plan to 28.2 lakh metres during the Seventh Plan Period.
- (ii) beside intensified exploratory efforts by ONGC and Oil India Ltd., an Indo-Soviet cooperation for integrated exploration, on a turnkey basis, in agreed areas of Cambay and Cauvery basins has also been formalised. This would soon be extended to cover agreed areas in the Bengal basins.
- (iii) under the Third Round of bidding, 27 offshore blocks were offered for exploration by foreign oil companies. Offers of foreign oil companies under this round are being processed and negotiations with them are at an advanced stage.

3.26 The country's exploratory efforts have yielded good results and several discoveries of oil and gas have been made in various parts of the country since the beginning of the Seventh Five Year Plan. During April-October 1987 the following discoveries of oil and gas were made in the country :—

<b>Onland</b>	
Bhuvanagiri (Cauvery Basin)	— Oil
Agartala Dome (Tripura)	— Gas
Diroi (Assam)	— Oil
Hapjan (Assam)	— Oil
Kumchai (Arunachal Pradesh)	— Oil and Gas
Kharsang (Arunachal Pradesh)	— Oil
<b>Offshore</b>	
<b>Western Offshore</b>	
C—24	— Gas
C—22	— Gas
B—80	— Oil
B—134	— Oil
B—132	— Oil
<b>Eastern Offshore</b>	
GS—16	— Oil

3.27 While several States in the country were affected by severe drought conditions, some States suffered from floods. These conditions necessitated ensuring improved supply of certain petroleum products like high speed diesel oil and kerosene. The oil industry continued its endeavour of meeting in full the requirements of HSDO in the drought affected States, particularly those in the North-West where the demand for HSDO was high. Similarly, additional allocations of kerosene were made to meet the specific demand of certain States and Union Territories due to floods and drought.

#### *Non-conventional Sources of Energy*

3.28 So far over 8.8 lakh biogas plants have been installed in the country since 1974-75. In 1986-87 alone over 2 lakh biogas plants were installed as against a target of 1.5 lakh plants. The programme has become popular among small and marginal farmers and in far-flung areas like the North-Eastern Region. A sum of Rs. 64 55 crores was released to the State Governments and programme implementing agencies. As against the target of 1.2 lakh plants for 1987-88, over 48,500 biogas plants have already been installed during April-October 1987. As a result of various measures undertaken, the quality of installation of biogas plants has improved considerably. New administrative and financial measures have been taken by the Government to accelerate the implementation of the programme. These include rationalisation of the rates of Central subsidy for different categories of beneficiaries and capacities of biogas plants, setting up of four new Regional Biogas Development and Training Centres, financial assistance for the removal of old non-functional plants, field demonstrations on the utility of biogas manure, popularisation of cheaper models developed recently, etc.

3.29 The exploitation of other non-conventional sources of energy has also been planned. During 1986-87 an outlay of Rs. 124 90 crores was approved for the non-conventional energy programmes like

solar thermal energy, solar photovoltaics, wind energy, rice straw agro thermal power plant, community/institutional biogas plants, etc. For 1987-88 an outlay of Rs. 100.70 crores has been provided.

#### Energy Conservation

3.30 In the context of the present power shortages, energy conservation or more efficient use of energy needs to be accorded increasing importance. The Inter-Ministerial Working Group on Utilisation and Conservation of Energy in its report submitted in 1983 had estimated the conservation potential at 25 per cent in the industrial sector and 30 per cent in agricultural sector. A Standing Group on Conservation of Electric Energy has been set up and it has recommended several measures. Encouraged by the result of a pilot project for rectification of pumpsets reflecting on an average a reduction of about 28 per cent in energy consumption, more such projects have been undertaken during 1987-88. The Petroleum Conservation Research Association has identified some areas for conservation of petroleum products. Energy audits in some major industries have been carried out and follow up action on the basis of the findings of these audits is being taken.

#### Transport and Communications

##### Railways

3.31 For the second year in succession, the freight loading on Indian Railways in 1986-87 registered an impressive increase. It carried about 307 million tonnes of originating traffic (including 29 million tonnes of non-revenue earning traffic) as against the target of 294 million tonnes (including 27 million tonnes of non-revenue earning traffic). There was a

quantum jump of 19 million tonnes, i.e., 7.4 per cent increase in revenue earning traffic over the previous year. In terms of NTKMs, the total freight transport output crossed 223 billion net-tonne Kms. (including 9 billion NTKMs of non-revenue earning traffic). The percentage increase of revenue earning NTKMs was about 9 per cent over the previous year and about 12 per cent over the target. Barring coal, cement and steel, loading of all other commodities was excellent. The shortfall in the traffic of coal, cement and steel was largely due to inadequate offerings. The Railways, however, made up these shortfalls by higher loading of other commodities. The overall loading performance of the Indian Railways during 1986-87 remained above the target despite the shortfall in offering of traffic in three major commodities and other constraints such as the non-transferability of loading capacity from one type of commodity and one area to another.

3.32 The target for the freight traffic for 1987-88 was set at 313 million tonnes (including 26 million tonnes of non-revenue earning traffic). In view of the record freight loading performance of the Railways in 1986-87, and the trend of actual traffic carried during the first two months of 1987-88, the freight traffic targets were revised upward from 287 million tonnes of revenue earning traffic to 290 million tonnes and that of total traffic from 313 million tonnes to 316 million tonnes. This implied an increase of about 12 million tonnes in the revenue earning freight traffic over the previous year and the transport output of 218 billion NTKMs i.e. about 4 billion NTKMs more than the figure of 214 billion NTKMs achieved during 1986-87.

TABLE—3.9  
Performance of the Railway Sector

Sl. No.	Item	1984-85	1985-86	£ 1986-87	£		Percentage change		
					April-December		1985-86	1986-87	1987-88*
					1986-87	1987-88	1984-85	1985-86	1986-87*
1	2	3	4	5	6	7	8	9	10
1.	Total revenue earning traffic (million tonnes)	236.43	258.55	277.75	199.30	210.03	9.4	7.4	5.4
	(i) Coal	91.58	101.64	109.45	78.78	86.31	11.0	7.7	9.6
	(ii) Raw materials for steel plants (excl. coal)	22.59	22.99	24.05	17.09	17.97	1.8	4.6	5.1
	(iii) Pig iron & finished steel from steel plants	8.22	8.85	9.48	6.57	6.91	7.7	7.1	5.2
	(iv) Iron ore for exports	11.06	12.54	14.17	10.18	9.88	13.4	13.0	-2.9
	(v) Cement	16.88	17.96	19.79	13.97	16.05	6.4	10.2	14.9
	(vi) Foodgrains	20.78	24.10	29.00	20.50	21.88	16.0	20.3	6.7
	(vii) Fertilizers	12.21	13.62	14.53	10.58	9.57	11.5	6.7	-9.5
	(viii) Mineral oils	18.17	18.63	19.85	14.31	6.21	2.5	6.5	13.3
	(ix) Balance "other goods"	34.94	38.22	37.43	27.32	25.25	9.4	-2.1	-7.6
2.	Net tonne kilometres (billion)	172.6	196.6	214.1	154.3	159.1	13.9	8.9	3.1
3.	Net tonne kilometres per wagon per day (BG)	1150	1296	1390	1357	1368	12.7	7.3	0.8

\*April—December

£ Provisional

3.33 According to revised target, the Railways were to carry 209.2 million tonnes of revenue earning freight traffic during April—December 1987. As against this 210.0 million tonnes were carried during this period thereby registering an increase of about one million tonnes over the target and 10.7 million tonnes (5.4 per cent) over the quantity moved in the corresponding period of the previous year. This achievement was despite the large breaches in September in the Eastern sector of the country due to floods in Bihar and West Bengal. The present trend, however, indicates that the revised target of 290 million tonnes of revenue earning freight traffic would be achieved despite some drop which is discernible to the loading of fertilisers, cement and iron ore for export.

3.34 As per total transport effort, measured in terms of net—tonne kilometres (NTKMs), the goods traffic during April—December 1987 has registered an impressive growth of 3.1 per cent over the corresponding period of last year and has reached a level of 159.1 billion NTKMs despite the fact that the traffic from the core sector in iron ore for export, fertilisers and cement was below the targeted level.

3.39 In 1986-87 major ports handled 124.2 million ways in freight movement can be gauged by the comprehensive index of wagon utilisation viz net—tonne kilometres (NTKMs) per wagon/day which reflects not only the mobility of the wagon but also the pay load. In 1986-87, the NTKMs per wagon/day averaged 1390 Broad Gauge (BG) and 695 Metre Gauge (MG) as against 1296 (BG) and 677 (MG) during 1985-86. During April—December 1987 NTKMs per wagon/day improved to 1368 (BG) as against 1357 (BG) during the same period in the previous year. Another efficiency indicator, viz., Wagon Turn Round time, which was 12.0 days (BG) and 14.3 days (MG) during 1985-86 was reduced to 11.6 days (BG) and 12.7 days (MG) during 1986-87 registering an improvement of 3.3 per cent and 11.2 per cent respectively over the previous year.

3.36 In order to improve efficiency and safety, the Railways continued their programme of replacement of overaged assets and modernisation of operations. Despite the severe resource constraints, Indian Railways completed track renewals of 3978 Kms. during 1986-87 and 1739 kms. during April—September 1987 in pursuance of targeted priority in the Seventh Five Year Plan. The Railways have also made satisfactory headway in replacement of over-aged assets, maintenance of existing assets, completion of essential on-going projects etc. for achieving required transport capacity to meet traffic demand.

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3.37 In order to sustain the process of growth and development, the induction of new technology by upgrading motive power technology, computerisation of freight operations, introduction of micro-processors in yards and other areas, induction of special type of rolling stock to carry bulk traffic etc. has been planned as part of a long-term profile of the railway freight system.

3.38 Another important achievement relates to introduction of computerised passenger reservation system. The main objective of this was to relieve passengers from undue strain in making reservations for seats and berths. The entire reservation load for all trains passing through Delhi area has been computerised. Extension of computerisation of reservation to Bombay and Calcutta has made substantial progress and is expected to be completed during the year. Computerised reservation is also expected to start at Madras, Secunderabad, Bangalore, Bhopal, Lucknow and Ahmedabad by the end of 1988.

#### Ports

3.39 In 1986-87 major ports handled 124.2 million tonnes of cargo compared to 120 million tonnes in 1985-86 representing an increase of 3.5 per cent. Coal, iron ore and container traffic showed significant increases. The increase in coal traffic was on account of both higher movement of coastal coal (thermal) as well as import of coking coal, while increase in container traffic was in line with the anticipation and the thrust of the Seventh Plan. The aggregate port capacity at the beginning of Seventh Plan was 132.73 million tonnes. It has increased to 141.93 million tonnes in 1986-87 with 8 million tonnes increase at Vishakhapatnam and Madras ports for POL traffic and 1.2 million tonnes increase at Paradip for fertiliser raw materials. With the commissioning of Nhava Sheva Port, the port capacity is likely to increase to 147.83 million tonnes by 1988-89. It is expected to go up further to 154.90 million tonnes towards the close of the Seventh Plan, on account of augmentation of container handling facilities at the ports of Bombay, Cochin, Madras and Calcutta, coal and P.O.L. handling facilities at Haldia and general cargo berth at Mangalore.

3.40 The total cargo handled at major ports during April—December 1987 was 95.8 million tonnes representing a growth of 8.7 per cent over the same period last year. There has been substantial increase in the traffic handled in the case of POL (18.9 per cent) as compared to the corresponding period of 1986 largely on account of increased imports; other commodities recorded an increase of 9.0 per cent. The traffic in iron ore, however, declined by 10.4 per cent as compared to the corresponding

period of 1986. The traffic at the major ports during 1987-88 is expected to be more than the projection of 123 million tonnes for the year and also the traffic which was handled during 1986-87. Accord-

ing to the trend available upto December, 1987, the total traffic in 1987-88 is likely to be around 130 million tonnes.

TABLE—3.10  
Trends in Port Traffic

Item	(Million tonnes)								
	1984-85	1985-86	1986-87 £	April—December £		Percentage change			
				1986-87	1987-88	1985-86	1986-87	1987-88*	
	2	3	4	5	6	7	8	9	
TOTAL . . . . .	106.7	120.0	124.2	88.1	95.8	12.5	3.5	8.7	
(a) P.O.L. . . . .	49.8	54.6	55.5	39.2	46.6	9.6	1.6	18.9	
(b) Iron Ore . . . . .	26.1	28.8	30.6	21.1	18.9	10.3	6.3	-10.4	
(c) Others . . . . .	30.8	36.6	38.1	27.8	30.3	18.8	4.1	9.0	

\*April—December £Provisional

#### Telecommunications

3.41 The performance of the telecommunications sector during 1986-87 has been encouraging. The number of direct exchange connections recorded a growth of over 10 per cent and of telex connections of 11.5 per cent. The production of telephone instruments by ITI at 7.52 lakhs was, however, below the target on account of the problems of supply of components by collaborators.

3.42 During the period April—December 1987 the total production of 5 lakh telephone instruments registered a growth of 2.6 per cent over the year, though it lagged behind the target for the period by about 8 per cent on account of the decline in production in Bangalore unit of ITI. The production was affected because of the problems associated with the availability of components and other materials. These bottlenecks need to be removed so that the respective targets can be achieved during the remaining period of 1987-88. A total of 83,875 new telephone connections were provided in the monitored sector during the first nine months of the year, which though 26 per cent higher than the target fixed for April—

December 1987 was marginally below the achievement in the corresponding period of the previous year. During the period April—December 1987 an addition of 74,600 lines of switching capacity was made in the monitored sector as against the target of 61,800 lines for the period and the achievement of 84,690 lines during the same period of 1986.

3.43 In respect of international service, the number of countries to which the Indian subscriber can dial directly rose from 5 in 1985-86 to 9 in 1986-87 with the necessary infrastructure built-up for a rapid increase during 1987-88. Within the country, as against 76 cities which had access to international subscriber dialling facilities in 1985-86, the number increased to 323 at the end of 1986-87. The service is now available from 460 stations in the country to 160 countries.

3.44 There was a significant thrust towards the extension of telephone service to rural areas. 1558 long distance public telephones were opened in rural areas in 1986-87 compared to 1509 in 1985-86. Also 818 rural telephone exchanges were commissioned in 1986-87 as compared to 630 in 1985-86.