CHAPTER 3

INFRASTRUCTURE

The key infrastructure sectors have performed reasonably well during the first nine months of the current year. Coal despatches, electricity generation by thermal stations, revenue earning goods traffic carried by the railways and cargo handled at major ports, in particular, showed considerable growth during April—December, 1985 over that of the corresponding period of 1984. Coal despatches increased by 10.4 per cent as against an annual growth rate of 6.3 per cent achieved during the Sixth Plan. Consequently, the accumulation of pit-head stocks has been checked. Thermal (including nuclear) power generation showed an increase of 15.5 per cent compared with an annual growth rate of 11.8 per cent during the Sixth Plan. Revenue earning originating goods traffic by the railways showed a high increase of 9.1 per cent as against a growth rate of 4.1 per cent during the Sixth Plan. Cargo handled at major ports showed an increase of 14.2 per cent as against an annual increase of 6.3 per cent achieved during the Sixth Plan. Crude oil production and coal production have shown moderate increases of 4.3 per cent and 2.3 per cent respectively during the first nine months of the current year. However, hydel generation registered a fall of 4.8 per cent.

TABLE 3.1

Trends in the Performance of Infrastructure Sectors

Item	Unit	1979-80	1984-85	1980-85*	1984-85 April-December	1985-86 April-December	Percentage change 1984-85 over 1983-84 Full year	Percentage change 1985-86 over 1984-85 April-December
1. Coal								
(a) Production	Million tonnes	103.9	147.4	7.2	101.7	104.0	6.7	2.3
(b) Pit-head stocks (year—end)	—do—	14.0	29.2	15.8	22.0	20.8	29.8	—5.5
(c) Despatches	—do—	99.6	135.1	6.3	98.8	109.1	3.7	10.4
2. Electricity Generated (Utilities only)	Billion kwh	104.6	157.0	8.5	116.1	125.6	11.9	8.2
(a) Hydel	—do—	45.5	54.0	3.5	41.8	39.8	7.8	—4.8
(b) Thermal (including nuclear)	—do—	59.1	103.0	11.8	74.3	85.8	14.2	15.5
3. Petroleum								
(a) Crude oil production	Million tonnes	11.8	29.0	19.8	21.1	22.0	11.4	4.3
(b) Refinery throughput	—do—	27.5	35.6	5.3	25.9	31.5	0.8	21.9
4. Railways								
Revenue earning goods (originating traffic)	—do—	193.1	236.4	4.1	171.3	187.0	2.7	9.1
5. Cargo handled at major ports	—do—	78.5	106.7	6.3	76.2	87.1	6.5	14.2

*Annual compound growth rate during the Sixth Plan.

Coal

3.2 Pithead stocks had increased sharply in 1984-85 and the primary aim, in early 1985-86, was to reduce these by increasing despatches and by regulating production in those collieries which had large pithead stocks. During April—December, 1985 despatches increased by 10.4 per cent over the corresponding period of the previous year, while production showed a small increase of 2.3 per cent. Consequently, it was posible to draw down the level of pithead stocks which at the end of December, 1985 was lower by 5.5 per cent compared with the level a year ago.

TABLE 3.2

Coal Production

(Million tonnes)

Company	1979-80	1984-85	1980-85 *	1984-85 April-December	1985-86 April-December	Percentage change 1984-85 over 1983-84 Full year	Percentage change 1985-86 over 1984-85 April-December
ECL	20.5	23.1	2.4	15.4	15.8	1.3	2.6
BCCL	20.1	21.8	1.6	14.9	14.5	0.9	—2.7
CCL	24.1	39.0	10.1	26.6	25.5	6.3	—4.1
WCL	26.1	46.1	12.0	32.2	33.0	17.0	2.5
NEC	0.6	0.8	5.9	0.5	0.6	†	20.0
Total (CIL)	91.4	130.8	7.4	89.6	89.4	7.8	—0.2
SCCL	9.4	12.3	5.5	9.0	11.3	—3.1	25.6
Others	3.1	4.3	6.8	3.1	3.3	4.1	6.5
TOTAL	103.9	147.4	7.2	101.7	104.0	6.7	2.3
Pithead stocks (year-end)	14.0	29.2	15.8	22.0	20.8	29.8	—5.5
Despatches	99.6	135.1	6.3	98.8	109.1	3.7	10.4

*Annual compound growth rate during the Sixth Plan.

†No change.

3.3 Coal production level of 147.4 million tonnes was achieved during 1984-85, which was 6.7 per cent more than the level achieved in 1983-84. During the year 1984-85, all the subsidiaries of Coal India Ltd. (CIL) showed an increase in production over the previous year. The 1984-85 growth rates in production of Eastern Coalfields Ltd. (ECL), Bharat Coking Coal Ltd. (BCCL), Central Coalfields Ltd. (CCL) and Western Coalfields Ltd. (WCL) were 1.3 per cent, 0.9 per cent, 6.3 per cent and 17 per cent, respectively. The increase in production of CCL and WCL was, particularly, noteworthy as these two companies exceeded their targets by 1.5 million tonnes and 6.7 million tonnes, respectively. The performance of ECL and BCCL was affected by flooding of mines in June, 1984 and by inadequate availability of power. The production by the Singareni Collieries Company Ltd. (SCCL) during 1984-85 was 3.1 per cent below the level in the previous year. This was below expectations and was attributed mainly to strikes, absenteeism and late commissioning of projects.

3.4 The target of coal production for the year 1985-86 is 154.5 million tonnes (7.1 million tonnes above the 1984-85 production level) of which 133.5 million tonnes is to be met by CIL, 16 million tonnes by SCCL and the balance of 5 million tonnes by companies other than CIL and SCCL. Coal production in the first nine months of 1985-86 was 104 million tonnes as against 101.7 million tonnes in the correspondng period of 1984-85, an increase of 2.3 per cent. An estimated 8.3 million tonnes of output was lost due to power shortages, heavy rains and absenteeism in CIL. Production by CIL during April—December, 1985 at 89.4 million tonnes was down by 0.2 per cent compared with the corresponding period of 1984-85. This was due to

a decrease in production in BCCL and CCL by 2.7 per cent and 4.1 per cent respectively during the same period. Production in ECL and WCL, however, showed increases of 2.6 per cent and 2.5 per cent respectively. The loss of production in BCCL and CCL in the current year was a result of power shortages, absenteeism, breakdown of machinery and the regulation of production in mines with high pithead stocks. The SCCL, however, performed remarkably well during the first nine months of 1985-86 by producing 2.3 million tonnes more than in the corresponding period of the previous year, an increase of 25.6 per cent. This has been mainly a result of better industrial relations.

3.5 Availability of coal across the country improved as 109.1 million tonnes of coal was despatched during the period April—December, 1985. Consequently, coal stocks at pitheads, which had reached a record figure of 29.2 million tonnes in March 1985 dropped sharply. The main thrust in the strategy to improve despatches has been to maximise supply of coal by rail. The daily average coal loading in CIL during first nine months of 1985-86 went up by 5.5 per cent to 10,565 wagons per day as against 10,024 wagons per day in the corresponding period of 1984-85. Coal loading in SCCL, also increased during the same period by 21.8 per cent to 1,216 wagons per day.

3.6 Guidelines have been formulated for the regulation of pithead stocks in the future. These guidelines stipulate that :

(i) for the subsidiary company as a whole, the company's stock at pitheads should be equal to one month's production;

(ii) at each colliery, stocks should not exceed three months' production; and

(iii) collieries should always have sufficient stocks to load the available number of wagons in time.

3.7 A production target of 226 million tonnes has been envisaged for the final year of the Seventh Plan against the estimated demand of 237 million tonnes. The gap is to be met by utilising pithead stocks and by some imports of coking coal. To achieve this production level, an annual growth rate of 8.9 per cent would be required during the Seventh Plan against the growth rate of 7.2 per cent achieved during the Sixth Plan. The proposed 8.9 per cent annual growth rate is sought to be achieved, among other things, by greater emphasis on open cast mining. This would mean augmentation of production from mechanised open cast mines by using heavy earth-moving machinery. The share of open cast production by the end of the Seventh Plan would increase to around 56 per cent as against 49 per cent in the Sixth Plan.

3.8 Reasons for the supply of poor quality coal have been examined by a number of committees, and the main problems which have been identified are :—

(i) High ash and low coking propensities in prime coking coal supply to steel plants, inadequate availability of high grade coal for chemical, cement, glass industries, etc.

(ii) Over-sized coal and presence of extraneous matter. As a remedy, a crash programme was initiated during the Sixth Plan, to install coal handling plants with continuous system of crushing, sizing, suppression of extraneous matter and mechanical loading. Presently, about 68 per cent of coal despatches pass through coal handling plants and this is proposed to be increased to 100 per cent by the end of the Seventh Plan. A number of new coking coal washeries have been identified to meet the requirements of washed coking coal during the Seventh Plan.

3.9 The Seventh Plan envisages a major thrust on environmental management. All the recently sanctioned coal mining projects and those that are being sanctioned contain a provision for the reclamation of land along with other protective measures for the control of air and water pollution arising from mining activities.

3.10 Other proposals in the Seventh Plan include 25 new schemes of research and development; supply of coal in slurry form by pipeline to overcome transport bottlenecks and for the first time, coal gasification on an experimental basis.

Power

3.11 During the Sixth Plan the installed capacity increased by 13,992 MW, an increase of 49 per cent over the base year of the Sixth Plan. The overall rate of growth of power generation was 8.5 per cent per annum during the Sixth Plan. The annual rate of growth of thermal (including nuclear) generation was 11.8 per cent and that of hydel generation 3.5 per cent. In 1984-85, the terminal year of the Sixth

Plan, power generation increased by 11.9 per cent over 1983-84, with an increase of 14.2 per cent in thermal (including nuclear) and 7.8 per cent in hydel generation.

TABLE 3.3

Trends in the Power Sector

Item	1979-80	1984-85	1980-85 *	April-December 1984-85	April-December 1985-86	Percentage change 1984-85 over 1983-84 Full year	Percentage change 1985-86 over 1984-85 April-December
Additional Capacity Commissioned/Rolled (MW)	1799	3080@	11.4	1668	2072@	—24.7	24.2
Power Generation (Billion kwh)	104.6	157.0	8.5	116.1	125.6	11.9	8.2
Hydel	45.5	54.0	3.5	41.8	39.8	7.8	—4.8
Thermal (incl. nuclear)	59.1	103.0	11.8	74.3	85.8	14.2	15.5
Plant load factor of thermal plants (percent)	44.3	50.1	..	48.0	50.8	..	..
Estimated deficit (percent)	16.0	6.7	..	5.6	8.3	..	..

@Excludes plants with 20 MW and less capacity.

*Annual compound growth rate during Sixth Plan.

3.12 Although shortages of power continued through the Sixth Plan, the estimated shortages declined considerably from 16 per cent in 1979-80 to 6.7 per cent in 1984-85, the terminal year of the Sixth Plan. There was also a significant improvement over 1983-84 when the shortages were to the extent of 10.8 per cent. Continuing shortages were mainly attributable to slippages in capacity additions and the non-completion of transmission lines. Delays in the commissioning of projects were a result of poor project management and lack of funds. The achievement in terms of transmission lines was only 50 per cent of the target, resulting in severe problems in the distribution of power.

3.13 Power generation during the first nine months of 1985-86 at 125.6 billion kwh. was 8.2 per cent higher than in the corresponding period of the previous year. The overall growth was the net effect of a rise of 15.5 per cent in thermal (including nuclear) power generation and a decline of 4.8 per cent in hydel generation. Hydel generation was lower because of lower generation in Rihand, Ukai, Koyna, Machkund, Sharavathy, Hirakud and Balimela reservoir-backed stations due to reduced inflows. Hydel generation, in fact, did not improve even in June and July although the monsoon had set in on schedule and rainfall during these two months was fairly good. The Maneri Bhali hydel station was under forced maintenance for about three months and the Vaitarna hydel station has been shut down for thrust block repairs and alignment works since June, 1985.

3.14 It is expected that the shortfall in hydel generation would be offset by higher generation of thermal and nuclear power. The hydel-thermal mix which was 40:60 and 33.7:66.3 at the end of the Fifth and Sixth Plans respectively, is likely to be 30.7 : 69.3 at the end of the Seventh Plan. Optimisation studies on long term power planning reveal that without adequate hydel back-up the overall cost of meeting power demand is high. Hence, necessary steps need to be taken during the Seventh Plan and even later towards improving the hydel—thermal balance.

3.15 The average Plant Load Factor (PLF) of the thermal plants at 50.8 per cent during April—Machkund, Sharavathy, Hirakud and Balimela reserthe corresponding period of the previous year. The

thermal PLF increased from 44.3 per cent in 1979-80 to 50.1 per cent at the end of the Sixth Plan, though it still remained far below the peak of 55.4 per cent achieved in 1976-77.

TABLE 3.4

Statewise/Systemwise Plant Load Factor (Thermal)

(Per cent)

State/System	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	April-December*	
							1984-85	1985-86
1	2	3	4	5	6	7	8	9
State/System with PLF above 43 per cent during 1984-85 and 1985-86								
Andhra Pradesh	40.9	36.3	46.8	51.1	54.6	54.4	51.8	62.4
Delhi (DESU)	61.0	60.0	50.0	51.0	47.7	58.9	59.9	60.9
Gujarat	43.9	50.0	53.6	57.9	55.3	54.0	53.1	52.2
Madhya Pradesh	53.1	52.4	49.9	58.5	53.1	51.7	49.5	51.5
Maharashtra	56.5	52.8	49.4	50.2	51.0	46.6	45.8	55.9
Punjab	29.6	37.8	41.3	51.0	57.0	64.3	61.1	51.5
Rajasthan	..	..	..	..	72.3	57.2	53.0	52.8
Tamil Nadu	33.0	34.5	37.8	44.0	39.4	49.0	46.0	54.0
D.V.C.	40.1	37.6	51.7	49.6	48.1	48.6	48.1	47.8
N.T.P.C.	34.0	46.0	49.7	56.6	53.3	54.3	51.9	60.7
State/System with PLF below 43 per cent								
Assam	41.1	36.5	34.8	36.9	34.2	29.6	30.2	26.4
Bihar	37.8	31.4	35.5	38.5	32.8	30.5	27.8	35.6
Haryana	25.7	31.7	37.3	32.2	31.1	34.7	31.0	29.8
Orissa	31.8	34.0	35.9	35.2	33.3	32.2	30.3	30.5
Uttar Pradesh	38.1	36.5	37.6	39.6	35.1	31.6	30.4	35.2
West Bengal	30.7	42.1	37.6	38.5	35.9	36.5	37.7	42.2
ALL INDIA	**44.3**	**44.6**	**46.8**	**49.4**	**47.9**	**50.1**	**48.0**	**50.8**

*Provisional.

3.16 Behind the overall average figures there are disturbingly wide inter-State variations. The PLF achieved by the state electricity boards in six States, viz. Assam, Bihar, Haryana, Orissa, Uttar Pradesh and West Bengal has been very low, averaging below 43 per cent all through the Sixth Plan and shows no improvement in the current year. Investment in the power sector in these six States at these efficiency levels, is not economical. It is essential that in these States a major effort is made to increase the efficiency of the existing plants.

3.17 In order to improve the performance of thermal plants, steps have been taken to improve the quality of coal and to reduce the time taken for planned maintenance. A comprehensive renovation and modernisation scheme has been taken up at an estimated cost of Rs. 500 crores. This amount is to be given as loan assistance from the Central funds to various electricity boards to meet the cost of the core programmes of renovation and modernisation.

3.18 The generation requirement at the end of the Seventh Plan is estimated to be 295 twh, yielding an annual growth rate of 12.1 per cent compared with 8.4 per cent per annum achieved during the Sixth Plan. The target for additions to the installed capacity during the Seventh Plan has been fixed at 22,245 MW. This would be 60 per cent more than the addition made during the Sixth Plan. A programme for adding 4,460 MW capacity had been envisaged for 1985-86. An allocation of Rs. 34,273 crores has been made for power sector during the Seventh Plan. Only a few new major projects would be taken up during the Plan period, since the focus would be on the completion of on-going projects. Consequently, annual capacity addition should show a rapid rise in the Seventh Plan period.

3.19 There is an urgent need for renovating the hydro-electric power stations especially those commissioned during the pre-independence period. Also, there are inbuilt design problems with some stations which were commissioned during the seventies. It is proposed to update the technology of the old machines under a renovation scheme during the Seventh Plan.

Petroleum

3.20 During 1985-86, crude oil production is expected to be about 30 million tonnes with off-shore production constituting nearly two-third of the output. Against the anticipated production of 30 million tonnes during 1985-86, achievement in the first nine months is 21.98 million tonnes. This was 4.3 per cent more than the production in April—December, 1984. While the performance of the off-shore areas in the western region was particularly good, the production in the eastern region suffered due to field problems and the seizure of some oil wells in the Assam fields. Moreover, continued delay in the delivery and in the commissioning of equipment and drilling rigs resulted in lower availability of producing wells.

TABLE 3.5

Trends in the Petroleum Sector

(Million tonnes)

Item	1979-80	1984-85	1980-85*	1984-85 April-December	1985-86 April-December	Percentage change 1984-85 (1983-84 Full year)	Percentage change 1985-86 (1984-85 April-December)
Crude oil production	11.77	28.99	19.8	21.10	21.98	11.4	4.3
(*i*) On—shore	7.35	8.85	3.8	6.60	6.96	2.5	5.5
(*a*) ONGC	5.09	6.12	3.8	4.51	4.97	6.3	10.2
(*b*) OIL	2.26	2.73	3.9	2.09	1.99	—4.9	—4.8
(*ii*) Off—shore (ONGC)	4.42	20.14	35.4	14.50	15.02	15.3	3.6
Refinery throughput	27.47	35.56	5.3	25.87	31.54	0.8	21.9
Natural gas (Billion cubic metres)	22.76	7.24	21.2	4.60£	5.19£	21.5	12.8£

£Relates to April—November.

*Annual compound growth rate during the Sixth Plan.

3.21 During 1984-85, crude oil production increased by 11.4 per cent to 28.99 million tonnes with on-shore production constituting 8.85 million tonnes and off-shore 20.14 million tonnes. As a result of increased production of oil, the level of self-reliance in oil improved to about 70 per cent during 1984-85.

3.22 Exploration and production activities were intensified further by the Oil and Natural Gas Commission (ONGC) by commissioning seven new drilling rigs purchased from Bharat Heavy Electricals Ltd. (BHEL). A jack-up 'Sagar Ratna' and a drilling ship 'Sagar Vijay' were also acquired and commissioned on the west coast. In addition, eight new platforms were also commissioned by ONGC in the off-shore areas. The on-shore exploration operation by ONGC led to the discovery of oil in various places such as Andhra Pradesh, Assam, Gujarat, Tamil Nadu and Tripura. In the off-shore areas oil was struck in Kutch and in the Godavari basins.

3.23 During the Seventh Five Year Plan, 159.14 million tonnes of crude oil is envisaged to be produced, 102.31 million tonnes from west coast off-shore and the balance from on-shore areas. The share of ONGC in on-shore production is projected to 41.3 million tonnes and that of Oil India Ltd. (OIL) to 15.5 million tonnes.

3.24 The ONGC plans to step up crude oil production mainly from Cambay and the areas of Upper Assam and Nagaland. The increase in oil production from Cambay basin would be due to the further development of a number of fields, particularly the Kalol field and the heavy oil fields in north Gujarat region. Oil production from ONGC areas in Upper Assam and Nagaland is expected to double during the Seventh Plan. Oil India's share of on-shore production is projected to be 15.5 million tonnes during the Seventh Plan as against 12.7 million tonnes achieved in the Sixth Plan. OIL would mainly concentrate on maintaining crude production rates from its ageing fields of Naharkatiya and Moran. Both these fields require additional development drilling and speedier recovery of sick wells to off-set the decline in production.

3.25 Projected off-shore (ONGC) oil production in the Seventh Plan is more or less, at the same level as in 1984-85. Additional platforms would be installed in the sourthern parts of Bombay High for sustaining the production rate as well as increasing the recovery of oil. Many marginal gas fields have been discovered in Bombay and Ratnagiri areas. ONGC propose to develop some of these during the Seventh Plan and these fields are expected to produce nearly four million tonnes of crude oil.

3.26 With the increase in domestic crude production, the refinery throughput has also been augmented. The refinery throughput during 1984-85 was 35.56 million tonnes indicating an increase of 0.8 per cent over the previous year. This was, however, below the target of 36.81 million tonnes. The refinery throughput was mainly affected by a major fire in Cochin Refinery as a result of which the refinery remained closed for a major part of the year. Despite this, the overall capacity utilisation in refineries remained well above 90 per cent.

3.27 The refinery throughput during 1985-86 is targeted at a little over 42 million tonnes, which is expected to reduce imports of petroleum, oil and lubricants (POL). During the first nine months of 1985-86, refinery throughput was 31.54 million tonnes, an increase of 21.9 per cent over the corresponding period of 1984-85. This reflected an almost full achievement of the planned target. The marginal shortfall, however, was on account of lower throughput in Gauhati, Barauni, Mathura, Hindustan Petroleum Corporation Limited (Bombay), HPCL (Vizag), Cochin and Bongaigaon Refinery & Petrochemicals Limited (BRPL) refineries. This, in turn, was due to lower supplies of crude from Assam fields to Gauhati, Barauni, Digboi, BRPL refineries; lower allocation of Bombay High crude to HPCL refineries at Bombay and Cochin; annual maintenance/shut down of Mathura refinery in June-July, 1985 and due to industrial relations problem in HPCL (Vizag) refinery.

3.28 Consumption of petroleum products increased by 7.4 per cent during 1984-85. It is further estimated to increase by 7.9 per cent during the current year. Middle distillates consisting of kerosene, high speed diesel oil, etc. constitute the major proportion of the total consumption of petroleum products. Their share was 58 per cent in 1984-85 and is likely to remain around the same level during the current year. Of the middle distillates, large increases are estimated in the consumption of kerosene and high speed diesel oil (HSDO) to the extent of 7.9 per cent and 10.7 per cent respectively. These rates of consumption growth are above the Seventh Plan projections and cannot be sustained over a period of time.

TABLE 3.6

Consumption of Petroleum Products

(Million tonnes)

	1984-85 (provisional)	1985-86 (estimated)	Percentage change	
			1984-85 / 1983-84	1985-86 / 1984-85
1. Light Distillates	**6.3**	**6.9**	**12.3**	**9.9**
of which :				
Naphtha	3.1	3.2	11.1	2.9
2. Middle Distillates	**22.4**	**24.4**	**8.2**	**9.2**
of which :				
Kerosene	5.9	6.4	7.4	7.9
High Speed Diesel Oil	13.6	15.1	8.2	10.7
3. Heavy Ends	**9.9**	**10.2**	**2.8**	**3.9**
of which :				
Fuel Oil	7.8	8.0	3.0	2.7
TOTAL	**38.5**	**41.6**	**7.4**	**7.9**

3.29 Natural gas is an important source of energy and feed stock during the Seventh Plan. With the step up in crude oil output the natural gas production also increased by 21.5 per cent to 7.24 billion cubic metres in 1984-85. Due to the absence of compression and dehyderation facilities, 43 per cent of the off-shore gas had to be flared in 1984-85. During the first eight months of the current year, gas production was 5.19 billion cubic metres, reflecting an increase of 12.8 per cent over the level achieved in the corresponding period of 1984-85.

3.30 Gas production is likely to increase from 7.2 billion cubic metres in 1984-85 to 14.9 billion cubic metres by 1989-90. This increase is mainly on account of commercial production of free gas from the Bombay basin. The production of gas from the Cambay and Upper Assam basins is expected to increase with a step up in crude production because part of the gas from these basins is associated gas. Free gas availability will also increase with the development of the Assam-Arakan belt, from south basin gas field, and possibly with development of a satellite gas field on the west coast. Though the availability of

gas is expected to increase, the flaring of gas would be reduced in a number of ways. From Bombay High, gas flaring is expected to be eliminated on the completion of additional gas compression and dehyderation facilities. Gas is also to be used by gas-based fertiliser plants at Thal Vaishat and Hazira. However, in the Assam area some surplus of gas may remain because of a lower off-take than the committed quantities by the down-stream users and due to problems with surface gas handling facilities (mainly the gas compression facilities of OIL). The flaring of gas, however, is expected to be largely eliminated by 1986-87.

3.31 As far as possible, natural gas is to be utilised as feed stock for production of fertilisers, petrochemicals and for extraction of LPG. It has been decided to use gas for power generation on a selective basis where for logistic and other reasons it is advisable to use alternative fuels. Natural gas makes a significant contribution to the household sector by way of LPG extracted from associated gas. During 1984-85 about 30 per cent of the country's output of LPG came from this source and during 1985-86 this share is likely to go up to 33 per cent. About 16 lakhs new LPG consumers were enrolled in 1984-85 taking the total number of LPG domestic consumers to over 8.9 million at the end of 1984-85. Another 16 lakh new LPG consumers are expected to be enrolled during 1985-86. This should further reduce the pressure on kerosene consumption.

Energy Strategy

3.32 Some of the main elements of the energy strategy for the Seventh Five Year Plan are : accelerated exploitation of coal; investment in hydel and nuclear power; intensification of exploration for oil and gas; improved management of oil demand including the formulation of a national transport fuel policy; exploitation of renewable sources of energy, like energy forestry, biogas, biomass, solar energy, with a particular focus on the energy requirements of the rural communities

3.33 During the Sixth Plan, major initiatives were taken to develop new and renewable sources of energy. Significant progress was made particularly in the areas of bio-gas. A National Project on Bio-gas Development was initiated in November, 1981. Since then about 3.56 lakh plants were installed upto 1984-85. These plants would generate an annual saving of more than 14.8 lakh tonnes of fuel wood valued at Rs. 59 crores per year besides generating 71 lakh tonnes of high quality manure annually as a by-product. During the current year a target of installing 1.80 lakh bio-gas plants has been fixed and this is likely to be achieved.

Railways

3.34 During 1984-85, the railways carried 236.4 million tonnes of revenue earning originating traffic, an increase of 2.7 per cent over the previous year. The original target for the year was 245 million

TABLE 3.7

Performance of the Railway Sector

Item	1979-80	1984-85	1980-85*	1984-85 (April-December)	1985-86 (April-December)	Percentage change: 1984-85 over 1983-84 Full year	Percentage change: 1985-86 over 1984-85 April-December
1. Total revenue earning traffic (Million tonnes)	193.06	236.43	4.1	171.35	187.02	2.7	9.1
(*i*) Coal	61.96	91.58	8.1	66.90	73.47	2.9	9.8
(*ii*) Raw materials for steel plants (excl. coal)	20.75	22.59	1.7	16.87	16.78	3.9	—0.5
(*iii*) Pig iron and finished steel from steel plants	7.22	8.22	2.6	5.74	6.20	5.4	8.0
(*iv*) Iron ore for exports	9.27	11.06	3.6	7.94	8.96	21.9	12.8
(*v*) Cement	10.04	16.88	10.9	12.40	12.82	8.5	3.4
(*vi*) Foodgrains	18.35	20.78	2.5	15.01	17.12	—15.4	14.1
(*vii*) Fertilizers	8.23	12.21	8.2	8.49	10.25	49.8	20.7
(*viii*) Mineral oils	14.27	18.17	4.9	13.28	13.74	1.2	3.5
(*ix*) Balance "Other goods"	42.97	34.94	—4.2	24.72	27.68	—3.8	12.0
2. Net tonne kilometres (in billion)	144.6	172.6	3.6	125.1	143.1	2.2	14.4
3. Wagon turn-round (days) (Broad gauge)	15.1	12.8	—3.3	12.95	12.25	—1.5	—5.4

*Annual compound growth rate during the Sixth Plan.

tonnes. However, at the mid-term review, it was scaled down to 237 million tonnes because the demand was not at the expected level. The targets for coal, raw-materials to steel plants, and iron ore for exports were reduced. However, cement's and fertilizer's targets were enhanced. The actual movement of traffic by the railways in 1984-85 was more or less in accordance with the revised targets.

3.35 The target for 1985-86, in terms of revenue earning originating goods traffic, was set at 250 million tonnes, an increase of 5.7 per cent over the level achieved in the previous year. The actual goods traffic during April—December, 1985 was 187.02 million tonnes, four million tonnes above the target for that period. In terms of total transportation effort measured in net—tonne kms., the goods traffic during April—December, 1985 registered an impressive improvement of 14.4 per cent over the corresponding period of the preceding year and was 8.8 per cent above the target. This was achieved despite the fact that traffic from core industries like coal and steel plants was below the expected levels. The short-fall against the target for coal was of the order of 4.4 million tonnes and for the steel plants 1.9 million tonnes. However, there was improved loading of fertilizers, which was 33.1 per cent more than the target and the residual 'other goods' category exceeded the target by 24.1 per cent. This enabled the railways to surpass the overall target by a margin of 2.2 per cent. Compared to the period April – December, 1984, traffic in all commodities, except raw-materials for steel plants, increased during the period April—December, 1985. Items showing large increases were coal, iron ore for exports, food-grains, fertilizers and 'other goods'. This sharp upswing in the performance of the railways in the current year was a result of better train operations; more efficient stock distibutional strategies; improved maintenance and utilisation of rolling stock; increase in the number of 'Box N' trains with heavier trailing load and improved monitoring.

3.36 Among the factors that constrained the performance of the railways during 1985-86 were : the less than expected flow of coal; the large number of wagons "left-behind" in the collieries on the Eastern and the South—Eastern Railways; the poor performance of Dugda-Bhojudih and Sudamdih washeries; reduced acceptance of iron ore at Bhillai, Durgapur and TISCO Steel Plants, a decrease in the loading of POL products owing to labour problems at Cochin Refinery and a reduced flow of traffic at Barauni.

3.37 The improved overall efficiency of the railways during 1984-85 and April—December, 1985 was reflected in wagon turn-round time, an important efficiency indicator of wagon utilisation for the railways. Wagon turn-round time in 1984-85 in terms of days on the broad gauge (BG) decreased by 1.5 per cent over 1983-84 and further by 5.4 per cent during April—December, 1985 over the corresponding period of the previous year. Another efficiency indicator *viz.* net tonne kilometers per wagon per day for BG, also showed an improvement. During 1984-85 it averaged 1,150 against 1,112 in 1983-84 and was 1,226 during April—December, 1985.

3.38 The railways continued their programme of replacement of over-aged assets and modernisation of operations in order to improve efficiency and safety. However, owing to severe resource constraints, the renewal of railway tracks could not be undertaken at the required rate. Against 14,000 kms. of track renewals envisaged during the Sixth Plan period, renewals of only 9,541 kms. were carried out and 1,007 kms. of new lines were opened. In the Seventh Plan top priority has been given to the replacement of over-aged assets, maintenance of existing assets and completion of essential on-going projects which add to the transport capacity. Technological upgradation and modernisation is also given considerable emphasis.

3.39 A substantial increase is expected in the movement of coal over the Seventh Plan, from around 91 million tonnes in 1984-85 to 152 million tonnes in 1989-90. The major increase in the coal demand is expected from the thermal power stations. An increase in traffic would also be generated by steel plants, cement, foodgrains and petroleum products.

Ports

3.40 The traffic handled at major ports during 1984-85 was 106.7 million tonnes, an increase of 6.5 per cent over the previous year. POL and iron ore traffic achieved a significant growth and at the end of 1984-85 accounted for 71 per cent of the total traffic handled at major ports. The performance of the ports was adversely affected by a strike by port workers in March-April, 1984 though special

arrangements were made to maintain the handling of essential items like edible oils, crude oil, petroleum products and fertilizers. The strike by the workers at Madras and Bombay ports during February, 1985 also adversely affected the handling of import and export cargo.

TABLE 3.8

Trends in Port Traffic

(Million tonnes)

Cargo handled at major ports	1979-80	1984-85	1980-85 *	1984-85	1985-86	Percentage change	
				April-December		1984-85	1985-86
						1983-84 Full year	1984-85 April-December
Total	**78.5**	**106.7**	**6.3**	**76.2**	**87.1**	**6.5**	**14.2**
Of which :							
(*a*) POL	28.8	49.7	14.6	35.7	41.7	1.6	16.6
(*b*) Iron ore	23.2	26.0	2.4	17.7	19.1	19.1	7.8

*Annual compound growth rate during the Sixth Plan.

3.41 During the first nine months of the current year the traffic handled was 87.1 million tonnes, an increase of 14.2 per cent over the corresponding period of the previous year. The achievement during the second quarter of 1985-86 was, however, slightly lower than that in the first quarter. Apart from seasonal factors, certain other problems affected the performance of the New Mangalore, Bombay and Calcutta ports. These included problems in industrial relations at the New Mangalore port due to inter-union rivalry; reduced availability of labour at Bombay port; reduced productivity of workers in Calcutta port and the excessive time taken in handling imported fertilizers (which were mostly in caked form and required decaking before unloading).

3.42 While the traffic handled at major ports showed a substantial increase, vessels were held up for berths at major ports, particularly Calcutta, Visakhapatnam, Bombay and Kandla from the middle of July, 1985. However, conditions improved from the beginning of September, 1985 and the number of vessels waiting for berths reduced from 64 as on August 31, 1985 to 39 as on September 28, 1985.

3.43 A number of important schemes at the ports were completed during the Sixth Plan. These include the provision of iron ore handling facilties at New Mangalore and Paradip; a container terminal at Madras; general cargo berths at Tuticorin, Madras, Kandla, Marmugao, Visakhapatnam, Paradip and New Mangalore; construction of a coal jetty at Tuticorin to meet the requirements of the Tuticorin Thermal Power Station; acquisition of container handling equipment for the port of Bombay and POL handling facilities at the ports of Bombay, Cochin and Kandla.

3.44 The broad objectives of the development of ports in the Seventh Plan primarily are : improved infrastructure to match the type and size of vessels and the volume and type of cargo; planned modernisation of port facilities and use of upgraded technology; expansion of facilities to handle at least 50 per cent of the general cargo in containerised form; improvement in productivity of labour ; equipment for efficient port operation ; and the development of selected minor ports as an integral part of the overall port systems.

3.45 The modernisation of port and cargo handling facilities specially to handle container traffic is to be a priority during the Seventh Plan. The concept of multi-purpose terminals would be adopted to blend modern cargo handling techniques with conventional operations. The main scheme for Calcutta and Haldia relate to modernisation of the port, railway and road network and the development of infrastructure facilities in and around the dock areas. At Bombay, besides expansion of container handling facilities at Marine Oil terminals at Butcher Island and Pi-Pau, the existing Bombay docks are proposed to be modernised. The additional oil berths at Madras port are proposed to be completed and provided with container handling equipment. At Visakhapatnam, the iron ore handling system will be upgraded to handle larger vessels. At Tuticorin one more coal jetty will be constructed to meet the requirements of the expansion of the Tuticorin Thermal Power Station.

3.46 The capacity of major ports is to increase from 133 million tonnes at the end of the Sixth Plan to 161.4 million tonnes by the end of the Seventh Plan as against anticipated traffic of 147 million tonnes. The major increases in capacity are expected to take place at Haldia, Visakhapatnam, Madras and Nhavasheva mainly to handle POL, fertilisers and container traffic.