



भारत सरकार Government of India
विद्युत मंत्रालय, Ministry of Power

तापीय विद्युत गृहों के कार्य निष्पादन का पुनर्विलाकन

REVIEW OF PERFORMANCE OF THERMAL POWER STATIONS 2007-08



केन्द्रीय विद्युत प्राधिकरण
CENTRAL ELECTRICITY AUTHORITY
नई दिल्ली - New Delhi
सितम्बर-08 - September-2008

HIGHLIGHTS

SCOPE OF REVIEW

The review for the year 2007-08 covers the performance of 385 coal / lignite based thermal units above 25 MW capacity aggregating to a total capacity of 70569.5 MW.

OVERALL PERFORMANCE

PLANT LOAD FACTOR

- Highest ever Plant Load Factor (PLF) of 78.75% at National Level was achieved during the year as against 77.03% achieved during 2006-07.
- All sectors viz. Central, State and Private had improved PLF as compared with previous year.
- Among all the sectors (Central, State and Private) PLF of 90.77% achieved by Private Sector stations was highest at the National level.
- Dahanu Thermal Power Station (500 MW) of M/s Reliance in Maharashtra achieved the highest PLF of 101.53 %.
- PLF of 104.14 % of Unit #1 of 110 MW of Sabarmati generating Station of M/s Torrent Power under private sector was the highest ever PLF achieved by any unit so far.
- PLF of 101.80 % of Unit #2 of Dadri (NCTPP) (210MW) of NTPC was the highest among all Central Sector units. This was also the highest ever PLF achieved by any Central Sector station unit so far.
- PLF of 100.15 % of Unit #6 of Kota TPS (195MW) of M/s Rajasthan Rajya Vidhyut Utpadan Nigam Limited was the highest among all State Sector units. This was also the highest ever PLF achieved by any State Sector station unit so far.
- Following three Thermal Power Stations had achieved PLF above 100%.

Station Name	Capacity (MW)	Organisation	% PLF
Dahanu	500	Reliance	101.53
Sabarmati	330	Torrent Power	101.42
Budge Budge	500	CESC	100.43

- Following eight Thermal Power Units had achieved PLF above 100%.

Station Name	Unit No.	Capacity	Organisation	% PLF
TORR. SABARMATI	1	110	TORR.	104.14
DAHANU	1	250	BSES	103.32
BUDGE BUDGE	2	250	CESEC	103.05
DADRI (NCTPP)	2	210	NTPC	101.80
UNCHA HAR	3	210	NTPC	101.32
TORR. SABARMATI	3	110	TORR.	101.04
UNCHA HAR	5	210	NTPC	100.79
DADRI (NCTPP)	1	210	NTPC	100.38
KOTA	6	195	RRVUN	100.15
KORBA STPS	5	500	NTPC	100.04

- 250 MW capacity group achieved the highest PLF of 88.78% among different capacity groups.
- 500 MW capacity group registered the second highest PLF of 87.58% among different capacity groups.
- BHEL/BHEL make units (254 units aggregating to 55027 MW) registered the highest PLF of 80.98% among units of different make.

PLANNED MAINTENANCE

- Energy loss on account of planned maintenance reduced to 7.54 %.
- Overall average duration of boiler overhaul was 23 days. Average duration of boiler overhaul in state sector was lowest (21 days).
- Overall average duration for turbine overhaul was 54 days.

FORCED OUTAGES

- Energy loss on account of forced outages reduced to 7.71 % of maximum possible generation as compared with 8.14 % during 2006-07.
- Main cause of forced outage was due to various boiler problems. Out of the total number of forced outages of 6426, outages on account of boiler problems were 3145.
- Maximum number of outages (1898 out of total No 6426) were the outages of duration lasting up to 3 hours.
- Maximum loss of generation (18657 MUs) was due to long duration forced outages (over 25 days).
- Loss of generation due to long duration forced outages (over 25 days) reduced to 18657 MUs from 19768 MUs in 2006-07.
- Harduaganj Unit #2 (40 MW) & Unit 4 (60 MW) in the Northern Region, Chandrapura Unit #4 to 6 (each of 120 MW) in the Eastern Region and Bongaigaon, Unit #1 to 4 (each of 60 MW) in the North-Eastern Region remained under forced outage through out the year and did not contributed to the generation.

OPERATING AVAILABILITY

- An all time high overall Operating Availability of 84.76% was achieved as against 83.72 % achieved during 2006-07.
- The overall Operating Availability of Generating Stations under Private Sector Utilities was 94.63% which was the highest among different Sectors.
- 250 MW group had the highest Operating Availability of 91.14% followed by 195/200 MW (90.23%) & 500 MW group (89.58%).
- The Operating Availability of BHEL/BHEL make units was 86.06% which was highest among the units of different make.
- The highest Operating Availability of 89.30% was achieved during May, 2007.

- **SECTORWISE OPERATING AVAILABILITY (%)**

SECTOR	OPERATING AVAILABILITY (%)
CENTRAL	88.34
STATE	81.41
PRIVATE	94.63

- **MAKEWISE OPERATING AVAILABILITY (%)**

MAKE	OPERATING AVAILABILITY (%)
BHEL/BHEL	86.06
BHEL/ ABL	70.50
RUSSIA/RUSSIA	76.68
OTHERS	85.70

PARTIAL UNAVAILABILITY AND NON- UTILISATION OF ENERGY DUE TO SYSTEM LOAD VARIATION

- Energy loss on account of partial unavailability was 6.54% as compared with 6.88% during 2006-07.
- Unavailability due to internal constraints arising out of deficiency in generating units/auxiliaries was 6.30 %. Unavailability due to Low System Demand was 0.24 %.
- Energy loss on account of Reserve Shutdown reduced to 0.28% from 0.29% during 2006-07.
- Energy loss on account of partial availability of main equipment and auxiliaries was 2.16 % and 1.05 % respectively.
- Energy loss on account of partial loss due to various constraint in the equipment including backing down was highest in the Western Region (8.5%) & lowest in North-East Region (4.5 %).

OPERATIONAL INPUTS

- 82 Thermal Power Stations provided information regarding coal/ lignite supplies. Out of these no station had reported any loss of generation due to coal shortage.

- All India specific coal consumption increased to .731 kg/kWh from 0.715 kg/kWh in 2006-07. Specific Coal Consumption was lowest in Northern Region (0.706 kg/kWh) and highest in Eastern Region (0.738 kg/kWh)
- Loss of generation due to shortage of gas, as reported to CEA was 9337.68 Million Units and based on possible operation of power plants at 90% PLF 31167.48 Million Units.
- The actual generation using liquid fuels has been dependent upon the requirement/acceptance by the beneficiaries on account of the prevailing high costs of these fuels resulting in high cost of generation.
- All India weighted average specific fuel oil consumption in the power stations was worked out as 1.47 ml/kWh.

STATON OPERATION UNDER DISTURBED GRID/FREQUENCY CONDITIONS

- There were no grid disturbances during the year in Eastern, Western, Southern and North Eastern Regions. However, there were three partial grid disturbances in Northern Region during the year 2007-2008.
- Frequency profile of different Region was as under:

Region	Percentage of time of operation of two different power systems			Max. Frequency (Hz)	Min. Frequency (Hz)
	Below 49.0	Between 49.0 - 50.5	Above 50.5		
	(Hz)	(Hz)	(Hz)		
Eastern, Northern, Western, and North-Eastern	13.20	86.75	0.05	50.55	48.71
Southern	5.96	93.96	0.08	50.66	48.54

AUXILIARY POWER CONSUMPTION

- Auxiliary power consumption reduced to 8.17% as compared to 8.29% during 2006-07.
- Trombay Station of Tata Power Co. Ltd achieved lowest auxiliary power consumption (4.30%) in the country.
- Among Central Sector Stations, Talcher STPS of NTPC achieved the lowest auxiliary power consumption (5.34%).
- Among State Sector Stations, Chandrapur STPS of MAHAGENCO achieved the lowest auxiliary power consumption (7.40%).
- Among different capacity groups, the lowest auxiliary power consumption was 6.13% in 500 MW group.
- BHEL/BHEL units had the lowest auxiliary power consumption (8.06%) followed by RUSSIA/ RUSSIA (8.15 %).

STATION HEAT RATE OF COAL/ LIGNITE BASED THERMAL POWER STATIONS

- There was an overall improvement of 5.49 % in operating SHR during the year 2007-08 over the preceding year as indicated below:

Year	No. of Stations analyzed	Capacity (MW)	Weighted Average Design SHR (kcal/kWh)	Weighted average Operating SHR (kcal/kWh)	% Operating SHR Deviation with respect to Design SHR
2006-07	56	38611	2398	2861	19.31
2007-08	53	37830	2376.8	2703.9	13.76

- Northern Region achieved the lowest heat rate of 2603.2 kcal/kWh among all other regions during 2007-08.
- Dahanu, Rayalseema, Vijayawada, Anpara, Ib Valley, North Chennai and Bakreswar have been assessed as the best stations the year 2007-08 with SHR deviations of 2.4%, 2.57%, 2.59%, 2.74%, 3.35%, 4.21% and 4.34% respectively with respect to their Design Station Heat Rate.

ENVIRONMENTAL ASPECTS IN POWER SECTOR DURING THE YEAR 2006-07

THERMAL POWER PLANTS: EMISSION STANDARDS

MOEF vide Notification of 19th May 1993 issued as amendment rules to environment (Protection) Act 1986. The particulate matter emission limits for thermal power stations are as follows:-

- (i) Generation capacity 62.5 MW or more -150 mg/Nm³
- (ii) Generation capacity less than 62.5 MW and plant Commissioned prior to 1.1.82 -350 mg/Nm³
- (iii) Units located in protected area irrespective of generation capacity. -150 mg/ Nm³

- Monthly environmental data of 321 coal/lignite based thermal units from 72 Thermal Power Stations were received and analyzed.
- 246 units comply the norms of Suspended Particulate Matter (SPM) emission at stack, 44 units were operating at high SPM emission(150 mg/Nm³ to 350 mg/ Nm³) and 20 units were operating at very high SPM emission level(>350 mg/ Nm³).

RENOVATION & MODERNISATION OF THERMAL POWER STATIONS

PARTNERSHIP IN EXCELLENCE (‘PIE’) PROGRAMME

- There was an over-all increase in PLF to 52.1% during the year 2007-08 as compared to PLF of 43.9 % before the implementation of PIE programme.