CHAPTER 3

INFRASTRUCTURE

3.1 Bottlenecks in critical infrastructure sectors such as coal, power, railways and ports had crippled the economy in 1979-80 and a sustained effort was made to remove these bottlenecks in the course of 1980-81. These efforts began to yield results in the second half of 1980-81 when there was a marked improvement in performance in the infrastructure. This improvement has been sustained throughout 1981-82. Coal production, power generation and rail transport have shown substantial growth over the previous year and the targets established for each of these sectors are expected to be fulfilled. Congestion in the ports has also eased.

3.2 In the first nine months of 1981-82, coal production registered an increase of 11.5 per cent, electricity generation increased by 11.6 per cent and revenue earning traffic moved by the railways grew by 15.5 per cent as compared with the increases of 7.0 per cent, 3.7 per cent and a decline of 1.5 per cent, respectively, during the corresponding period of 1980-81.

3.3 The Sixth Plan envisages substantial increases in output in these sectors and to that end, ambitious programmes for capacity expansion have been undertaken. Successful implementation of these programmes will be crucial for the health of the economy in the medium term. Each of these sectors confronts major challenges of technological upgradation, organisational restructuring and operational efficiency over the medium term.

Coal

3.4 Coal production in 1980-81 reached the level of 114 million tonnes. This was 9.6 per cent higher than that in the previous year and marked a welcome break from the near stagnation which characterised the industry after 1976-77. As indicated above, production in 1981-82 shows even higher growth, and should reach the revised target of 124 million tonnes.

3.5 The pattern of increase in coal output of different coal companies in recent years is shown in Table 3.1. All major companies have shown a healthy performance from 1980-81 onwards. It is noteworthy that substantial increases have been recorded by Bharat Coking Coal Ltd. (BCCL) and Central Coalfields Ltd. (CCL) which are the major coking coal producers. Inadequate availability of coking coal has been a major constraint on steel production necessitating imports of coking coal in 1980-81. For the corrent year, imports of 1.5 million tonnes of coking coal have been planned. Together with higher domestic production this should ensure adequate availability of coal to the steel plants.

TABLE 3.1

Coal Production

(Million tonnes)

Company	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	April—December 1981-82	Percentage change in 1981-82 over 1980-81 (April—Dec.)
1	2	3	4	5	6	7	8	9
ECL	26.2	26.5	25.3	22.1	20.5	22.7	16.9	+10.6
BCCL	20.1	20.7	20.2	19.7	20.1	21.4	15.6	+13.2
CCL	20.7	20.7	21.2	23.4	24.1	27.5	20.9	+11.8
WCL	21.4	21.0	21.7	24.2	26.1	28.8	22.4	+10.0
NEC	0.6	0.6	0.6	0.6	0.6	0.6	0.5	+5.2
TOTAL COAL INDIA	89.0	89.5	89.0	90.0	91.4	101.0	76.3	+11.2
SCCL	7.4	8.3	8.9	9.0	9.4	10.1	8.7	+14.3
Others	3.3	3.3	3.1	2.9	3.1	2.9	2.3	+12.2
TOTAL	99.7	101.1	101.0	101.9	103.9	114.0	87.3	+11.5

3.6 Although production of coal began to improve in 1980-81, this was not reflected in a corresponding improvement in coal availability to industries in that year because of transportation difficulties. This had led to a build up of pithead stocks during 1980-81 which rose from 14 million tonnes at the beginning of April 1980 to 18.3 million tonnes at end March 1981. Improvement in the co-ordination between coal production and railway movement of coal was therefore one of the areas of high priority tackled by the special co-ordination machinery set up by the Government. These efforts showed results by the second half of 1980-81 when coal movement improved substantially. This has continued in 1981-82. Railway movement of coal in 1981-82 has been much better and increased by 14.5 per cent in April—Decemer 1981. As a result, pithead stocks declined from 18.5 million tonnes on 1st April 1981 to 15.3 mililon tonnes by end of October 1981. Higher production and better movement has considerably eased coal availability to power plants, cement factories and steel plants in 1981-82.

3.7 Continued expansion in capacity and output in the coal sector is critical for industrial production and the energy balance of the country. Accordingly, the Sixth Plan attaches high priority to coal development. Production of coal is targeted to reach 165 million tonnes by 1984-85. Assuming a production level of 124 million tonnes in the current year, this calls for a growth rate of about 10 per cent per year over the remaining three years of the Plan. Expansion on this scale requires large investment and this has stepped up substantially in the first two years of the Plan. The Plan allocation for coal (including lignite) in 1980-81 was increased by 45 per cent over that in 1979-80 to Rs. 443 crores. The allocation for 1981-82 was enhanced further to Rs. 578 crores, an increase of about 30 per cent.

3.8 Along with investment in new capacity, it is also necessary to undertake extensive modernisation of coal mining techniques. In the case of underground mines, the present largely manual method of mining by board and pillar has to be progressively replaced by mechanised mining. New technologies such as longwall mining have to be adopted together with advanced methods of extraction of thick seams by sub-level coring and other techniques. Steps have already been taken to obtain the requisite technology from countries such as the USSR, U.K., France and Poland. It is also necessary to shift increasingly to open cast mines which can be developed more quickly than underground mines and which facilitate full extraction of available coal. Major changes are also necessary in technologies for exploration with increasing resort to modern methods such as drilling of non-coring boreholes, comprehensive geophysical logging, high resolution seismic reflection techniques and computer processing of data.

3.9 Achievement of Sixth Five Year Plan targets calls for a major transformation of the level of technology and corresponding charges in the organisation and management of the coal industry. The new mining methods involving superior technology call for a highly skilled workforce. Increased attention, therefore, needs to be paid to training of coal workers, many of whom are also engaged in agricultural labour at the time of peak harvest demand.

Power

3.10 The power situation in 1980-81 was characterised by shortages in the first half of the year and improvement in the second half. Hydel generation remained severely depressed in the first quarter of 1980-81 reflecting the depletion of major reserviors following the 1979 drought. Hydro-electric generation picked up in the second quarter following replenishment of reservoirs due to the timely and adequate monsoon. At the same time, the demand for electricity from agriculture was greatly reduced because of adequate rains. This provided the opportunity for extensive maintenance and overhaul of thermal plants in the second quarter of 1980-81. As a result, thermal generation was relatively low in that quarter. Thereafter, the performance of both hydro-electric and thermal plants showed marked improvement. In the second half of 1980-81, electricity generation was about 13 per cent above that in the corresponding half of the previous year. Recent trends in power generation are shown in Table 3.2.

TABLE 3.2

Recent Trends in Power Generation (Percentage change)

Electricity generated	1980-81 / 1979-80					1981-82 / 1980-81			
	I Qr.	II Qr.	III Qr.	IV Qr.	Full year	I Qr.	II Qr.	III Qr.	April—Dec.
Hydel	—18.8	+8.1	+14.0	+6.1	+2.3	+16.7	+2.4	+2.3	+6.1
Thermal (including nuclear)	+5.8	—3.2	+14.6	+15.3	+8.3	+20.7	+17.3	+10.1	+15.8
Total	—4.9	+2.1	+14.3	+11.7	+5.7	+19.2	+9.9	+6.7	+11.6

3.11 The improvement in performance of the power sector continued into 1981-82. Total power generation in the period April—December 1981 was 11.6 per cent above that in the same period of 1980. This was mainly due to the expansion in thermal generation which was 15.8 per cent above that achieved in the same period last year. Hydel generation in these months showed a relatively modest growth of 6.1 per cent. The high growth rate in power observed in the first nine months is partly a reflection of the depressed level of generation in the first half of 1980. The remaining months of 1981-82 are expected to show more modest growth compared to that of the corresponding months of the previous year. Nevertheless, for 1981-82 as a whole, electricity generation is expected to register a growth of about 9 per cent over 1980-81. This compares favourably with a growth rate of 5.9 per cent in 1980-81. However, demand for power has continued to grow so that even with the higher generation the economy continues to experience shortages. The gap between requirement and availability was 12.4 per cent in 1980-81 and is projected to decline only slightly to 10.9 per cent in 1981-82.

3.12 Although there has been some improvement in capacity utilisation in 1981-82, the plant load factor of thermal plants (including nuclear) remains low. It averaged 45 per cent in the period April—December 1981 as against 43 per cent in the same period last year. This improvement was brought about mainly by larger supply of coal to the power plants. In the period April—December 1981, average daily loading of coal to thermal power plants reached 3,880 wagons which was 27 per cent higher than the level of 3,066 wagons in the same period in 1980. As a result, the position of coal stocks with thermal plants improved substantially. The ground stock of coal at 38 power stations in the country increased from 14 days' stock as on 1st April 1981 to the comfortable level of 20 days' stock on 1st October 1981. Special efforts were also made to improve maintenance of power plants. The Energy Ministry has set up expert teams in both the thermal and hydro sectors. These expert teams visit each power station with a view to identifying areas where modifications can be carried out at relatively modest cost to improve capacity utilisation. Where necessary, foreign technical know-how can also be brought in, to help bring about improvements.

3.13 While these efforts have led to some improvement in capacity utilisation in 1981-82, it must be emphasised that much remains to be done. The plant load factor (PLF) of 45 per cent achieved in 1980-81, is well below the peak level of 55.3 per cent achieved in 1976-77 and still lower than the achievable norm of 58 per cent prescribed by the Rajadhyakhsha Committee. It is worth noting that moving from a PLF of 45 per cent to a PLF of 58 per cent would increase generation from existing thermal capacity by about 29 per cent and increase total electricity generation by 16 to 17 per cent. This would more than wipe out the present power deficit.

3.14 Experience of recent years shows that the low level of overall capacity utilisation in the thermal sector is largely due to low utilisation achieved in the newly added capacity. The new sets are taking a long time to stabilise for a variety of reasons which were noted in last year's Economic Survey. The thermal sector suffers from a number of deep rooted problems such as organisational and operational deficiencies of some of the Electricity Undertakings, non-adherence of maintenance schedules leading to frequent unplanned outages, inadequacies of equipment and supply of spares, and high ash content of coal. These problems are not amenable to quick correction and call for sustained effort along many fronts over the medium term. As noted above, several steps have been taken over the past year to improve plant maintenance. Measures have also been implemented to ensure timely supply of equipment and spares. About 84 coal handling plants are being installed by Coal India Limited to ensure supply of standard quality coal to thermal plants. Many more such plants are to be added in the next two to three years. Advanced technologies such as fluidised bed combustion are being considered to overcome the problem of high ash content of coal. In view of the crucial importance of the power sector for the whole process of development, it is essential to implement these and other relevant measures expeditiously.

3.15 Together with efforts at improving capacity utilisation it is also important to ensure adequate expansion of capacity in the power sector. The Sixth Five Year Plan targets envisage increasing the total generating capacity from about 30,000 MW at the start of the Plan to about 51,000 MW at the end of the Plan period. This calls for an annual average addition of about 4000 MW per year in power generating capacity. Achievement has fallen targets in the first two years. During 1980-81 the addition to installed capacity was only 1823 MW against a target of 2687 MW. The target for addition to installed capacity in 1981-82 was 3212 MW. Actual achievement is likely to be around 2190 MW. Thus in the first two years of the plan the addition to capacity is likely to be about 60 per cent of the target. If the Sixth Five Year Plan target for expansion of capacity is to be achieved, the addition to capacity in the remaining three years will have to be over 5000 MW per year. The main reasons for the slippages in power capacity creation are land acquisition problems, delay in the execution of civil works due to contractual and administrative difficulties, shortage of materials such as steel and cement, delay in placement of orders and in delivery of equipment. A broad-based improvement in procedures, project implementation capacity, and materials supplies is essential for achieving the targets of the plan in the power sector.

Railways

3.16 Railway movement of freight in 1981-82 showed a marked improvement over the previous year. The total tonnage of originating revenue earnings freight moved in the first nine months of the current year was 15.5 per cent higher than that in the same period of 1980-81. In terms of net tonne kilometres the growth is 15.7 per cent.

3.17 The best results in the clearance of railway traffic were achieved in 1976-77 and 1977-78 when the railways achieved a peak freight loading (revenue and non-revenue combined) of 239.1 million tonnes in 1976-77, and freight movement of 162.7 billion net tonne kilometres (NTKMs) in 1977-78. These years were followed by three years of extremely poor performance when wagon utilisation on broad gauge declined to 976 net tonne kilometres per wagon per day in 1978-79, 972 in 1979-80 and 968 in 1980-81. The inability of the railways to move bulk commodities in the required quantities had become a serious constraint on the economy. Improvement in railway's operation was one of the critical objectives of Government policy in 1980-81, but the trend of continuous decline took time to arrest and a turn around was achieved only after the middle of the year 1980-81. For the year 1980-81 as a whole the total freight movement showed a modest growth of 1.5 per cent, but nonetheless a year of positive growth after three years of declining performance. The growth rate of 15.5 per cent recorded in the first nine months of 1981-82 as mentioned earlier undoubtedly reflects in part the depressed performance in the first half of 1980-81 but even so, the year as a whole promises to show a growth rate of over 10 per cent. It is expected that performance of the railways both in respect of output as well as utilisation of capacity will exceed the best results achieved in 1976-77 and 1977-78.

3.18 The improvement in railways in 1981-82 led to better movement of most bulk commodities but especially of coal which is a crucial input of thermal power generation and also in some other key industries. Data regarding coal movement to power plants, cement factories and steel plants in the first nine months of 1981-82 and comparative figures for earlier years are presented in Table 3.3. There was a substantial increase in coal movement by rail to all three users-power, cement and steel plants. This is an important difference between the situation in 1981-82 and that in 1980-81. In 1980-81, there was an improvement in rail movement of coal to the power plants but rail movement to steel plants was actually lower and to cement plants only marginally better. In 1981-82 all three sectors show a significant improvement.

TABLE 3.3

Average daily loading of coal in four wheeled wagons

Period	Average daily loading of coal in four wheeled wagons to		
	Power plants	Cement plants	Steel plants
1978-79	2579	542	2406
1979-80	2869	452	2335
1980-81	3249	477	2307
April—December 1980-81	3066	447	2222
April—December 1981-82	3880	597	2484
Percentage change 1981-82 / 1980-81 (April—December)	+26.5	+33.6	+11.8

3.19 Better railway performance in 1981-82 was achieved through greater efficiency in utilisation of existing capacity. The most important utilisation indicator reflecting all round performance in loading and mobility *i.e.* net tonne kilometres per wagon per day increased substantially on both broad gauge and meter gauge lines. In the first six months of 1981-82 net tonne kilometres per wagon per day on the broad gauge were 1,082 as compared with 1,020 in 1980-81 and the best performance of 1,045 in 1977-78. Wagon turn round time, an important indicator of efficiency, declined substantially. On broad gauge lines, the average turn round in days in the first eight months of 1981-82 was 13.7 compared with 16.01 in the same period of 1980-81. On meter gauge lines, the turn-round time dropped to 15.5 days in the first five months of 1981-82 compared with 15.9 in the same period last year. These improvements in wagon utilisation, especially the substantial improvement noted on broad gauge lines not only increase the ability of the railways to move freight with given wagon capacity, they also help railway finances.

3.20 These improvements in operating efficiency were due to several steps aimed at better railway management. Segregation of the conventional wagon fleet from wagons fitted with roller bearings and with centre buffer couplers helped to improve speeds and to handle heavier trailing loads. Integrated end-to-end running of trains was introduced which helped to reduce substantially enroute detention of trains. Steps were also taken for the optimisation of trailing loads of trains and rationalisation of loco utilisation so as to ensure the timely availability of superior class locos in comparatively difficult sections on a priority basis. Attention was also given to the quicker movement of commodities like food grains and cement by the segregation of conventional covered wagon fleet equipped with roller bearing and centre buffer couplers into jumbo rakes.

3.21 As noted in last year's Economic Survey, the railways suffer from a considerable shortage of wagons and an excessive number of very old wagons. Expansion and upgrading of the wagon fleet is therefore a high priority task for modernisation of the railways. There was considerable progress in this area in 1981-82. Between November 1980 and August 1981 a total of about 16,300 overaged wagons have been condemned. However, it has not been possible to replace these wagons fully because of limitations on the availability of new wagons. It had been planned to acquire 18,000 wagons in 1981-82. Against this target, the production of wagons during April—November 1981 was 11,300 wagons. This was 39.5 per cent higher than the production in the same period last year but it was below the requirement of new wagons. In spite of this slower pace of replacement discarding of overaged wagons has helped to increase the overall efficiency of the system because the overaged wagons were reducing the mobility of even the good stock. However, it is essential to step up wagon production substantially if the targets of the Sixth Five Year Plan are to be achieved. The Plan envisages an ambitious target of augmenting the wagon fleet by 100,000 wagons

over the period. This implies an average annual acquisition of 20,000 wagons. Since acquisition has been at a lower rate in the first two years, the annual rate in the remaining three years of the Plan will have to be higher than 20,000 wagons per year. The magnitude of the task ahead can be gauged from the fact that the average rate of acquisition in the past decade was only about 6,600 wagons per year.

3.22 The Sixth Five Year Plan envisages a massive expanstion in railway traffic reaching 309 million tonnes of originating tonnage and 220 billion tonne KMS of freight movement during the terminal year 1984-85. This would require a growth rate of over 9 per cent per year over the next three years. As noted in last year's Economic Survey, the railways have suffered from an extended period of under- investment in the past which has left them with a capital stock (*i.e.* rolling stock, track and other equipment and facilities) which is inadequate in capacity, and requires extensive repair and modernisation. All this will require large investments in the coming years. The railways plan outlay in 1980-81 was Rs. 762 crores. It was stepped up by 29 per cent to Rs. 980 crores in 1981-82. It is likely that because of the massive scale of the expansion needed, the resources currently planned may not be adequate. This makes it all the more important that expendiure with low returns is avoided and productivity in the organisation improved even further. In particular, it is essential to minimise opening up of new and uneconomic railway lines which require heavy investment and recurrent subsidies. Priority should be given to directing scarce resources into areas that have the maximum payoff in terms of improving productive capacity and operational efficiency of the railways.

Shipping and Ports Facilities

3.23 Inadequate traffic handling capacity at major ports had emerged as a critical constraint in recent years. In 1979-80 the volume of traffic handled amounted to 78.5 million tonnes and this increased marginally to 80.4 million tonnes in 1980-81. Special attention was given to reduce port congestion during the year. The tonnage handled by major ports during April—November, 1981 at 53.9 million tonnes was 5.7 per cent higher than the tonnage of 51.0 million tonnes handled in April—November, 1980.

3.24 Several schemes initiated since March, 1980 to improve the capacity of ports have made progress, the important ones being the construction of general cargo berths at Cochin, Mormugao, New Mangalore, Paradip, Kandla, Madras, Tuticorin and Visakhapatnam; and construction of oil jetties at Kandla and Visakhapatnam. Containerisation is developing rapidly in world shipping and concerted action for the provision of efficient container services in Indian shipping is essential. This requires building up of adequate infrastructure comprising cranes, berthing space and back up areas for efficient handling of containers and for reducing the clearing time of containerised cargo. Steps have been initiated to establish a full fledged container terminal at Madras port and to acquire container handling equipment for Bombay and Cochin ports. To reduce congestion at Bombay port, action is being initiated to develop another port at Nhava Sheva on modern lines. This port would be meant exclusively for handling containers and bulk carriers. Apart from such long-term schemes, a series of short-term measures have been taken to relieve the congestion at Bombay port, such as, allowing a rebate for expeditious loading/unloading of cargo, penalising vessles continuously showing poor rate of loading/unloading, and providing extra facilities to get the cargo cleared from the docks. As a result, the waiting time of ships has been substantially reduced.

3.25 Coastal shipping, as a supplemental mode of internal transport has assumed importance due to its low energy consumption per unit of transport. In the past the trend in the tonnage handled by coastal shipping has been erratic due to several constraints like high turn-round of ships on account of inadequate handling arrangements at ports predominance of over-aged vessels, uneconomic freight policy and inappropriate planning. Commodities like coal, cement and salt can be economically transported along the long coast line of the country.

3.26 In summary, the short-term performance of all the infrastructure sectors in 1981-82 was highly satisfactory. Production levels showed a healthy growth over 1980-81 and targets for the current year are expected to be achieved. However, overcoming the longer term constaints in these sectors would be problematical. The Sixth Plan has identified these sectors as critical for the health and growth of the economy and envisages a very large expansion in capacity and production. Increased investment in these sectors needs to be accompanied by the use of new techniques and extensive modernisation. This calls for a quantum jump in operational and organisational efficiency for higher utilisation of available capacity and improved implementation of the ambitious plan schemes for expansion and modernisation.