

Power

9.4 Electricity generation by power utilities during 2005-06 was targeted at 621.5 billion

Kwh, up 5.8 per cent from the previous year. The growth of power generation in April-December 2005 at 4.7 per cent (Table 9.2),

Table 9.1 : Trends in growth of physical output in infrastructure sectors (in per cent)

Items	2001-02	2002-03	2003-04	2004-05*	April-December*	
					2004*	2005*
I. Energy						
1. Coal production	4.5	4.2	5.8	3.9	7.3	5.7
2. Electricity generated by utilities	3.1	3.2	5.0	5.2	6.5	4.7
(a) Hydel	-0.7	-13.7	15.6	14.5	18.1	19.1
(b) Thermal (including nuclear)	2.5	6.2	3.5	3.8	4.6	1.6
3. Petroleum						
(a) Crude oil production	-1.2	3.2	1.0	1.8	2.8	-5.9
(b) Refinery throughput	3.7	4.9	8.2	4.3	6.6	0.4
II. Steel	4.6	9.9	9.8	6.5	7.5	7.1
III. Cement	7.4	8.8	6.1	6.6	6.9	10.9
Average growth of I to III	3.5	5.5	6.2	5.1	6.4	4.5
IV. Transport and Communications						
1. Railway revenue-earning goods traffic	4.0	5.3	7.5	8.0	7.7	9.8
2. Cargo handled at major ports	2.3	9.0	10.0	11.3	10.9	12.4
3. Telecom: New telephone connections ¹	23.9	21.5	40.1	28.5	21.4	27.9
4. Civil Aviation						
a. Cargo handled						
i. Export cargo handled	4.1	13.3	1.0	12.6	11.8	13.1
ii. Import cargo handled	-1.0	18.6	13.4	24.4	30.1	12.7
b. Passengers handled at						
i. International Terminals	-5.0	4.8	6.5	14.0	15.7	12.7
ii. Domestic Terminals	-5.7	9.6	13.1	23.6	25.9	21.9
* Provisional						
¹ WLL, fixed and cellular.						
Source: I-III Ministry of Commerce and Industry, IV.1 Ministry of Railways, IV.2 Department of Shipping, IV.3 Ministry of Communications, and IV.4 Ministry of Statistics and Programme Implementation						

Table 9.2 : Trends in the power sector (utilities only)¹

	2003-04	2004-05	April-December*		Change over previous year @	
			2004	2005	2004	2005
			(In billions of units)		(per cent)	
1. Power generation ¹	558.3	587.4	438.0	458.6	6.5	4.7
(i) Hydro-electric	73.8	84.5	67.7	80.6	18.1	19.1
(ii) Thermal	466.8	486.1	357.9	363.0	5.1	1.4
(iii) Nuclear	17.7	16.8	12.3	13.2	-7.2	7.2
Memorandum item: Plant load factor (PLF), in per cent	72.7	74.8	73.1	71.5	N.A.	N.A.
*Provisional; @ April-December						
¹ Excludes generation from captive and non-conventional power plants, and less than 20 MW thermal plants.						
N.A.: Not applicable						

Table 9.3 : Thermal plant load factor

	2000-01	2001-02	2002-03	2003-04	2004-05	April-December	
						2004	2005
I. State Electricity Boards	65.6	67.0	68.7	68.4	69.6	68.1	64.8
II. Central Sector	74.3	74.3	77.1	78.7	81.7	79.5	79.8
III. Private Sector	73.1	74.7	78.9	80.5	85.1	85.4	86.6
IV. Regions							
Northern	73.1	75.1	75.4	76.3	77.1	76.1	74.9
Western	73.4	74.1	75.8	75.1	78.6	77.1	74.5
Southern	82.0	82.4	86.4	83.4	84.1	81.5	75.1
Eastern	47.9	48.7	52.1	56.9	60.4	58.5	62.4
North Eastern	18.5	16.7	14.8	14.0	15.0	14.4	16.2
All-India	69.0	69.9	72.2	72.7	74.8	73.1	71.5

however, was lower than not only the 6.5 per cent achieved in the same period of the previous year but also the annual target. While nuclear generation showed a sharp turnaround for the better, thermal generation dipped during this period.

9.5 The Plant Load Factor (PLF) is an important measure of the operational efficiency of thermal power plants. During April-December 2005, the PLF of Central

power plants was higher than that of State Electricity Boards (SEBs) put together, while PLF of private plants was higher than that of the public sector. The PLF of SEBs declined during April-December, 2005 to 65 per cent. The drop in PLF in southern and western States was due to a good monsoon boosting hydro-generation and reducing the demand from thermal plants. The average for SEBs as a whole, however, masks substantial

Table 9.4 : Financial performance of the state power sector*(In Rs. crore)*

	1991-92	2004-05 Provisional	2005-06 (RE)	2006-07 Plan projection
Gross subsidy on sales to:				
(a) Agriculture	5,938	25,240	25,043	25,013
(b) Domestic consumers	1,310	10,432	10,179	10,967
(c) Other States	201	516	410	136
A. Gross subsidy (a+b+c)	7,449	36,187	35,632	36,115
B. Subventions received from State Governments	2,045	10,478	11,562	10,254
C. Net Subsidy (A-B)	5,404	25,709	24,070	25,861
D. Surplus from sale to other sectors	2,173	6,391	8,083	7,389
E. Uncovered subsidy (C-D)	3,231	19,319	15,987	18,472
F. Commercial Losses				
i. Excluding subsidy	4,117	23,558	22,569	23,924
ii. Including subsidy	NA	13,080	11,007	13,670
G. Rate of return (in per cent)	-12.70	-31.94	-26.13	-25.12
H. Additional revenue				
Additional Revenue Mobilisation:				
(a) Required for mandatory 3 per cent return	4,959	26,513	25,929	27,578
(b) From charging 50 paise per unit from Agriculture/Irrigation	2,176	1,042	1,441	1,105
# for losses without subsidy.				
Note:- (i) The information regarding commercial losses in case of Orissa and Delhi pertains to GRIDCO of Orissa and transmission company of Delhi only. (ii) Information in case of Andhra, Haryana, Karnataka, Maharashtra, Rajasthan, Uttar Pradesh and Uttaranchal States is relating to distribution companies set up after the reforms. In case of other States, the information pertains to power sector as a whole.				
Source : Planning Commission.				

Box 9.1 : Partnership in Excellence

To improve generation in the short term, Ministry of Power has launched the programme: “**Partnership in Excellence**”. Priority is being given to restoration of units to an operating level by enhancing performance through short- and medium-term measures. Central Electricity Authority (CEA) has identified 26 thermal power stations operating at a PLF of less than 60 per cent. The concept of Partnership in Excellence, to be forged between these 26 stations and the better performing utilities, is to utilize the expertise of the latter to improve the performance of these 26 stations.

Modus operandi

- Team of engineers from the better performing partners to visit the identified power stations to diagnose the problems behind the low performance.
- The team to formulate a report for improving O&M practices and other measures for starting operation of the unit on a short term regular basis, with zero-based budgeting.
- On the recommendations of the team, needed funds, as subsidized loans or grants, to be provided by Power Finance Corporation (PFC).
- A team of 8 to 10 engineers to be posted at low performing thermal power stations, which will strive to implement the improved O&M practices and formulate the need based Renovation and Modernisation (R&M) scheme.
- R&M programme so identified to be implemented under the supervision of partner in excellence.

The programme has received a positive response, and these low performing power stations are expected to attain 60 per cent PLF or more during the period December, 2005 to March, 2006.

variation across States. The PLF for the eastern and north-eastern states was relatively lower.

9.6 The rate of return of SEBs improved to –26 per cent in 2005-06 (RE) from –32 per cent in 2004-05 (Table 9.4). The resources forgone through such poor return continue to

be very large. In 2005-06, while the direct transfers from State Governments to SEBs was Rs.11,562 crore, an uncovered subsidy of Rs.15,987 crore remained, indicating the large potential that reforms have in improving not only the electricity sector itself but also the fiscal position of the States.

9.7 Out of the total power generated in the country, around 66 per cent comes from the coal-fired power stations. Domestic coal production is not keeping pace with the growing demand for coal in the power sector (Table 9.5). The demand-supply imbalance has been a matter of concern for the last two years. Non-availability of the desired level of coal has resulted in generation loss of 1512 Million Units during 2004-05, and hampered the growth of thermal generation.

9.8 The power generation capacity based on gas/liquid fuel in October 2005 was 12,530.62 MW (10,513.62 MW gas & 2,017 MW liquid

Table 9.5 : All India coal requirement, availability and likely shortfall

(In million tonnes)

Particulars	2005-06	2006-07
Coal requirement	338*	365**
Availability	316.66	334
Shortfall from indigenous sources	21.34	31

* Including 28 million tonnes for captive power plants.

** Including 33 million tonnes for captive power plants

Table 9.6 : Trends in requirement, allocation, supply and shortfall of gas

(In MMSCMD)

Year	Requirement at 90% PLF	Allocation	Supplied	Demand-Supply gap	Estimated Generation Loss *(BU)
2000-01	44.54	36.67	24.40	20.14	33.0
2001-02	46.31	38.76	24.33	21.98	36.1
2002-03	48.26	39.47	25.12	23.14	38.0
2003-04	49.25	39.47	25.62	23.63	38.9
2004-05	49.73	40.95	30.70	19.03	31.2

* Considering the demand-supply gap of gas at 90 per cent PLF, station heat rate of 2000 Kcal/KW/hr and no generation made using liquid fuel

Note: 1. MMSCMD—Million metric standards cubic metre per day. 2. BU—Billion Units

fuel). Demand for gas is outstripping supply in India and the power stations are not getting the required allocation of gas (Table 9.6). The actual supply has fallen substantially short of allocation, resulting in a huge loss of power generation. The gas-based stations (with dual-fuel facility) sometimes have to resort to liquid fuel like Naphtha, resulting in very high cost of generation.

9.9 It has not been possible to harness the advantages of gas/LNG as a fuel for power generation effectively, primarily because of its limited availability and lack of price competitiveness vis-à-vis coal. Fuel price, constituting about 60 per cent of the total cost of thermal power generation, is a critical determinant of long-term sustainability of a thermal plant.

Capacity addition programme

9.10 The Tenth Plan capacity addition target of 41,110 MW was revised down to 36,956 MW at the time of the Mid-Term Appraisal (Tables 9.7 and 9.8). The likely achievement is expected to be around 34,000 MW, which

is about 83 per cent of the original target and 92 per cent of Mid-Term Appraisal target.

9.11 While there is a shortfall vis-à-vis the targets, the shortfalls are limited compared to earlier Plans. It may be recalled that in the Eighth and Ninth Plans, achievements were less than 50 per cent of the target. By type of ownership, the anticipated shortfall (13 per cent) is the highest in the Central sector, while by type of plants, it is the highest (9 per cent) in thermal plants.

9.12 Revival of the Dabhol Power Project, which was shut down from June, 2001 following disputes between the Dabhol Power Company and Maharashtra SEB (MSEB), was initiated in 2005. A joint venture company by the name of Ratnagiri Gas and Power Private Limited (RGPPL), with shareholding of National Thermal Power Corporation (NTPC), Gas Authority of India Limited (GAIL), Indian Financial Institutions (IFIs) and MSEB has been constituted to restart the power plant and complete the construction of Phase II and the associated LNG terminal. The Project's assets have been taken over by RGPPL with the

Table 9.7 : Tenth Plan targets and achievements in power sector (by ownership)

(in MW)

	Target		Additional Capacity : Status		
	Original	Mid-Term Appraisal	Commissioned	Under execution	Overall anticipated
Central	22832	19817*	8325	8900	17225*
State	11157	12240	3946	7955	11901
Private	7121	4899	1145	3753	4898
Total	41110	36956	13416	20608	34024

* Including 2520 MW nuclear projects under construction

Table 9.8 : Tenth Plan targets and achievements in power sector (by type)

(in MW)

	Target		Additional Capacity : Status		
	Original	Mid-Term Appraisal	Commissioned	Under execution	Overall anticipated
Thermal	25417	23261	7446	13784	21230
Hydro	14393	11125	5380	4794	10174
Nuclear	1300	2570	590	2030	2620
Total	41110	36956	13416	20608	34024

approval of Maharashtra High Court. The project is expected to start generating power by the middle of 2006, subject to the availability of LNG.

9.13 Power plants using super critical technology have greater efficiency of about 40.3 per cent compared to 38.6 per cent of normal 500 MW units. Presently six units of 660 MW super critical power plants of NTPC are under construction in India. Bharat Heavy Electricals Limited (BHEL) has recently tied up the technology for making super critical units. 25 probable sites/ projects have been identified for 800 MW super critical units.

9.14 Government is encouraging the use of hydel and wind energy sources which do not rely on fossil fuels and avoid carbon emissions. India has an estimated unutilized hydro-power potential of more than 1,50,000 MW. A study by the Central Electricity Authority (CEA) has identified 399 potential hydel projects with an aggregate capacity of 1,07,000 MW. Preparation of pre feasibility Reports (PFRs) of 162 schemes with aggregate installed capacity of 47,930 MW has already been completed by CEA.

9.15 Five sites including three coastal sites, one each in Karnataka, Gujarat and Maharashtra are being identified for development of Ultra-Mega Power plants with capacity of 4,000 MW each, through the competitive bidding route to meet the needs of the States on a regional basis. The initial groundwork such as land acquisition, coal-linkage/allotment of coal blocks, water linkage, Environment Impact Assessment (EIA) studies and the preparation of Feasibility Reports (FRs)/ Detailed Project Reports (DPRs) is to be done by the shell companies being formed in the name of the project through initial funding by PFC. After the projects are brought to the take-off stage by the shell companies, bids would be invited from the prospective investors to take over the shell company by bidding the lowest tariff and developing the project thereafter. In such large projects, which would supply power to a number of States, it has been suggested that necessary coordination may be done at the apex level. It is expected that in view of their size, they would deliver power at rates between Re.1.60-1.80/KWh.

9.16 Electricity Act, 2003 has helped enhance investment in the power sector. An Inter-Institutional Group (IIG), comprising of senior representatives from the financial institutions and Ministry of Power, has been constituted to especially focus on fast-track power projects, which could be taken up for early commissioning and could achieve early financial closure. 13 private sector power projects having a total capacity of about 5000 MW involving an investment of about Rs.18,127 crore achieved financial closure and another 10 projects with a total capacity of 11,432 MW involving an investment of Rs. 40,000 crore approximately are being monitored by the IIG for facilitating early financial closure.

Power transmission

9.17 An All-India power grid, also called the "National Grid", is envisaged to be developed in a phased manner – first by integrating a cluster of regions, and subsequently all the regions by the year 2012. The total inter-regional transmission capacity is planned to increase from its present 9,450 MW to about 37,150 MW by 2012. Strong regional grids presently exist in all the five regions.

9.18 In the Central transmission sector, an additional 60,000 circuit kms of transmission network with a capital investment of over Rs. 71,000 crore, including investment from the private sector, is to be implemented under the Tenth and Eleventh five year plans (2002-12). With a view to facilitate and encourage private participation in transmission, Ministry of Power is in the process of finalizing the "Policy Guidelines for Private Investment in Transmission" and tariff-based competitive bidding guidelines for transmission services.

Distribution reforms and success of Accelerated Power Development and Reform Programme (APDRP)

9.19 Considering the increasing commercial losses of the state power utilities, distribution reforms have been identified as the key area to infuse efficiency and commercial viability into the power sector. The 2002 privatisation experience of Delhi has been encouraging so far (Box 9.2).

Box 9.2 : Privatisation of the power sector in NCT of Delhi

The power sector in Delhi was unbundled in July, 2002 when the erstwhile Delhi Vidyut Board (DVB) was unbundled into one holding company, one generation company, one transmission company and three distribution companies. The three distribution companies were created each having 51 per cent equity participation from the private sector, the remaining equity participation coming from the Government of NCT of Delhi. The privatization was undertaken on the basis of bids in terms of reduction in Aggregate Technical and Commercial (AT&C) losses. Each distribution Company has to reduce the AT&C loss levels by at least 17 per cent over a five year period i.e. from 2002-07. The AT&C loss levels at the beginning of the privatisation process, the targets set for each year and the actual performance — in per cent — were as follows:

Opening levels			2002-03	2003-04	2004-05
BSES Yamuna Power Limited	57.2	Target	56.45	54.7	50.7
		Achievement	61.89	54.29	50.12
BSES Rajdhani Power Limited	48.1	Target	47.55	46.0	42.7
		Achievement	47.4	45.06	40.64
North Delhi Power Limited	48.1	Target	47.6	45.35	40.85
		Achievement	47.79	44.86	33.79

As is evident from the above table, the actual AT&C levels for each distribution company has been better than the respective target. Further, there have been several other benefits from privatisation of the power sector in Delhi as given below:

- i) The Government was spending more than Rs.1,000 crore each year for the power sector in Delhi before privatisation which has now been reduced to about Rs.200 crore which is spent on the capital expenditure schemes of the Delhi Transco Ltd. and the generation companies.
- ii) There has been considerable improvement in the quality of power given the fact that load shedding has come down from 2.32 per cent of the energy input in 2002-03 to only 0.85 per cent in 2004-05.
- iii) 100 per cent payment is being made to central power sector utilities for power purchased.
- iv) About Rs.1250 crore invested by the distribution companies for capital schemes during the period 2002-03 to 2004-05.
- v) The average response time for attending to break downs has improved considerably.
- vi) The number of options available to consumers for payment of bills have increased manifold.

9.20 Government is implementing APDRP to undertake distribution reforms in a time-bound manner, which include setting up of State Electricity Regulatory Commission (SERC), unbundling of State power utilities, metering of feeders & consumers, starting energy accounting & auditing, and grid discipline. As on date, 24 States have constituted SERCs. Also notified are a Joint Electricity Regulatory Commission for UTs other than NCT of Delhi and one Joint Commission for Manipur and Mizoram. Government of Nagaland is in the process of setting up a SERC. Twenty States have issued tariff orders rationalising tariffs.

Rural electricity initiatives under Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY)

9.21 This Scheme of Rural Electricity Infrastructure and Household Electrification was introduced in April, 2005 for achieving the NCMP objective of providing access to electricity to all rural households over a period of four years. At present, only 44 per cent of the rural households have access to electricity. Rural Electrification Corporation (REC) is the nodal agency for the programme. Under the scheme, projects can be financed with 90 per cent capital subsidy for provision

of Rural Electricity Distribution Backbone (REDB), creation of Village Electrification Infrastructure (VEI) and Decentralized Distributed Generation (DDG) and supply. REDB, VEI and DDG will cater to the requirements of agriculture and other activities, including irrigation pumpsets, small and medium industries, khadi and village industries, cold storage chains, healthcare, education and IT. Under this scheme un-electrified BPL households will get electricity connection free of charge, as per norms of Kutir Jyoti Programme in all rural habitations.

9.22 The services of Central Public Sector Undertakings (CPSUs) have been offered to the States for assisting them in the execution of rural electrification projects as per their willingness and requirement. The management of rural distribution has been envisaged through franchisees who could be Non-Governmental organisations (NGOs), Users' Association, cooperatives or individual entrepreneurs. Panchayat institutions would be associated with the management. The franchisee arrangement could be for systems beyond and including feeders from substation or from and including distribution transformer(s).

Progress of implementation of RGGVY (till Dec. 2005)

- 27 States and their utilities have signed Memorandum of Agreement (MoA) agreeing to the conditionalities for implementation of the programme as envisaged under RGGVY.
- So far 187 projects for 191 districts have been sanctioned covering 22 States at the cost of Rs.6,241.86 crore covering 51,284 un-electrified villages and 69.29 lakh rural households, of which 45.15 lakh are BPL households.
- Notice Inviting Tenders (NITs) have been issued for projects covering 163 districts.
- Contracts have been placed for projects covering 95 districts covering 41,461 un-electrified villages and 9,379 electrified villages.
- CPSUs are working in 131 districts.

- 1,941 villages have been electrified till December, 2005

Policy initiatives

Competitive bidding guidelines

9.23 The Electricity Act, 2003 provides that the SERCs shall adopt the tariffs through a transparent process of bidding in accordance with the guidelines issued by the Central Government. A move away from the cost plus approach, this approach to tariff determination is expected to encourage private sector investment. Government issued the guidelines for competitive bidding for determination of tariff for procurement of power by distribution licensees on January 19, 2005. The main objectives of these guidelines are promoting competitive procurement, facilitating transparency and fairness, reducing information asymmetry, protecting consumers' interests, enhancing standardization and reducing time for procurement, and finally providing flexibility to suppliers on availability of power while ensuring certainty on tariffs for buyers. The guidelines provide both for long-term procurement for a period of 7 years or more and also for medium-term procurement for a period of one to seven years.

Amendment to the Electricity Act 2003

9.24 The NCMP, *inter-alia*, states that: "The review of the Electricity Act 2003 will be undertaken in view of the concern expressed by a number of States. The mandatory date of June 10, 2004 for unbundling and replacing the state electricity boards will be extended. The UPA government also reiterates its commitment to an increased role for private generation of power and more importantly power distribution." A review of the Act has been carried out and it has been proposed to bring the following amendments:

- (i) Amendment to Section 6 to clarify that both the concerned State Governments and the Central Government would jointly endeavour to provide access to electricity to all areas including villages and hamlets

through rural electricity infrastructure and electrification of households.

- (ii) Amendment to relevant sections to delete the provision for 'elimination' of cross subsidies. Provision for 'reduction' of cross subsidies will continue.
- (iii) Amendment to Section 151 to clarify that the police would be able to investigate cognizable offences under the Act.

9.25 The Electricity (Amendment) Bill, 2005 on the above proposed amendments has been introduced in the Lok Sabha on December 23, 2005. Electricity Rules, 2005, notified on June 8, 2005, which among other things describe the requirement of captive generating plant, have brought clarity for implementation of the provisions of the Act. Under the provisions of the Electricity Act, 2003, the Appellate Tribunal for Electricity became operational from July 21, 2005 and started hearing appeals against decisions of various Electricity Regulatory Commissions.

Tariff policy

9.26 Under the provisions of Electricity Act 2003, Central Government has notified the

tariff policy, evolved in consultation with the State Governments, CERC and various stakeholders. To promote competition, the policy provides that all future requirements of power should be procured competitively, except in the case of one-time expansion of existing projects, or where a State-controlled publicly owned company has been identified as the developer. A transition period of five years has been indicated for achieving the goal of developing generation and transmission projects in the public sector also through competitive bidding only. The policy lays down a timeframe for rationalization of electricity tariffs and mandates reduction of the cross-subsidies to within a band of $\pm 20\%$ by the end of year 2010-11. The policy clearly says that provision of free electricity is not desirable, as it encourages wasteful consumption of electricity and, in most of the cases, depletion of the water table. To facilitate choice of supply to the consumers through open access in distribution, the policy provides unambiguous methodology for calculating cross-subsidy surcharge and its time bound reduction. It also lays down mechanism for arranging back-up supply for such consumers.