8

INFRASTRUCTURE

Performance of the infrastructure sector during April-December, 1992 has been uneven. Shipping, railways and telecommunication have been able to meet targets. The performance of coal and power has been below target. Domestic production of crude oil has continued to decline since 1989-90.

Productivity levels in coal need to be improved. Washing capacity is inadequate to meet demand. The private sector has been invited to put up captive coal washing capacity. Government has also decided to allow the private power-generating companies to develop captive coal mines.

The average plant load factor of the State Electricity Boards has been below expected levels. Transmission and distribution (T & D) losses continue to be high. The government has increased investment outlays in the power sector during the Eighth Plan and permitted private sector investment with the view to improve the demand-supply balance in the medium term.

There has been a decline in the production of crude oil despite rising domestic demand. To help the oil companies generate internal resources, the prices of petroleum products were increased by an average 18 per cent in September, 1992.

The decline in the relative share of railways in transport continues. Investment on a large scale is required for the acquisition of rolling stock capacity, gauge conversion and electrification of tracks. Port productivity in terms of ship turnaround time and average ship-berth-day output has improved; but labour and equipment productivity at ports are still low. Significant progress has been made in building an efficient fleet through acquisition of modern vessels and specialised fleet. The national and state highways network needs considerable investment for repair, reconstruction and expansion. The Government has drawn up a plan to involve the private sector in construction, maintenance and operation of fee-based facilities on national highways. In the civil aviation, Air India can further improve its performance by increasing its load factor. Domestic carriers, Indian Airlines and Vayudoot, need structural reforms in their organisations and operations to improve their financial performance. An open sky policy for cargo has been introduced to facilitate exports. The air taxi services have now become fully operational.

There has been an impressive growth in telephone connections. However, demand continues to outstrip the increase in direct exchange lines and expansion in switching capacity. Production of switching equipment has been opened to the private sector. A National Telecom Policy is expected to be announced shortly by the government to provide directions for future expansion and structural reforms in the sector.

Overall economic growth, especially growth of exports, is crucially dependent on improved performance of and adequate investment in key infrastructural sectors. Given the reduced access to budgetary support, this can be achieved through recourse to larger private sector investment and participation.

International competitiveness of Indian industry and the future success of India's export expansion strategy are critically dependent on adequate growth and efficient performance of the infrastructural sectors. Seen in this perspective, the performance of these sectors, which produce predominantly non-tradable goods and services in the economy, will determine the success of on-going structural reforms. Hence, policy attention is now increasingly focussed on performance of these core sectors and on measures required to improve their performance. Such a shift of focus to structural reforms in the energy, transport and communications sectors also represents a sequential follow-up to the measures undertaken so far to restore macro-economic balance in the economy and removing the distortions in trade, industrial and financial policies.

TABLE 8.1

Trends in the Performance of Infrastructure Sectors

							Change over previous year		
				April-December*					
	Unit	1989-90	1990-91	1991-92*	1991	1992	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9	10
								(per cent)	
Energy									
1 Coal									
(a) Production	Mn.tonnes	200.89	211.73	229.28	153.8	158.22	5.40	8.29	2.87
(b) Pit-head stocks(year-end)	,,	37.43	42.56	48.73	34.49	37.72	13.71	14.50	9.37
(c) Despatches	,,	191.93	201.07	218.85	158.34	166.36	4.76	8.84	5.07
2 Electricity generated (Utilities only)	Bn. kwh	245.4	264.3	286.7	211.47	221.28	7.70	8.48	4.64
(a) Hydel	,,	62.1	71.53	72.55	56.83	54.24	15.19	1.43	-4.56
(b) Thermal (incl.nuclear)	,,	183.3	192.7	214.15	154.64	167.04	5.13	11.13	8.02
3 Petroleum									
(a) Crude oil production	Mn.tonnes	34.09	33.02	30.34	22.92	20.44	-3.14	-8.12	-10.82
(b) Refinery throughput	,,	51.94	51.77	51.42	37.54	40.36	-0.33	-0.68	7.51
Transport and communications									
1 Railway revenue-earning goods traffic	,,	309.97	318.4	337.98	244.91	254.45	2.72	6.15	3.90
2 Cargo handled at major ports	,,	148.38	152.86	157.86	114.18	121.78	3.02	3.27	6.66
3 Telecommunications-new telephone connections provided (DELs)	'000Nos.	416.22	485.76	735.41	277.62	378.3	16.71	51.39	36.27

* Provisional.
@ April-December.

8.2 All these sectors are characterised by the dominant presence of public sector enterprises (PSEs). Many of these sectors have been the exclusive preserve of PSE activity. A number of these infrastructural sectors are in the nature of natural monopolies,for instance, railways, ports and airports, where the role of Government

regulation and direct intervention has traditionally been higher than in other sectors and has been justified on grounds of technical and allocative efficiency. Policy measures taken so far to restore fiscal balance have sought to impose a hard budget constraint on the operation of these PSEs and reduce their dependence on budgetary support. Even for future capacity expansion, sectors such as telecom are now expected to mobilise the required investment funds through internal resource generation or from the capital markets. The Eighth Plan also postulates a larger role of private sector investment for further capacity expansion in these sectors. Any discussion of the performance of and prospects for these sectors, will therefore need to pay special attention to the two issues of efficiency in operation of PSEs and modalities for private sector participation in these sectors.

Coal

8.3 Coal production increased by 2.9 per cent during April-December 1992 over the corresponding period in 1991. The output of 158.22 million tonnes reached by December 1992 was, however, three per cent below target. The shortfall was due almost entirely to a 12.7 per cent slippage in output of Singareni Collieries Company Limited (SCCL) owing to disturbed law-and-order condition (Table 8.2).

TABLE 8.2

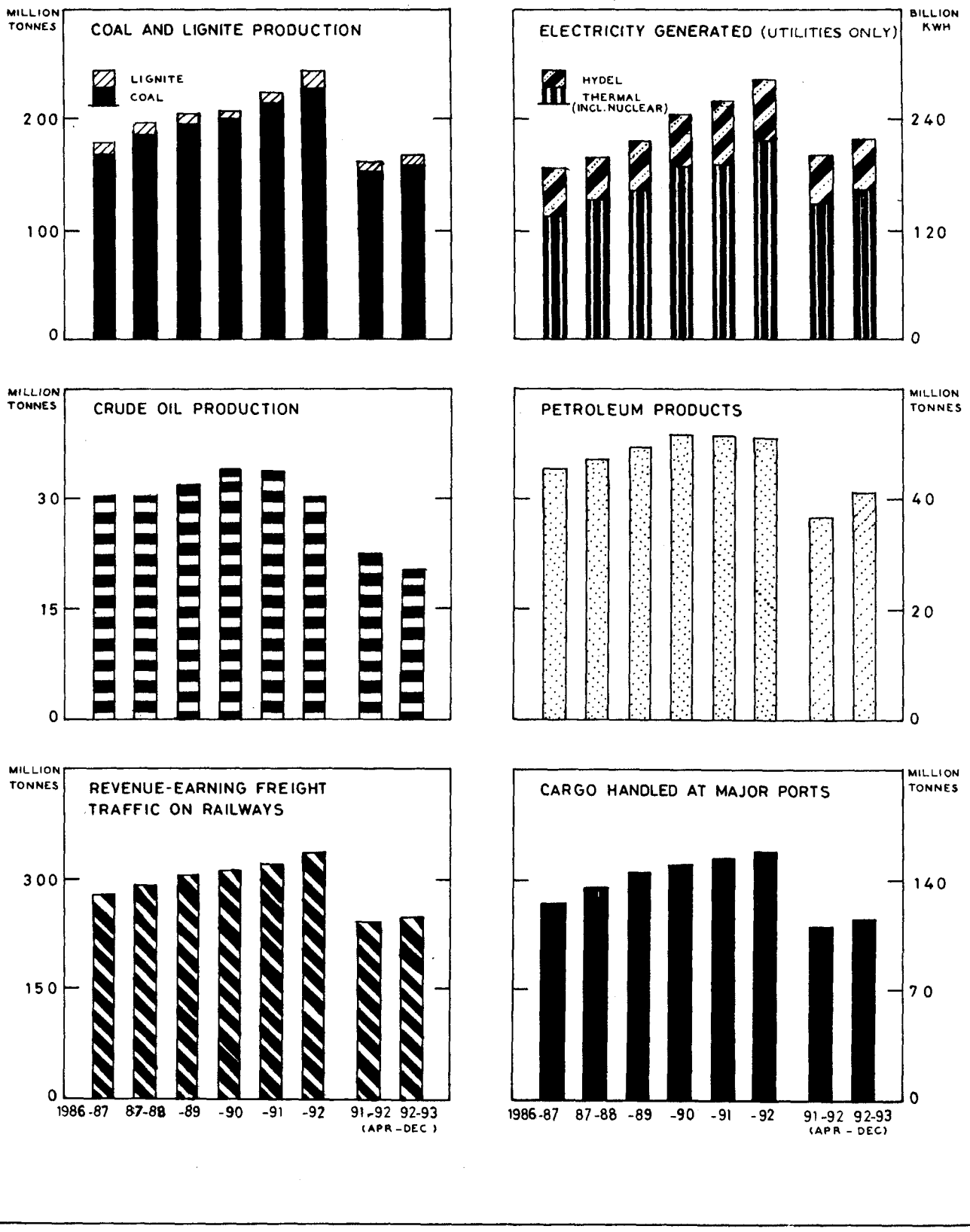
Trends in the Coal Sector

				April-December*		Change over previous year		
	1989-90	1990-91	1991-92*	1991	1992	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
		(Million tonnes)				(per cent)		
1 Production								
(i) CIL								
(a) Opencast	119.92	133.80	147.52	95.78	99.49	11.57	10.25	3.87
(b) Underground	58.70	55.84	56.62	40.28	40.44	-4.87	1.40	0.40
(ii) SCCL								
(a) Opencast	5.77	6.59	8.28	5.10	5.34	14.21	25.64	4.71
(b) Underground	12.03	11.12	12.30	9.24	9.54	-7.56	10.61	3.25
(iii) Others								
(a) Opencast	-	-	-	-	-	-	-	-
(b) Underground	4.47	4.38	4.56	3.40	3.41	-2.01	4.11	0.29
Total	200.89	211.73	229.28	153.80	158.22	5.40	8.29	2.87
2 Production (By coal grades)								
(a) Coking coal	44.43	45.30	46.28	30.07	29.87	1.96	2.16	-0.67
(b) Non-coking coal	156.46	166.43	183.00	123.73	128.35	6.37	9.96	3.73
(c) Washed coal	11.12	11.19	12.88	8.67	8.78	0.63	15.10	1.27
(d) Middlings	4.61	4.40	4.94	3.44	3.66	-4.56	12.27	6.40
3 Pithead stocks (year-end)	37.43	42.56	48.73	34.49	37.72	13.71	14.50	9.37
4 Despatches	191.93	201.07	218.85	158.34	166.36	4.76	8.84	5.07
5 Lignite production $	12.60	11.76	12.50	9.01	9.28	-6.67	6.29	3.00
6 Output per man-shift (OMS)								
(i) CIL	1.21	1.31	1.40	1.26	1.33	8.26	6.87	5.56
(ii) SCCL	0.99	0.96	0.98	0.91	0.94	-3.03	2.08	3.30

* Provisional.
@ April-December.
$ By NLC only.

Figure 8.1

PERFORMANCE OF INFRASTRUCTURE SECTORS



8.4 Raw coking coal production during April-December 1992 at 29.87 million tonnes was marginally less than the output over the previous year. Output of washed coal which was 12.9 million tonnes in 1991-92 reached 8.78 million tonnes in April-December 1992, a 1.3 per cent increase over the previous year. Given the high ash content of Indian coking coal, a more rapid increase in coal beneficiation capacity is required to meet domestic demand and to keep imports in check. Coking coal imports reached a level of 6.08 million tonnes in 1991-92. Investment in modernisation of existing washing capacity and in overall capacity expansion will therefore represent efficient import substitution for the iron and steel sector. Some measures have already been initiated. These include modernisation of existing washeries, augmentation of power supply through direct feeders from Damodar Valley Corporation (DVC), and installation of captive power generating units in Bharat Coking Coal Limited (BCCL).

TABLE 8.3

Productivity in the Coal Sector (in terms of OMS)

Company	1990-91			1991-92*			April-December 1992*		
	Under-ground	Open-cast	Total	Under-ground	Open-cast	Total	Under-ground	Open-cast	Total
1	2	3	4	5	6	7	8	9	10
	(Million tonnes)								
1 Eastern coalfields Ltd.	0.42	1.57	0.61	0.44	1.56	0.62	0.42	1.21	0.52
2 Bharat Coking Coal Ltd.	0.46	1.91	0.79	0.43	2.14	0.78	0.43	2.04	0.76
3 Central Coalfields Ltd.	0.44	1.97	1.31	0.47	2.27	1.47	0.45	2.16	1.36
4 Northern Coalfields Ltd.	-	8.8	8.8	-	8.03	8.03	-	6.88	6.88
5 Western Coalfields Ltd.	0.67	3.31	1.24	0.63	3.43	1.30	0.64	3.17	1.23
6 South Eastern Coalfields Ltd.	0.79	7.58	2.24	0.79	7.94	2.45	0.79	6.83	2.01
7 North Eastern Collieries	0.4	1.78	0.65	0.44	3.12	0.92	0.45	2.87	0.89
8 Coal India limited	0.54	3.33	1.31	0.53	3.70	1.40	0.52	3.56	1.33
9 Singareni Collieries Company Limited (SCCL)	0.65	4.76	0.96	0.67	4.46	0.98	0.66	4.10	0.94
	Percentage change over the corresponding period of the previous year								
1 Eastern coalfields Ltd.	-2.33	3.29	0.00	4.76	-0.64	1.64	0.00	12.04	0.00
2 Bharat Coking Coal Ltd.	-4.17	0.00	3.95	-6.52	12.04	-1.27	2.38	7.37	10.14
3 Central Coalfields Ltd.	-2.22	8.84	9.17	6.82	15.23	12.21	4.65	113.86	6.25
4 Northern Coalfields Ltd.	-	0.80	0.80	-	8.75	-8.75	-	-10.88	-10.88
5 Western Coalfields Ltd.	-4.29	-13.80	-5.34	-5.97	3.63	4.84	6.67	13.62	4.24
6 South Eastern Coalfields Ltd.	0.00	19.94	12.56	0.00	4.75	9.38	3.95	-8.20	-12.23
7 North Eastern Collieries	-2.44	-25.52	-17.72	10.00	75.28	41.54	4.65	15.73	12.66
8 Coal India limited	-1.82	8.12	8.26	-1.85	11.11	6.87	1.96	6.27	5.56
9 Singareni Collieries Company Limited (SCCL)	-8.45	-12.82	-3.03	3.08	-6.30	2.08	1.54	0.00	3.30

* Provisional.

8.5 Non-coking coal output in 1991-92 was 183 million tonnes. The pressure to raise output levels at a rapid rate as also the relatively simpler production methods in open cast (OC) mines have contributed to a marked shift in favour of open cast mining, Coal production from OC mines is generally of poorer grades and fit only for thermal power generation. Expansion in OC output thus also reflects the increasing importance of the power sector as a coal user.

8.6 In spite of increasing mechanisation both in OC mines and Under Ground (UG) operations, the coal industry employs a massive work force of nearly 700000 employees. OC mines which today produce 70 per cent of the total output in CIL, employ only 20 per

cent of its total manpower. The remaining 80 per cent are deployed in UG mines which contribute about 30 per cent of CIL's output. Overall output per man shift (OMS) of the CIL was 0.77 tonnes in 1981-82 and increased to 1.40 tonnes in 1991-92 (Table 8.3). Planning Commission has fixed an OMS target of 0.66 tonnes for the UG mines of CIL and 4.32 tonnes for the OC mines, to be achieved by 1996-97. Improvement in productivity levels which can be achieved through better utilisation of existing stock of machines and equipment both in OC and UG mines, will contribute greatly to minimising cost increases in the sector. A degree of flexibility in manpower deployment and in rationalising the work force may also be necessary for the industry to be able to achieve its productivity targets.

8.7 Total despatches of coal during April-December 1992 stood at 166.36 million tonnes, 5.1 per cent higher than output in the same period of last year. Despite higher despatches, total pit-head stocks of coal increased to 37.72 million tonnes at the end of December 1992 from 34.49 million tonnes a year earlier. These levels are far above the optimal stock levels which would be equal to one month's production (about 20 million tonnes). Pithead stocks not only add to the cost of production but also pose a serious danger of fire as Indian coal is prone to auto-combustion when exposed. Faster loading and wagon movement can eliminate excess pit-head stocks. However, during 1991-92, 15568 wagons per day (wpd) were loaded and dispatched as against a target of 16487 wpd.

8.8 Production of lignite in Neyveli Lignite Corporation (NLC) was 12.5 million tonnes in 1991-92 and 9.28 million tonnes during April-December 1992 against the target of 9.55 million tonnes. NLC has extended its activities to Rajasthan where it is implementing a Rs.828 crore mine-cum-power project in Barsingsar of Bikaner district.

8.9 Sector-wise offtake of raw coal in 1990-91, 1991-92 and the first half of 1992-93 is given in Table 8.4. The anomalous position of rising pit-head stocks on the one hand and supply shortages of superior grades of non-coking coal in some parts of the country on the other has to be rectified. Quality improvement in non-coking coal supplies through manual or mechanical deshaling as well as washing is part of the solution to this problem. This will, however, require investment in washing capacity and price revision. A more efficiently working market for non-coking coal can help take care of these distributional problems. Such a market could be established by permitting private companies to stock coal and eliminating the present system of Government- sponsored permits for different categories of coal consumers. This has created a complex system of paper trading and prevented a rationalisation of coal distribution system.

8.10 Public sector coal producing companies have received declining budgetary support in the last two years. They have had to rely increasingly on internally generated resources for financing their investment. CIL has also suffered from heavy outstanding dues which had touched the level of Rs.2145 crore as on 1 August 1991. Consequently, it came out with the cash-and-carry scheme from 1 October 1991. Coal is now supplied to State Electricity Boards (SEBs) and other power utilities only against advance payments to CIL. The scheme is expected to improve the financial position of CIL and reduce the number of disputes between coal companies and power utilities.

8.11 The Government has allowed private power-generating companies to own and develop captive coal mines. This will augment capacity and ensure reliability both on account of quality and delivery schedules. The necessary amendment to the Coal (Nationalisation) Act, 1973 is expected to be enacted by Parliament. It was pointed out earlier that both non-coking and coking coal reserves in India are characterised by high ash content. This necessitates their beneficiation at the pit-head so as to reduce the load on transport and improve boiler and blast furnace efficiency. Washing capacity, both for coking and non-coking coal, has therefore to be expanded at a rapid rate. Given the constraint on Government investment outlays, the private sector has been invited to put up washing capacity for captive needs.

TABLE 8.4

Sectorwise Offtake of Raw Coal

Sector			April-December*		Change over previous year	
	1990-91	1991-92*	1991	1992	1991-92	1992-93@
1	2	3	4	5	6	7
		(Million tonnes)			(per cent)	
1 Power(including midlings)	118.79	136.90	98.84	106.47	15.25	7.72
2 Steel	30.05	31.65	18.81	18.59	5.32	-1.17
3 Cement	9.74	9.97	7.39	8.05	2.36	8.93
4 Others	53.56	50.41	38.36	37.79	-5.88	-1.49
Total	212.14	228.93	163.40	170.90	7.91	4.59

* Provisional
@ April-December

8.12 Emphasis in the coal sector has now to shift from simply meeting physical production targets to producing consistently higher quality coal and minimising the buildup of pit-head stocks. The need to generate larger investment funds will also put a premium on achieving higher productivity and profits. The public-sector coal companies are taking the required steps in this direction.

Power

8.13 In 1991-92, total power generation at 286.7 billion kWh increased by 8.5 per cent over 1990-91 (Table 8.5). While thermal and hydro generation went up by 11.8 per cent and 1.4 per cent respectively; nuclear generation declined by 9.7 per cent.

TABLE 8.5

Trends in the Power Sector (utilities only)

				April-December*		Change over previous year		
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
		(Billion KWH)					(per cent)	
1 Power generation	245.10	264.20	286.70	211.47	221.28	7.79	8.52	4.64
(i) Hydro-electric	62.00	71.50	72.50	56.83	54.25	15.32	1.40	-4.55
(ii) Thermal	178.50	186.50	208.60	150.67	162.26	4.48	11.85	7.69
(iii) Nuclear	4.60	6.20	5.60	3.98	4.78	34.78	-9.68	20.15
			(per cent)					
2 Plant load factor of thermal plants	56.50	53.80	55.30	53.40	54.80	-	-	-

* Provisional.
@ April-December.

8.14 Total generation of power in April-December, 1992 was 221.28 billion kWh compared to 211.47 billion kWh during the same period last year, showing a growth of 4.6

per cent. Thermal generation went up by 7.7 per cent and nuclear power by 20.2 per cent. However, hydel generation at 54.25 billion kwh was lower by 4.5 per cent. This shortfall may be made up during the remaining months as the monsoon has been bountiful in the southern region where the shortfall was concentrated.

8.15 The PLF provides a powerful indicator of operational efficiency in conditions of excess demand. As Table 8.6 reveals, the PLF in 1991-92 in central sector was appreciably higher than achieved by the SEBs. The overall PLF of 55.3 per cent in thermal plants achieved in 1991-92 can be substantially improved because, under the same conditions, the central sector and private thermal plants achieved PLF of 64.7 per cent and 56.7 per cent respectively. Every one per cent improvement in PLF makes available an additional 500 MW of power. Improvement in the PLF will increase power availability as well as generate greater financial resources for the SEBs.

TABLE 8.6

Plant Load Factors : Achievements during 1990-91, 1991-92 and April-December, 1992

(per cent)

Board/Undertaking/ Sector	Plant load factor			
	1990-91	1991-92	April-December 1992	
	Actual	Actual	Target	Actual
1	2	3	4	5
PLF above 50%				
1 West Bengal Power Development Corporation	57.30	61.40	61.50	58.70
2 Rajasthan State Electricity Board	42.80	52.60	67.00	72.80
3 Maharashtra State Electricity Board	58.20	61.30	56.20	58.30
4 Andhra Pradesh State Electricity Board	65.80	62.10	64.00	60.30
5 Gujarat State Electricity Board	57.70	57.00	58.10	59.60
6 Punjab State Electricity Board	53.00	52.80	60.60	58.20
7 Delhi Electric Supply Undertaking	50.90	57.20	53.40	53.80
8 Tamil Nadu State Electricity Board	58.30	55.70	58.80	62.20
PLF 40% to 50%				
1 Madhya Pradesh State Electricity Board	52.70	49.20	53.70	48.80
2 Uttar Pradesh State Electricity Board	52.10	44.30	47.00	48.60
3 Haryana State Electricity Board	34.60	45.80	48.20	48.90
4 Karnataka Power Corporation	76.30	59.10	59.90	45.40
PLF below 40%				
1 West Bengal State Electricity Board	30.90	30.80	35.80	28.70
2 Orissa State Electricity Board	34.00	30.00	31.80	31.70
3 Assam State Electricity Board	27.70	24.60	33.70	23.50
4 Durgapur Projects Ltd.	24.50	17.80	25.80	25.30
5 Bihar State Electricity Board	24.00	21.30	33.20	24.00
PLF of Central Sector (Total)	58.10	64.70	61.60	59.50
PLF of individual units:				
1 Neyveli Lignite Corporation	69.60	66.30	57.30	54.60
2 National Thermal Power Corporation	60.90	69.20	66.20	65.20
3 Damodar Valley Corporation	33.30	33.60	38.00	30.10
PLF of private utilities	58.40	56.70	53.00	60.10

8.16 During April-December 1992, the gap between requirement and availability of power was 8.5 per cent compared to 7.7 per cent in the corresponding period of last year. Majority of the deficit States have a PLF of less than 50 per cent. Thus, better utilisation of existing capacity can greatly mitigate the prevailing shortage conditions. The country is facing a peaking shortage of about 20 per cent which is likely to persist in the medium term. In a regime of shortages, proper grid management becomes vital. There is an urgent need for agreement among the constituent members of each region for observing grid discipline while managing the load in their respective systems to facilitate integrated operation of the regional power systems. This can be achieved through financial incentives including a two-part or a time-of-day tariff system. Appropriate price policy can also play an important role in levelling off peak demand.

8.17 During 1991-92, total capacity of 3027 MW was installed as against a target of 3811 MW (Table 8.7). Thermal capacity has increased in 1980-81 to 1990-91 by 10.7 per cent per annum whereas hydroelectric capacity has shown a trend growth rate of 5.3 per cent per annum. The decline in the share of hydel capacity has to be reversed so that an optimal capacity mix of 40 per cent hydel in total power generation may be achieved. During April-December 1992, 1500 MW of additional thermal and 228 MW of hydel capacity was commissioned. This was much below target.

TABLE 8.7

Addition to Generating Capacity

(MW)

Sector	1990-91		1991-92		April-December 1992	
	Target	Actual	Target	Actual	Target	Actual
1	2	3	4	5	6	7
Thermal	2971	2331	2587	2371	2103	1500
Hydro	1007	446	754	436	252	228
Nuclear	235	nil	470	220	220	220
Total	4212	2777	3811	3027	2575	1948

8.18 If the existing rate of capacity utilization in the power sector is maintained, the installed capacity requirement in 1996-97 to achieve Central Electricity Authority's (CEA) projected supply availability of 81.6 per cent for peak demand works out to nearly 104235 MW. This implies that additional capacity of 35153 MW would need to be added during the Eighth Plan unless PLF and capacity utilization levels are improved.

8.19 The Eighth Plan document envisages a total addition of 30538 MW of additional capacity. The Central sector is expected to add 12859 MW of new capacity which will bring its share to 32 per cent in the total installed capacity by 1996-97. In the State sector an addition of 17680 MW is planned. This includes a capacity addition of 2810 MW in private projects. The Eighth Plan document indicates that another 3000 MW of additional capacity in the private sector may materialise over and above the 2810 MW already approved in the private sector.

8.20 The State sector will need to generate large volumes of internal resources so as to meet its capacity expansion targets. The present experience of internal resource generation by SEBs is dismal; they made losses of Rs.1724 crore in 1990-91, and Rs.1683 crore in 1991-92 and are expected to lose Rs.2230 crore in 1992-93. In 1991-92, only Andhra Pradesh, Karnataka, Kerala, Maharashtra and Tamil Nadu State Electricity Boards generated surpluses. The SEBs, which are expected to earn a rate of return of a minimum of three per cent on net fixed assets, actually made losses of 14.2 per cent on net fixed assets during 1991-92. Only three out of 18 SEBs achieved the stipulated rate of return. On 31 October 1992, the SEBs owed Rs.2693 crore to the Central power corporations.

8.21 The poor financial performance of the SEBs has led to reduced access to market borrowings and inability to utilize multilateral and bilateral assistance. Only 26 per cent of the total commitments by the World Bank for State sector power projects have been utilized. The problem can be resolved with some effort at better project management and an improvement in the tariff structure for power supplied by SEBs.

8.22 The average price of power charged by various SEBs in 1992 was 86 paise per unit, about 50 per cent of the long-run marginal cost. The agricultural sector alone accounted for a loss of about Rs.5181 crore in 1991-92 and Rs.5889 crore in 1992-93; the average tariff realisation from agriculture was only 17 paise per unit. The domestic consumer sector is also highly subsidised; the supply of power to this sector resulted in an estimated loss of Rs.1223 crore in 1991-92 and Rs.1565 crore in 1992-93 (Table 8.8). Apart from the extensive cross-subsidies involved in the prevailing power tariff structures, the SEBs have continued to suffer from high transmission and distribution (T&D) losses. These T & D losses have remained above 20 per cent while the international average is less than 10 per cent. Underinvestment in transmission systems and inability to replace these systems is the major cause for such high T&D losses, but inadequate billing and pilferage of power are not insignificant.

TABLE 8.8

Cross-subsidies in the State Power Sector

(Rs.crore)

Year	Agriculture	Domestic	Others	Total
1	2	3	4	5
1990-91	-2801	-1056	2133	-1724
1991-92	-5181	-1223	4721	-1683
1992-93*	-5889	-1565	5224	-2230

* Anticipated.

8.23 Restoration of the financial health of SEBs and improvement in their operational performance are the most critical issues today in the power sector. A minimum three per cent return on net fixed assets with a minimum agricultural tariff of 50 paise per unit may provide a working framework for fixing tariffs and achieving the necessary improvement in financial performance. This will involve an overhaul of the existing tariff structure and substantial reduction in cross-subsidies. This step will generate internal resources of Rs.5000 crore and encourage consumers to conserve energy. On the operational side, SEBs need to improve their PLF and bring down T&D losses.

8.24 It is important to attract domestic and foreign private investment to overcome the resource constraint in this sector. Such investment in the power sector will substantially improve the overall risk perception of the Indian economy in the investing community in India and abroad. The Government has already revised the electricity statutes to permit private generating companies to be established. A package of incentives for private investors, both Indian and overseas, has also been announced. This includes a guaranteed rate of return of 16 per cent and the permission for private generating companies to own captive coal mines. An additional capacity of more than 2800 MW is expected to be put up in the private sector. So far, new proposals for capacity addition by private enterprises of 14082 MW with a total investment of more than Rs.35000 crore have been received. However, no proposal has so far fructified. Given the normal gestation period for power projects, additional capacity in the private sector may not come on line within the Eighth Plan period unless urgent action is taken now. Absence of legally enforceable fuel linkages, lack of access to the final market for electricity, the poor finances of the SEBs, their poor record in settling debts and hence poor credibility as buyers of power - these are

the major obstacles to the attraction of private investment into power sector. The mechanism of escrow accounts into which SEB earnings would flow and on which private power suppliers would have the first claim may reduce the disincentive; but nothing would work better than the restructuring of tariffs to make the SEBs financially viable.

8.25 It is crucial that the power supply position is improved substantially if the economy has to grow at the rate of 5.6 per cent per annum as envisaged in the Eighth Plan. The 14th Electric Power Survey predicts that peak demand will grow at 8-9 per cent per annum and that energy demand will more than double during the Plan period. Urgent initiatives are therefore required to address the structural issues in this sector.

Petroleum, Oil and Lubricants

8.26 Crude oil production during 1991-92 was 30.34 million tonnes, 4.6 per cent below target and 12.4 per cent lower than the peak of 34.09 million tonnes achieved in 1989-90. Oil and Natural Gas Commission's (ONGC) off-shore structures contributed 62 per cent of the total. Oil India Limited's (OIL) on-shore output accounted for eight per cent.

8.27 Targetted crude production during 1992-93 is 28.46 million tonnes, 6.6 per cent lower than 1991-92 output. This decline is evident in the output of April-December 1992 which at 20.44 million tonnes was 10.8 per cent below the previous year's level (Table 8.9). Consequently, domestic production, which accounted for 70 per cent of total consumption in 1984-85, saw its share decline to 56 per cent in 1990-91 and further to 50 per cent in 1991-92. It will go down further during 1992-93 and put pressure on the balance of payments.

TABLE 8.9

Trends in the Petroleum Sector

				April-December*		Change over previous year		
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
		(Million tonnes)					(per cent)	
1 Crude oil production	34.09	33.02	30.34	22.92	20.44	-3.14	-8.12	-10.82
(i) Onshore	12.37	11.83	11.38	8.57	8.44	-4.37	-3.80	-1.52
(a) ONGC	9.67	9.18	8.85	6.63	6.55	-5.07	-3.59	-1.21
(b) OIL	2.7	2.65	2.53	1.94	1.89	-1.85	-4.53	-2.58
(ii) Offshore	21.72	21.19	18.96	14.35	12	-2.44	-10.52	-16.38
2 Refinery through put	51.94	51.77	51.42	37.54	40.36	-0.33	-0.68	7.51
3 Production of petroleum products	48.69	48.56	48.35	35.17	37.71	-0.27	-0.43	7.22
		(Billion cubic meters)						
4 Naural gas production	16.98	18.00	18.65	13.87	13.61	6.01	3.61	-1.87

* Provisional.
@ April-December.

8.28 The decline in crude oil production is not due to inadequacy of reserves. The reserve base is comfortable at a reserve/production ratio (R/P ratio) of 26:1. The onshore

and offshore R/P ratios for the country are 26.2:1 and 25.9:1 respectively. This compares favourably with R/P ratios of 18.3:1 for Asia and Australia; 10.1:1 for the USA; 9.0:1 for Western Europe, and 24.5:1 for Africa. The immediate reasons for the decline in output are major technical constraints such as a high gas-to-oil ratio (GOR) in the wells of Bombay High; high water cut in North Gujarat fields; and inadequate water injection in the Gandhar fields of South Gujarat. There are also structural causes for the declining trend in crude oil production, namely: (i) over-exploitation of some major offshore structures, specially in the Bombay High fields; (ii) underinvestment in exploration and slowdown of drilling operations on account of resource constraints faced by the public sector oil-producing companies; (iii) non-generation of investible surpluses by oil-producing companies and (iv) continuation of disturbed conditions in oil-producing areas in the North-East, which also hampered refinery production. While some of the more contingent and technical constraints may be overcome through efficient corporate management, the structural issues have to be addressed through policy measures. By opening this sector to domestic and foreign private investment and relaxing the administrative controls on petroleum prices, the first set of policy measures which address these issues has been taken during the current year.

8.29 An important step in this respect was taken on 16 September 1992 when an average price increase of 18 per cent on petroleum products was announced. The price of kerosene used in households was left unchanged. It has enabled the Government to pay more remunerative prices to oil-producing companies, ONGC and OIL. The base price for indigenous crude was revised simultaneously from Rs.968/M.T. to Rs.1506/M.T. This will help the oil companies to generate internal resources for investment. The price increase would be adequate to cover the deficit in the Oil Pool Account.

8.30 The total refinery crude throughput of 51.42 million tonnes during 1991-92 was a little below the level of last year. The shortfall was a result of lower domestic crude availability and import compression. The target set for 1992-93 is 52.23 million tonnes. The refinery throughput of 40.36 million tonnes in April-December 1992 is 2.4 per cent higher than target. Capacity utilization of the refineries during the current year so far has been 103.3 per cent. The capacity of refinery crude throughput has been more or less unchanged since 1989-90.

8.31 Refinery production of petroleum products during 1991-92 was 48.35 million tonnes, a little less than the level reached during the previous two years. During April-December 1992, a production level of 37.71 million tonnes was achieved, an increase of 7.2 per cent over the previous year.

8.32 Under the liberalised industrial policy framework, setting up of new refineries is now allowed in both the private and the joint sectors. Joint sector refineries with a capacity of six million tonnes each are planned to be set up in the eastern, central and western regions of the country. Letters of Intent have been issued to the leading companies in the country to establish refineries in collaboration with renowned foreign companies. These ventures envisage creation of additional refinery capacity of over 40 million tonnes in the country, which may come on stream after 3-4 years. The projections for petroleum product output therefore envisage significant increases only after 1994-95.

8.33 The decline in the production of crude oil in the face of rising domestic demand has necessitated increasing dependence on imports of crude oil. Imports of crude oil and petroleum products increased from 21.88 million tonnes in 1987-88 to 33.44 million tonnes in 1991-92, an annual average compound growth rate of 11.2 per cent. During April-December 1992, imports reached 29.75 million tonnes as against 23.35 million tonnes during the same period last year. During 1991-92, the value of imports of crude and petroleum products was Rs.13038 crore as against Rs.10779 crore during 1990-91. During April-December 1992, Rs.11963 crore of imports were made as against Rs.9259 crore during the same period last year. The downward adjustment in the external value of the Rupee has increased the cost of oil imports. US $ 5.1 billion was allocated in the

current year for oil imports at the official exchange rate. This allocation has been exhausted, and an estimated US $ 1 billion's worth of oil and POL is likely to imported at the market rate, adding further to their cost. The pressure on country's BOP position exerted by POL imports has to be lowered. This can be done by taking steps to raise domestic crude production, expand refinery capacity and pay greater attention to energy conservation.

8.34 The consumption of petroleum products grew at an annual average compound rate of around 6.5 per cent in the 1980s. During 1991-92, the consumption of petroleum products stood at 56.84 million tonnes, indicating an increase of 3.3 per cent over 1990-91. The growth in the consumption of middle distillates comprising mostly of kerosene and High Speed Diesel (HSD) in the 1980s was around eight per cent and that of Liquid Petroleum Gas (LPG) in the light distillate category was 21 per cent. The growth of consumption of these commodities in the last two years was subdued.

8.35 After a relatively low rise in 1991-92, consumption of petroleum products during April-December 1992 rose by 4.3 per cent over the same period last year. The rate of growth was highest in the case of LPG (9.9 per cent) and HSD (9.7 per cent) (Table 8.10). Thus this year is likely to witness a significant acceleration in the growth of demand.

TABLE 8.10

Consumption of Petroleum Products**

				April-December*		Change over previous year		
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
	(Million tonnes)					(per cent)		
1 Light distillates	9.41	9.8	10.13	7.47	7.65	4.14	3.37	2.41
(a) Naphtha	3.35	3.45	3.43	2.53	2.48	2.99	-0.58	-1.98
(b) LPG	2.27	2.42	2.65	1.91	2.1	6.61	9.50	9.95
(c) Petrol	3.49	3.55	3.57	2.69	2.7	1.72	0.56	0.37
2 Middle distillates	32.48	33.11	34.35	25.17	26.74	1.94	3.75	6.24
(a) Kerosene	8.24	8.42	8.35	6.19	6.29	2.18	-0.83	1.62
(b) Diesel oil	20.71	21.14	22.68	16.49	18.09	2.08	7.28	9.70
3 Heavy ends	12.2	12.13	12.36	9.08	9.13	-0.57	1.90	0.55
(a) Fuel oil	8.82	8.99	9.13	6.82	6.86	1.93	1.56	0.59
Total	54.09	55.04	56.84	41.72	43.52	1.76	3.27	4.31

* Provisional.
@ April-December.
** Excluding Refinery Boiler Fuel (RBF).

8.36 While the household sector consumes around 80 per cent of LPG, the transport sector consumes around 90 per cent of HSD. The other products are, by and large, consumed by industry. Since the household and infrastructure sectors are still deficient in energy consumption and per capita energy consumption levels are low, there is every likelihood that demand for these petroleum products would continue to increase rapidly. Unless domestic production of crude and petroleum products increases faster, an increasing amount of imports of these commodities will be required to meet the demand.

Natural Gas

8.37 The output of natural gas grew at 24 per cent a year in the 1980s. However, it was 18.7 billion cubic metres in 1991-92, only 3.6 per cent higher than in the previous year. It was 13.61 billion cubic metres in April-December 1992, a shortfall of 1.9 per cent over the same period last year. This indicates a considerable slowdown in the production of natural gas in the face of the excess demand for gas as a source of energy and chemical feedstock. The utilisation of natural gas during April-December 1992 was 89 per cent of total production during the period.

8.38 Flaring of natural gas has come down from 11 million cubic metres per day in 1991-92 to about seven million cubic metres per day currently. For an energy-deficit economy, this still represents an unacceptable waste of nation's natural resources. The flaring takes place mostly in Bombay High fields and results from inability to maintain the required reservoir pressures. It is expected that ONGC's Gas Flaring Reduction Project will be brought back on schedule and will effectively minimise the flaring in the coming years. A Gas Linkages Committee has been constituted to monitor the gas linkages between upstream and downstream projects. The private sector has been invited to participate in the bids for exploration of oil and gas and to develop discovered small and medium fields.

Conservation

8.39 Conservation of POL products is important to improve energy supply conditions and minimise the undue strain on balance of payments position of country. Conservation of hydrocarbon fuels is economical in terms of investment, shorter in term of gestation periods, quicker in terms of flow of results, and environmentally more desirable than production. Energy conservation is perhaps one of the most important components in any strategy for sustainable development.

8.40 The major planks of oil conservation strategy are: (i) increase in the oil use efficiency of the equipment, vehicles and appliances through improvisation, retrofitting and switch-over to more energy-efficient technologies: (ii) increase in the efficiency of use of petroleum products through better house-keeping, maintainance practices and improved operational arrangements; and (iii) promotion of optimal and viable inter-fuel substitution, particularly by renewable forms of energy.

8.41 An optimal consumption pattern for energy and promotion of conservation require optimisation of relative fuel prices to reflect actual costs. This essential condition for conservation can be further supplemented by consumer education .pa and awareness programmes. These are promoted by the Petroleum Conservation Research Association (PCRA).

8.42 An improvement in energy balances in a number of industries such as refining, steel making, cement manufacture and aluminium smelting can contribute significantly to energy conservation. Refineries are reported to have achieved fuel savings of Rs.700 crore in the Seventh Plan and Rs.130 crore in 1991-92. A regular system of energy audits of different industries and implementing their recommendations in a time bound manner can contribute significantly in this regard.

Renewable Sources of Energy

8.43 Major programmes launched for the development and utilisation of new and renewable sources of energy include programmes for development of biogas, solar photovoltaic, wind power and micro-hydel. Over 15.75 lakh biogas plants had been set up in the country till end of March 1992 under the National Project on Biogas Development. An estimated biogas generation capacity equivalent to over 49.1 lakh tonnes of fuelwood per year valued at Rs.245.5 crore and 236.3 lakh tonnes of manure a year has been created.

The target for 1992-93 is fixed at 1.35 lakh plants of which 82800 were installed during April-December 1992. There is a need to reduce the overall cost of biogas plants and improve their efficiency through R & D.

8.44 Under the Eighth Plan, R & D would be intensified to improve the efficiency of woodstoves. So far 125.26 lakh fuel-efficient and smokeless chullahs have been set up. There is a need to diversify the feedstock to include non-woody biomass and crop residues in place of firewood. The aggregate capacity of solar photovoltaic systems installed in the country for various applications is about four MW. Over 8360 villages and hamlets have been provided with solar photovoltaic lighting systems till March 1992 and over 63 village-level solar photovoltaic power plants have been installed. A programme for the development of amorphous silicon solar cell technology has been taken up and a pilot plant in Haryana was inaugurated in September 1992. The programme for solar thermal extension and solar cookers has also made substantial progress.

8.45 Till the end of March 1992, over 142 million units of electricity have been fed to the respective State grids since the commencement of the Wind Farm Programme in 1986. A capacity of 3.3 MW has been developed. A programme for installing 100 Stirling engines with 7.8 MW capacity is undergoing. The programme faces operation and maintenance problems primarily because the equipment is almost completely imported. Under the Mini-Micro/Small Hydro programme, 125 projects of up to three MW capacity of an aggregate capacity of 86 MW have been installed by end-March, 1992. Under the demonstration programme of Alternative Fuels for Surface Transportation, 25 buses of the Delhi Transport Corporation have been run with ethanol induction for over 20 lakh kilometres till the end of March 1992. They achieved approximately 14 per cent diesel replacement and 33 per cent visible smoke reduction. Battery-operated mini-buses for group transportation have also been successfully demostrated at Delhi. These programmes are being extended to other cities. The Indian Renewable Energy Development Agency Ltd.(IREDA) set up in March, 1987 is a nodal agency in this area. By the end of August 1992, it had sanctioned 201 projects for about Rs.74.79 crore for installation of new and renewable sources of energy (NRSE) systems and for manufacturing the required equipment and devices. IREDA provides soft-term loans and fiscal incentives to users and manufacturers of NRSE systems.

8.46 Efforts are being made to involve the private sector participation in non-conventional power generation. Some of the State governments have taken a policy decision to allow generation of power from renewable sources and its distribution to nearby utilities by private promoters. Some governments are actively considering purchase of power generated from such sources by private promoters. Given the high fixed costs of these projects, which have negligible recurring costs, initial financial assistance would required. IREDA has this as one of its major objectives and is thus helping to commercialise these technologies.

8.47 One of the important means to encourage the growth and expansion of non-conventional and renewable sources of energy is to eliminate the existing subsidies in the use of conventionally generated energy. Unless the fuel costs of consuming hydrocarbon or fossil-fuel-based energy are recovered from the users, the financial motivation to shift to NRSE systems will be weak. Thus eliminating subsidies in energy consumption is justified on more than one count.

Railways

8.48 The length of the railway network during 1991-92 was 62571 route kilometers. The electrified network increased at an average annual rate six per cent in the 1980s, and by eight per cent in 1991-92. The electrified network in 1991-92 was 10809 route kilometers.

TABLE 8.11

Performance of the Railways

				April-December*		Change over previous year	
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
							(per cent)	
1 Total revenue-earning freight traffic (million tonnes)	309.97	318.40	337.98	244.91	254.45	2.72	6.15	3.90
(i) Coal	130.15	135.16	146.43	106.56	113.82	3.85	8.34	6.80
(ii) Raw materials for steel plants (excl.coal)	27.43	25.90	29.56	20.93	24.44	-5.58	14.13	16.77
(iii) Pig iron & finished steel from steel-plants	10.15	10.01	11.44	7.96	8.80	-1.38	14.29	10.55
(iv) Iron ore for export	14.76	13.14	12.76	9.52	7.99	-10.98	-2.89	-16.07
(v) Cement	27.45	28.78	30.51	21.51	21.66	4.85	6.01	0.70
(vi) Foodgrains	23.66	25.35	27.38	19.39	19.16	7.14	8.01	-1.19
(vii) Fertilizers	16.97	18.36	18.59	14.08	14.51	8.19	1.25	3.05
(viii) POL	24.31	25.06	25.63	18.89	19.77	3.09	2.27	4.66
(ix) Balance (other goods)	35.09	36.64	35.68	26.07	24.30	4.42	-2.62	-6.79
2 Net tonne-kilometers (million)	229.60	235.78	250.24	181.30	184.82	2.69	6.13	1.94
3 Net tonne-kilometers per wagon per day (broad gauge)	1428.00	1455.00	1473.00	1380.00**	1439.00**	1.89	1.24	4.30**
4 Passenger traffic originating (million)	3653.00	3858.00	4048.00	2292.00**	2162.00**	5.61	4.92	-5.70**
5 Passenger-kilometers (billion)	280.80	295.70	314.56	186.10**	181.85**	5.31	6.38	-2.30**

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

8.49 Energy constitutes a little over 20 per cent of the Railways' working expenses. Therefore, priority is being given to energy-conserving measures like the accelerated phasing out of energy-inefficient steam locomotives, retrofitting fuel-efficient kits on diesel locomotives, fitting choppers and thyristors on electric locomotives, and introducing lightweight coaches and wagons.

8.50 Originating freight traffic increased by six per cent to 337.43 million tonnes in 1991-92 (Table 8.11). During the 1980s, it increased at an average annual rate of 4.8 per cent. Shortfalls from the target for moving traffic reflected the slowdown in industrial growth, specially in steel and engineering. The freight traffic carried was 254.45 million tonnes in April-December, 3.9 per cent higher than during the same period of previous year. 6000 kms of gauge conversion from metre and narrow gauge to broad gauge has been targetted.

8.51 There has been a progressive decline in the share of freight carried by the Railways Since rail transport is more energy-efficient and environment-friendly, the decline in its share of freight needs to be reversed by means of higher efficiency, lower costs and a competitive management of the Railways. The importance of road transport for shorter haulages of high-value and perishable products is well established. An optimum mix of both forms of transport needs to be developed.

8.52 In order to augment the coverage and efficiency of the Railways, several areas of improvement have been indicated in the Eighth Plan, particularly acquisition of rolling stock, gauge conversion, electrification of tracks and technological upgradation.

8.53 Improvement in railways can be achieved by increasing the productivity of the existing activities as well as augmenting investment. The Railways employ 16 lakh workers, the largest number for any undertaking in the country. Labour productivity has been quite low. A comprehensive human resource development programme is required to upgrade skills, retrain workers and achieve higher productivity. While staff productivity in terms of the number of traffic units per employee, asset productivity in terms of net tonnes per km per wagon-day, wagon turnaround time, loco utilisation etc. have improved over the years, there is still scope for further improvement.

8.54 Budgetary support for the Railways has declined. The prospects of extra-budgetary support by way of market borrowings are receding, resulting in further pressure on internal resource generation. Railways being a basic infrastructural facility, the scope for raising fares and freight rates is limited. Hence, they have to meet the challenge by eliminating non-essential expenditure, increasing operational efficiency, conserving energy and raising manpower productivity.

Ports

8.55 During the second half of the 1980s, the cargo-handling capacity at major ports increased at an average annual rate of 4.5 per cent to reach the level of 162.77 million tonnes in 1989-90. During 1991-92, this capacity rose to 169.3 million tonnes, four per cent over the preceding year. Cargo handled at major ports during 1991-92 was 157.9 million tonnes against 152.9 million tonnes in the preceding year and a target of 155 million tonnes.

TABLE 8.12

Trends in Traffic at Major Ports

					April-December*		Change over previous year		
		1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
	1	2	3	4	5	6	7	8	9
			(Million tonnes)				(per cent)		
1	POL	63.6	65.88	69.62	50.14	54.93	3.58	5.68	9.55
2	Iron ore	33.21	31.9	32.09	22.48	20.24	-3.94	0.60	-9.96
3	Fertiliser & raw materials	6.74	7.26	7.08	5.83	6.28	7.72	-2.48	7.72
4	Foodgrains	1.16	0.88	1.2	0.93	1.18	-24.14	36.36	26.88
5	Coal	17.6	19.65	22.5	16.82	18.1	11.65	14.50	7.61
6	Vegetable oil	0.49	0.88	0.36	0.25	0.19	79.59	-59.09	-24.00
7	Other liquids	2.26	2.75	4.43	3.28	3.25	21.68	61.09	-0.91
8	Containerised cargo	7.29	8.04	7.59	5.44	6.19	10.29	-5.60	13.79
9	Others	16.03	15.62	12.99	9.01	11.42	-2.56	-16.84	26.75
	Total	148.38	152.86	157.86	114.18	121.78	3.02	3.27	6.66

* Provisional.
@ April-December.

8.56 During April-December 1992, the major ports handled 121.8 million tonnes of cargo against the target of 120.4 million tonnes, 6.7 per cent more than in the period last year (Table 8.12). Major increases in traffic were in respect of POL (4.79 million tonnes), coal (1.28 million tonnes) and general cargo, mostly foodgrains (3.32 million tonnes). However, iron ore traffic declined.

8.57 The composition of traffic has undergone significant changes in recent years, making the item-wise capacities available at major ports unrealistic (Table 8.13).

TABLE 8.13

Commodity-wise Capacity and Actual Traffic Handled at Major Ports

Commodity	984-85 Capacity	984-85 Traffic	1991-92 Capacity	1991-92 Traffic
1	2	3	4	5
		(Million tonnes)		
POL	55.25	49.73	78.00	69.42
Iron ore	41.50	26.00	41.50	32.09
Coal	6.25	4.50	7.0	22.50
Fertilisers	3.90	6.00	7.95	7.08
Containers	3.48	3.23	6.83	7.59
General cargo	22.35	17.28	27.95	18.98
Total	132.73	106.74	169.23	157.86
		(Per cent share in the total)		
POL	41.6	46.6	46.1	44.1
Iron ore	31.3	24.4	24.5	20.3
Coal	4.7	4.2	4.1	14.3
Fertilisers	2.9	5.6	4.7	4.5
Containers	2.6	3.0	4.0	4.8
General cargo	16.8	16.2	16.6	12.0

Note: Foodgrains are included in general cargo.

8.58 The traffic in containers is expected to increase substantially in the Eighth Plan. This would require expansion and modernisation of port capacities to prevent the emergence of a major bottleneck on the growth of exports and industrial output in the coming years. Acute budgetary constraints in public sector outlay have led to the move to invite private investment in this sector. A number of ports have been asked to explore possibilities of inviting private investment for construction of new facilities. A new berth reservation scheme has been approved making major ports independent to decide and negotiate requests for berth reservations from various shipping lines. This would enable the shipping lines to call on a particular port according to a fixed schedule and have a berth available without delay. Private parties have been approved to lease berths in Haldia Docks for their exclusive use. Leasing of dry docks has also been permitted.

8.59 Port productivity has improved in recent years. The average ship turnaround time declined from 8.1 days in 1990-91 to 6.7 in 1991-92. The average ship-berth-day output increased from 3372 tonnes in 1990-91 to 3905 tonnes in 1991-92.

8.60 In contrast to port productivity, labour and equipment productivity are still low. Low labour productivity is mainly due to surplus labour in ports and outdated manning scales. These have to be renegotiated and made more flexible and raised in line with investment in equipment and machinery. Low equipment productivity is due to operational constraints such as equipment breakdown, time spent on surveys and deballasting, power failures etc.

8.61 In order to give a boost to container traffic and cut down transit time, the cabotage restrictions have been removed. Foreign shipping lines are now allowed to bring containers from the hinterland to a port and carry them from such a hub centre to destinations abroad without transhipment en route. Some foreign shipping lines have taken advantage of this scheme. The Coastal trade restrictions have also been further relaxed to give foreign ships access to minor ports for break-bulk, support and import cargo.

8.62 Container Corporation of India Limited (CONCOR) provides and organises the multimodal logistics infrastructure for containerised cargo traffic for international as well as internal trade and commerce. CONCOR has now significantly diversified into domestic cargo transport. During 1991-92 CONCOR handled 1.1 lakh twenty-foot equivalent units (TEUs), 64 per cent more than in the previous year.

Shipping

8.63 Indian vessels carried about 38 per cent of the total sea borne cargo in 1991-92 against 37.8 per cent during 1990-91. The share of Indian vessels in POL was 61 per cent in 1991-92, in bulk carriers 28 per cent (long-term target: 50 per cent) and in liner traffic 17 per cent (long-term target: 40 per cent).

8.64 The fleet strength at the end of December 1992 was 430 vessels of 6.28 million Gross Registered Tonnes (GRT) against 414 vessels of 5.917 Million GRT in November, 1991. Overseas trade during 1991-92 was 113.77 million tonnes against 111.03 million tonnes during 1990-91.

8.65 During 1985-86 to 1989-90 the gross addition was less than gross tonnage scrapped as the fleet was modernized and diversified. The acquisition of a modern, diversified fleet will continue during the Eighth Plan also.

8.66 Acquisition of vessels by ship-owning companies is now granted automatic approval except in respect of crude tankers from September 1992. There are no restrictions on the sale of vessels by shipping companies. Foreign shipping companies are free to charter Indian vessels.

8.67 Shipping Corporation of India (SCI), a public-sector unit, which accounted for 6.36 million GRT (52.6 per cent of the fleet) in 1985-86, brought it down to 3.01 million GRT (47.9 per cent of the fleet) by November 1992. It increased its gross internal resources to Rs.257 crore in 1991-92 from Rs.198 crore in 1990-91. Net profit after tax was Rs.54.46 crore in 1990-91 and Rs.114.52 crore in 1991-92. During April-September 1992 the net profit after tax was 47.06 crore, compared to 56.18 crore in the same period of the previous year.

Road and Road Transport

8.68 The total road network in the country increased 20.7 per cent from 16.9 lakh km in 1985 to 20.4 lakh km at the end of 1990-91. The National Highways constitute hardly two per cent of the total road network but carry nearly 40 per cent of the total road traffic.

8.69 The National Highway network is in need of considerable improvement. About 12 per cent of the total National Highway needs widening from single to double lanes. About 56 per cent of the total length of two-lane roads have to be strengthened; 44 per cent of the

National Highway network is expected to have traffic of more than 15000 passenger car units by 1995 and thus will have to be widened to four lanes. Selected corridors, traffic of more than 40,000 passenger car units in 1995 - about 3 per cent fo the National Highway network - needs conversion into expressways. The estimated expenditure on the above items as worked out by the Ministry of Surface Transport will be Rs.41390 crore at 1991 prices. An outlay of Rs.2600 crore has been approved by the Planning Commission for the Eighth Plan.

8.70 In the face of reduced budgetary allocation, the Government has drawn up a plan to involve the private sector in construction, maintenance and operation of fee-based facilities on national highways on Build, Operate and Transfer (BOT) basis. The idea is to allow the private sector to collect fees from users for an agreed period in order to recoup their investment.

8.71 All-weather accessibility of villages has improved significantly over the years. During 1990-91 and 1991-92, 93,000 villages was connected with all-weather roads.

8.72 The present share of road traffic is about 80 per cent in passenger traffic and about 50 per cent in freight traffic.

8.73 The sixty-six State Road Transport Corporations operate a fleet of nearly 1.12 lakh buses with an investment of over Rs.3910 crore. They employ over 7.53 lakh workers and carry about 6.8 crore passengers a day.

8.74 Fleet utilisation has declined from 89 per cent in 1989-90 to 87 per cent in 1991-92. Vehicle productivity at 283 kms/bus/day in 1991-92 has increased at 5 per cent per annum since 1989-90. The performance of most State transport undertakings is below the desired level. Most incur heavy losses. Their losses declined from Rs.167.30 crore in 1987-88 to Rs.118.90 crore in 1991-92 as a number of them revised fares. Financial performance should be a criterion in allocating capital grants and financial support from the Government to the SRTUs.

8.75 The number of goods vehicles registered at the end of March 1992 was 15.28 lakh. Credit scarcity and rising input costs have adversely affected the performance of private transport operators. In line with the liberalised provisions in the Motor Vehicles Act, 1988, many State Governments have granted an increasing number of permits to private operators, and certain States have de-nationalised routes. The Government is considering changes in the Motor Vehicles Act to remove the ceilings on the number of stage carriage permits that can be held by an individual or company.

Civil Aviation

8.76 The civil aviation sector has two functional divisions: operational and infrastructural. On the operational side, Indian Airlines, Vayudoot and private air taxis provide domestic air services, and Air India provides international air services. Pawan Hans provides helicopter services to ONGC in its offshore operations and to inaccessible areas and difficult terrains. Infrastructural facilities are provided by the International Airports Authority of India (IAAI) and the National Airports Authority (NAA).

Air India

8.77 The net profit of Air India has increased to Rs.279.03 crore in April-December 1992 compared to Rs.77.15 crore in the same period of the previous year (Table 8.14). The load factor in April-December 1992 was 58.2 per cent compared to 58.5 per cent in the same period of the previous year.

TABLE 8.14

Performance of Air India

				April-December*			Change over previous year	
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
							(per cent)	
1 Revenue (Rs. crore)	1428.38	1747.96	2128.84	1486.28	1996.32	22.37	21.79	34.32
2 Expenses (Rs. crore)	1357.49	1666.73	2012.13	1409.13	1717.29	22.78	20.72	21.87
3 Net Surplus after tax (Rs. crore)	70.89	81.23	116.71	77.15	279.03	14.59	43.68	261.67
4 Capacity available (million tonne-km)	2292	2260	2249	1462	1513	-1.40	-0.49	3.50
5 Capacity utilised (million tonne-km)	1441	1381	1493	849	874	-4.16	8.11	2.88
6 Load factor (per cent)	62.87	61.11	66.39	58.50	58.20	-2.81	8.64	-0.51

* Provisional.
@ April-December.

8.78 Air India's load factor is still low compared to other international airlines. Its share of international traffic originating from India has come down from 42 per cent in 1981 to 35 per cent in 1990-91. Air India intends to augment its aircraft capacity and reduce the average life of its fleet by a fleet renewal and expansion plan.

TABLE 8.15

Performance of Indian Airlines

				April-December*			Change over previous year	
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
							(per cent)	
1 Revenue (Rs. crore)	1125.15	1169	1457.85	1288.79	1189.06	3.90	24.71	-7.74
2 Expenses (Rs. crore)	1140.19	1234	1685.97	1341.76	1296.17	8.23	36.63	-3.40
3 Net surplus after tax (Rs. crore)	15.24	-64.59	-198.65	-52.97	-107.11	-523.82	207.56	102.21
4 Capacity available (million tonne-km)	1134	926.7	1089.77	904.33	779.64	-18.28	17.60	-13.79
5 Capacity utilised (million tonne-km)	826	699.2	761.08	639.53	553.96	-15.35	8.85	-13.38
6 Load factor (per cent)	72.84	75.45	69.84	70.72	71.05	3.58	-7.44	0.47

* Provisional.
@ April-December.

Indian Airlines

8.79 The total revenue of Indian Airlines increased by 3.9 per cent in 1990-91 and 24.7 per cent in 1991-92, but the expenses increased by 8.2 per cent in 1990-91 and 36.6 per centin 1991-92. The net loss tripled from Rs.64.6 crore in 1990-91 to Rs.198.65 crore in 1991-92 (Table 8.15).

8.80 The net loss at the end of April-December 1992 was Rs.107.11 crore. Revenue was 7.74 per cent less than in the corresponding period of last year and the expenses incurred was lesser by 3.4 per cent. The load factor had improved to 75.5 per cent in 1990-91 but it again declined to 69.8 per cent in 1991-92.

8.81 During the current year the Indian Airlines has also suffered from the deterioration in industrial relations. The Commercial Pilots Association, had resorted to industrial action in pursuance of its demand for higher salaries and perks. The management on its part wanted to implement a productivity-linked scheme. The Airlines needs urgent remedial steps to improve its operational and financial performance. This is specially required at this stage because the Airlines is beginning to face a degree of competition in the domestic sector.

Vayudoot

8.82 The loss incurred by Vayudoot was Rs.37.07 crore in 1990-91 and Rs.30.59 crore in 1991-92, was more than the revenue earned in the respective years. The loss incurred until April-December, 1992 is Rs.15.8 crore compared to 25.1 crore in the same period of the previous year.

Pawan Hans Limited (PHL)

8.83 The induction of three Mi-8 helicopters on wet lease from Russia augmented the efforts of PHL in providing total helicopter support services to the oil sector. The revenue of the corporation is expected to increase by 27 per cent in 1992-93. Projected expenditure shows an increase of 15 per cent over the previous year. Net operating profit is projected to increase by about 46 per cent in 1992-93.

Air Taxi Services

8.84 The scheme for the operation of air taxi service by private sector has become operational since 1990. All citizens of India or groups of Indians including Non-resident Indians or public-sector undertakings can apply for an air taxi operator's permit. Air taxis are permitted to operate to all authorised airports and can decide their fares and flight schedules. Air taxi services can be operated both on a charter and on a non-charter basis. The number of passengers carried by these air tax operators has increased from 582 in 1990 to 35018 during April-November 1992.

8.85 Certain important policy initiatives have been taken recently to accelerate the development of civil aviation in the country. The tourist charter policy has been considerably liberalised so that foreign nationals can now visit the country by specially chartered aircraft, automatic clearance for which is given by the Director General of Civil Aviation.

8.86 An open sky policy for cargo has been introduced to facilitate exports. Under this policy, any foreign or domestic airline or association of exporters or private operators can bring freighters to the country for lifting of cargo from any Customs airport.

International Airports Authority of India (IAAI)

8.87 During 1990-91 and 1991-92, IAAI fell short of performance level of 1989-90 in terms of passenger and cargo handled (Table 8.16). To some extent, this represents a slowdown in tourist arrivals and foreign trade compression of 1991-92. But it also emphasises the need for better capacity utilisation and improving the quality of facilities and services at the international airports.

TABLE 8.16

Performance of the International Airports Authority of India

	1989-90	1990-91	1991-92*	April-December* 1991-92	1992-93	Change over previous year 1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
							(per cent)	
1 Revenue (Rs. crore)	227.83	230.89	259.92	192.82	220.22	1.34	12.57	14.21
2 Expenses (Rs. crore)	119.89	131.84	171.34	95.01	112.08	9.97	29.96	17.97
3 Net Surplus after tax (Rs. crore)	60.94	54.05	46.08	48.59	54.27	-11.31	-14.75	11.69
4 Passengers (lakh)	199.64	177.23	188.2	140.33	146.07	-11.23	6.19	4.09
5 Cargo (Thousand tonnes)	414.99	376.9	370.3	268.9	295.12	-9.18	-1.75	9.75

* Provisional.
@ April-December.

National Airport Authority

8.88 Airport Surveillance Radars (ASR) and Monopulse Secondary Surveillance Radars (MSSR) were installed at Guwahati, Trivandrum, Hyderabad and Ahmedabad. The total capital outlay for a set of ASR and MSSR is estimated at Rs.28.15 crore including a foreign exchange content of Rs.20.66 crore.

8.89 For the civil aviation sector, an outlay of 3998 crore has been made in the Eighth Plan. About 97 per cent of the outlay would be met from internal and extra-budgetary resources. International Air Port Authority of India (IAAI), National Air ports Authority, Pawan Hans and Air India may be able to generate internal resources. Given the present trends in financial performance, Indian Airlines and Vayudoot may not be able to generate the required quantum of internal resources.

The Post

8.90 Indian postal services have grown rapidly over the years. The country has the largest network of post offices in the world. By the end of March, 1992 the national postal network had 150346 post offices in the country. A post office covered on an average an area of 21.9 sq.km. and a population of 5827. The long-term objective is to locate a post office within three km. of every village. During the Eighth Five Year Plan (1992-97), the Postal Department will open 500 Departmental sub-offices and 3000 extra-departmental branch offices.

8.91 The main thrust areas in the Eighth Plan are computerisation and associated networks for electronic mail, money transfer, mechanical sorting, quality stamps and seals.

8.92 The major projects initiated for introduction of computers for customer services have started functioning in the areas of Savings Bank, Postal Life Insurance, Counter Computerisation through Front Post Office Machines, and development of integrated Managemant Information System (MIS).

8.93 To speed up money order transmission to remote, hilly, tribal and rural areas, a proposal has been drawn up for utilising satellite network through micro-earth stations, also known as Very Small Aperture Terminals (VSATs), at selected locations in the country, which will reduce the transmission time and bring new customers to Postal Department for fund transfer. This network will also facilitate provision of other value-added services in future.

8.94 To expedite the sorting of mail, especially in the metro cities where a large quantities of mail have to be handled within limited hours, technology is proposed to be introduced in the form of automatic mail processing units. It is proposed to instal a unit at Bombay this year consisting of two letter sorting machines and 30 coding desks. This will be followed up by six other metro centres during the Eighth Plan period.

8.95 The number of speed post centres under the National Network has increased from six at inception in 1 August 1986 to 62 on 31 October 1992. In addition, point-to-point speed post service has been extended to 666 pairs of stations. Contractual Speed Post service is now available for any place in the country. Speed Post carried 1.2 million packets and earned Rs.3.17 crore in 1987-88; in 1991-92 it carried 5.2 million packets and earned Rs.22 crore. During April-September 1992 the traffic and revenue figures were 3.55 million and Rs.13.5 crore respectively. A manual track-and-trace system has been introduced in speed post to answer the various questions raised by the customers and to intimate to them the status of their articles whenever desired.

8.96 The Post Office Savings Bank operates through a network of 146251 Post Offices out of which about 88.7 per cent are located in rural areas. The gross collections during 1991-92 through Post Office Savings Bank were Rs.17365 crore; net collections were Rs.574 crore. The outstanding deposit balances as on 31 March 1992 were Rs.56064 crore.

8.97 The Post Office Savings Bank has been identified as an important area for computerisation. Computers have been commissioned in seven Head Post Offices in Delhi. During the current financial year, it is planned to extend them to the other three metro cities of Bombay, Calcutta and Madras.

8.98 The maximum limit of insurance for which an individual can take Postal Life Insurance (PLI) or policies was raised from Rs. one lakh to Rs. two lakh. The minimum condition of three years' service for certain categories of employees of local bodies has been removed and brought at par with other categories of employees. Extra-Departmental Agents' Group Insurance Scheme 1992 has been introduced from 1 April, 1992 at a low cost and on a wholly contributory basis. Three lakh Extra-Department employees of the Department of Posts will be covered. An almost threefold increase in the sum assured under postal life insurances and twofold increase in the number of policies has been registered as compared to 1983-84.

8.99 The gross receipts of the Department of Posts increased from Rs.841 crore in 1990-91 to Rs.948 crore in 1991-92. There was a revision of rates of foreign traffic on 1 November 1990. With working expenses of Rs.1162 crore, there was a net deficit of Rs.214 crore, Rs.41 crore less than in 1991-92(RE). The mounting deficit in the postal system has to be addressed to. Since 80 per cent of the total expenditure is accounted by establishment expenses, measures to improve staff productivity and further rationalisation of the rate structure are called for to eliminate this deficit.

Telecommunications

8.100 India has a network comprising of over 15000 exchanges with a capacity of 70 lakh lines and 60 lakh working telephones. The network is growing at the rate of 15 per cent per annum. Additional switching capacity of 9.58 lakh lines was commissioned

TABLE 8.17

Performance of the Telecommunications Sector

				April-December*			Change over previous year	
	1989-90	1990-91	1991-92*	1991-92	1992-93	1990-91	1991-92	1992-93@
1	2	3	4	5	6	7	8	9
							(per cent)	
I Net additional switching capacity (lakh lines)	4.78	5.57	9.58	3.26	3.84	16.53	71.99	17.79
(i) Metro districts	1.45	1.44	2.41	1.25	0.7	-0.69	67.36	-44.00
(ii) Others	3.33	4.13	7.17	2.01	3.14	24.02	73.61	56.22
II Net telephone connections provided (DELs) (thousand)	416.22	485.76	735.41	277.62	378.3	16.71	51.39	36.27
(i) Metro districts	122.45	133.09	204.56	91.52	92.85	8.69	53.70	1.45
(ii) Others	293.77	352.67	530.85	186.1	285.45	20.05	50.52	53.39
III Telex service:								
(i) Telex capacity (lines)	1020	2051	2206	1744	2589	101.08	7.56	48.45
(ii) Telex connections	3080	2156	1795	1167	232	-30.00	-16.74	-80.12
IV Production of switching equipment (Thousand lines)	974.4	944	1095.7	573.1	796.9	-3.12	16.07	39.05
(i) Strowger	175.8	85.8	39.2	39.2	0.0	-51.19	-54.31	0.0
(ii) Crossbar	63.5	57.9	55.2	37.3	23.3	-8.82	-4.66	-37.53
(iii) Electronic	735.1	800.3	1001.3	496.6	773.6	8.87	25.12	55.78
V Laying of telephone cables (lakh conductor-km)	64.7	70.85	91.29	55.9	64.1	9.51	28.85	14.67
(i) Metro districts	22.37	19.48	23.25	13.6	16.25	-12.92	19.35	19.49
(ii) Others	42.33	51.37	68.04	42.3	47.85	21.36	32.45	13.12
VI Rural communications:								
(i) New exchanges	484	2727	4779	1122	1891	463.43	75.25	68.54
(II) New long distance public telephones (LDPTs)	1633	1742	21752	7663	13309	6.67	1148.68	73.68

* Provisional.
@ April-December.

during 1991-92 - 72 per cent more than in 1990-91. About 25 per cent of this capacity expansion was in Delhi, Bombay, Calcutta and Madras.

8.101 Between 1979 and 1989 the number of telephone connections grew at 8.4 per cent annually. The number of new telephone connections provided in 1991-92 was 7.35 lakh direct exchange lines (DELs), 51.4 per cent more than in 1990-91 (Table 8.17). The four metros accounted for around 27.8 per cent. The number of people waiting for new connections on 31 March 1992 was 22.87 lakh, 16.6 per cent higher than a year earlier. The demand for telecommunication services has far outstipped the availability.The Eighth Plan endeavours at reducing the waiting period by installing additional switching capacity of 93 lakh lines in order to provide 75 lakh new telephone connections.

8.102 An excess capacity has been built up in tele-instruments production, which is roughly three times the actual demand. There is an urgent need to augment the production of the switching equipment so as to eliminate the mismatch. Total production of switching equipment (strowger, crossbar and electronic switches) by the Indian Telephone Industries (ITI) during 1991-92 was 10.96 lakh lines, 16.1 per cent higher than in 1990-91. The Government has opened these sectors to private investment. Companies which are joint ventures of leading foreign companies and domestic companies have been permitted to manufacture electronic switches. With this initiative, it may be possible to meet the Eighth Plan demand for additional switching capacity through domestic production.

8.103 The increase in telex switching capacity during 1991-92 was 2206 lines, 7.6 per cent higher than in 1990-91; 1795 telex connections were added, 16.7 per cent less than in 1990-91. Demand for Telex connections has declined because of increased use of FAX.

8.104 The old strowger and crossbar exchanges will be phased out of production and replaced by digital switching equipment. During the Eighth plan the ITI will expand into the manufacture of cordless telephones and transmission equipment including fibre optic systems. Production in switching capacity so far has been an ITI monopoly, but is now being opened to the private sector. During 1991-92 and 1992-93 (April-December), licences were issued for switching capacity of over 1.5 million lines.

8.105 During 1991-92, 91.29 lakh conductor kilometres (lckms) of cables were laid, 28.8 per cent more than in the 1990-91. Cables laid in four metro cities accounted for 25.5 per cent of the total. In the manufacture of telecom cables, private sector investment has been allowed.

8.106 The Telecom Department has embarked upon a programme of providing public telephones in village panchayats. During 1991-92, 21800 thousand villages were provided with telephone facilities as compared to 1700 villages during 1990-91.

8.107 While retaining the objective of providing telephones against registered demand, the expansion of value-added services in the urban areas and increasing access to the telephone network in the rural areas are the two other objectives in the telecommunication sector. It has been decided to expand the supply of value-added services (telematics) with a participation of the private sector. Accordingly, these services are being given to the private sector on a franchise or licence basis, consisting of cellular mobile services, voice and electronic mail services, audio and video conferencing services, radio paging and videotex. This will relieve the Department of Telecommunications (DOT) of the financial costs of providing these services, and will give it additional revenue from licence fees and additional tariffs. Network operations may also be opened to the private sector participation. The Government will shortly come out with a National Telecom policy which will provide directions for the future expansion of the system and for structural reforms required to achieve it.

8.108 The outlay for the telecommunication sector in the Eighth Plan is Rs.25,137 crore. During 1991-92, Plan expenditure was Rs.3547 crore, 71.5 per cent was financed through internal resources. For 1992-93, the plan outlay is Rs.4500 crore, 65.3 per cent of which will be financed through internal resources. With restricted budgetary support and limited options of market borrowings, there is a need to draw up a plan for allowing private sector funding in basic telecommunication operations and services. The options may include leasing, joint ventures with a majority share for the Government, etc. They would require structural and institutional reforms in the telecommunication sector.

8.109 In the information age, the quality of services rendered by the telecommunication sector has to be of an extremely high order. The thrust has, therefore, to be on improving the operational efficiency of telecommunications and introducing measures that ensure customer satisfaction.

8.110 Capacities in the infrastructural sectors need to expand at more than 8 per cent per annum if the target for 5-6 per cent growth in national output are to be achieved. In the absence of such expansion, inadequate supply of infrastructural facilities and services may impose a binding constraint on growth in the economy. Given the high capital-intensity of these sectors, a massive infusion of investible resources will be required to achieve these growth rates. In the context of a tight budgetary position, such resources will need to be generated from within the sector and supplemented by market borrowings and private investment from domestic as well as from foreign investors. This, therefore, calls for a radical change in the sources of capital formation within the sector. While some steps have been taken in this regard, more urgent changes will be required in the remaining years of the Eighth Five Year Plan.

8.111 These sectors are also dominated by the presence of public sector enterprises. Some of these are in the nature of public sector monopolies which were created to ensure capacity expansion in these sectors at a time when private investment was shy of entering these sectors. Conditions have now changed in many ways. Technological advances have converted a number of these industries from being natural monopolies to ones where competitive market structures can viably exist. The Indian private sector has also now matured enough to participate actively in infrastructural industries. At the same time, for reasons discussed elsewhere in this Survey, public sector enterprises have not been able to undertake adequate capacity expansion over the years. These issues will now need to be faced and resolved urgently so as to ensure that the supply, costs and quality of infrastructural facilities and services in the economy permit the user industries to become internationally competitive.