



**तापीय विद्युत गृहों के कार्य निष्पादन का
पुनर्विलोकन 2015-2016
REVIEW OF PERFORMANCE OF THERMAL POWER
STATION 2015-16**



**भारत सरकार विद्युत मंत्रालय केन्द्रीय विद्युत प्राधिकरण
नई दिल्ली**

**GOVERNMENT OF INDIA MINISTRY OF POWER
CENTRAL ELECTRICITY AUTHORITY
NEW DELHI**

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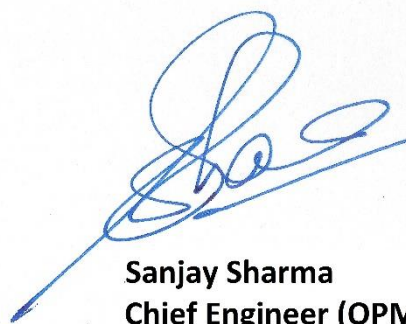
The report on “Review of Performance of Thermal Power Stations 2015-16 is the fortieth (40) publication of this series brought out by the Central Electricity Authority.

Successful completion of such a voluminous Report covering data from 617 thermal units in 175 thermal Stations would not have been possible without active cooperation of all.

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Sanjay Sharma
Chief Engineer (OPM)

OBJECTIVE OF THERMAL PERFORMANCE REVIEW

Under section 73(i) & (j) of the electricity act 2003, responsibility has been vested on Central Electricity Authority to collect & record the data concerning the generation, distribution and utilization of power and carryout studies related to Cost, Efficiency, Loss, Benefits and such like matters and also make public from time information secured under this act and to provide for the publication of reports and investigation.

Central Electricity Authority has been publishing the report on the '**Review of Performance of Thermal Power Stations**' by collecting and recording various operational data, such as unit wise generation, auxiliary consumption, outages (day in, day out, time in, time out and reasons for outages) and partial loss data (including its reasons) and analyzing the data to make the power sector/ utility aware about the following: -

- Unit wise performance indices of thermal power station in the country, such as, Plant Load Factor, Planned Maintenance, Forced Outage, Operating Availability, Partial Loss, Reserve shut down. The performance of the thermal units considered in the review is also arranged capacity group wise/make wise, sector wise and region wise. These performance indices are available for last three years for comparison and investigation.
- The average duration (day) in respect of Boiler overhaul, Capital overhaul and Long duration forced outage. The unit-wise details of boiler overhaul, Capital and long duration forced outage (more than 25 days) is also available in the review.
- The station-wise/ organization wise coal and gas consumption and auxiliary power consumption.
- All India major Grid Disturbances and areas affected.

The above information enables different power utilities/ manufacturers and other concerned to improve upon the process of generation of power and manufacture of equipment related to power. Also, it helps them bench mark the performance with the other generation companies and manufactures for the same kind of equipment so as to investigate and develop methodology, for future needs.

OVERVIEW

PARTICULARS	2011-12	2012-13	2013-14	2014-15	2015-16
ALL INDIA GENERATION (BU)	876.89	912.06	967.150	1048.67	1107.82
THERMAL GENERATION (BU)	708.81	760.68	792.48	878.32	943.79
NUCLEAR GENERATION (BU)	32.29	32.87	34.228	36.102	37.41
HYDRO GENERATION* (BU)	136.12	118.51	140.448	134.25	121.38
THERMAL PLANT LOAD FACTOR (%) **	73.32	69.93	65.57	64.29	61.06
NUCLEAR PLANT LOAD FACTOR (%)	76.90	78.49	81.74	80.74	73.69

* Hydro generation includes import from Bhutan

** Coal & lignite based stations received

PERFORMANCE OF THERMAL STATIONS CONSIDERED IN THE REVIEW

PARTICULARS	2011-12	2012-13	2013-14	2014-15	2015-16
1. COAL & LIGNITE BASED UNITS REVIEWED					
(a) NUMBER OF UNITS	454	506	539	570	617
(b) CAPACITY (MW)	97768	118024	132625	147297	173291.
(c) GROSS GENERATION (MU)	606684	689036	746090	835830	894541.
2. FORCED OUTAGE (%)	11.46	13.59	17.64	19.05	21.9
3. PLANNED MAINTENANCE (%)	5.93	5.71	5.01	4.66	4.28
4. OPERATING AVAILABILITY FACTOR (%)	82.61	80.69	77.35	76.29	73.82
5. PARTIAL UNAVAILABILITY DUE TO INTERNAL AS WELL AS EXTERNAL PROBLEMS (%)	9.43	10.77	12.12	11.62	10.99
6. LOW SYSTEM DEMAND & RESERVE	1.9	2.24	8.57	4.48	7.95
7. PLANT LOAD FACTOR (%)	73.32	69.93	65.57	64.29	61.06
8. AUX. POWER CONSUMPTION (%)	8.44	8.15	8.16	8.02	7.95
9. (a) AVERAGE TIME TAKEN IN DAYS FOR POWER OVERHAUL	30	30	33	31	29
9. (b) AVERAGE TIME TAKEN IN DAYS FOR CAPITAL MAINTENANCE	58	52	43	35	35

HIGHLIGHTS

- The review covers the performance analysis of 617 coal/lignite based thermal units (25 MW & above capacity) aggregating to 173291.5 MW installed in 175 thermal power stations.
- During the financial year 2015-16, the capacity addition of 26275.0 MW (25 MW & above capacity) (Thermal, Nuclear and Hydro) was achieved.
- All India electricity generation from conventional sources¹ in the country during 2015-16 has been 1107.82 BU as compared to the generation of 1048.67 BU during 2014-15 representing a growth rate of 5.64 %.
- Thermal generation stood at 943.79 BU representing a share of 85.19 % of total electricity generation from conventional sources in the country.
- Coal/ Lignite based plants continued to have major contribution with a major share of 91.34 % of the total thermal generation.
- During 2015-16, the total thermal generation achieved a growth rate of 7.45 %. Coal based generation recorded a growth rate of 7.41%.
- The thermal generation in the country during 2015-16 was 97.63% of its Programme fixed for the year.
- Operating Availability of 73.82% was achieved for the units considered in the Review during the year 2015-16 as against 76.29% achieved during 2014-15.
- Thirty-five (35) out of 175 thermal stations achieved an Operating Availability more than 90% during 2015-16.
- All India Plant load factor (PLF) of thermal power units considered in the Review, reduced to 61.06% during 2015-16, from 64.29% achieved during previous year. The Lower PLF was mainly due to increased generation loss due to Reserve Shut Down (RSD).
- Plant load factor (PLF) of Central Sector units was highest at 69.63%. However, the PLF of Private Utility reduced from 66.05% during 2014-15 to 59% during 2015-16.
- Plant load factor (PLF) of BHEL/BHEL make units (358 units aggregating to 98315 MW) was 60.68% - the highest among units of different makes. However, the PLF % of BHEL/ABL make units reduced from 40.57% during 2014-15 to 29.49% during 2015-16 due to increased forced outages of these units.
- Energy loss on account of planned maintenance was 4.28%² in 2015-16 as compared to 4.66% during 2014-15. The decrease in planned maintenance was due to decrease in unscheduled Capital maintenance and in unscheduled R&M activity of some units.
- The loss of generation due to forced outages during 2015-16 increased to 21.9% as compared to 19.05% during 2014-15. The increased forced outages were mainly due to higher RSD and coal/transmission constraints losses. The details are given in Section 4.
- The average duration of boiler overhaul and capital maintenance was achieved as 29 days and 40 days respectively.
- Following loss of generation due to various external constraints were reported by the utilities:

Sl. No.	Category	Energy (BU) (2014-15)	Energy (BU) (2015-16)
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¹ Thermal, Hydro and nuclear stations of capacity 25 MW and above

² All losses referred are with respect to maximum possible generation of units considered-MWh from date of stabilization to end of year at rated capacity.

Performance Review of Thermal Power Stations 2015-16

1	Shortage of coal	2.68	1.62
2	Wet/poor coal quality	14.02	0.29
3	Reserve shut down	84.55	113.41
4	Transmission constraints	13.33	8.81
5.	Total	114.58	124.13

- The generation from gas based plants had negative growth rate on account of low schedules from the beneficiaries coupled with shortage of gas. During the year 2015-16, the generation from gas based plants (including liquid fuel, Diesel etc.) was 47.12 BU in comparison to 41.07 BU in 2014-15. As such the % PLF also reduced from 24.85% during 2014-15 to 22.54% during 2015-16.
- Energy loss due to partial unavailability of the thermal generating units operating in the country during 2015-16 had decreased to 10.99% of the maximum possible generation during the year in comparison to the 11.62% in 2014-15.
- The All India average auxiliary power consumption by the thermal stations during 2015-16 decreased to 7.95% from 8.02% during 2014-15.

DEFINITIONS

The definitions of the different performance indices referred to in this review are as under: -

(i) **“Capacity”** means the installed or derated/uprated cap. accepted by CEA.

(ii) **Forced Outage/Unavailability (F.O. %)**

$$\frac{Cf1 \times Hf1 + \dots \dots Cfn \times Hfn}{CxH} \times 100$$

Where Cf1 Cfn are the capacities in MW of the units on Forced outage and

Hf1 Hfn are the duration of each outage in hours. C is the total capacity in MW and H is the total hours in the period under review.

(iii) **Planned Maintenance/Planned Unavailability (P.M. %)**

$$= \frac{Cp1 \times Hp1 \dots \dots Cpn \times Hpn}{CxH} \times 100$$

Where Cp1 Cpn are the capacities in MW of units on planned Shutdown and Hp1 Hpn are the duration of each shutdown in Hours in the periods under review.

(iv) **Operating Availability (Op Av.) % = 100 FO – PM**

(v) **Plant Load Factor :**
$$\frac{\text{Energy generated during the period}}{CxH} \times 100$$

(vi) **Partial Unavailability :**
$$\frac{Cr1 \times Hr1 + \dots \dots Crn \times Hrn}{CxH} \times 100$$

ABBREVIATIONS USED IN THE REPORT

Act.	Actual
ACQ	Annual Contracted Quantity
AM	Annual maintenance
AVB	ACC Vickers Babcock
B&W	Babcock & Wilcox
BEE	Bureau of Energy Efficiency
Cap.	Capacity
CCGT	Combined Cycle Gas Turbine
CEA	Central Electricity Authority
CBIP	Central Board of Irrigation and power
CM	Capital Maintenance
EEC	Excellence Enhancement Centre For Indian Power Sector
FO	Forced Outage
FW	Foster Wheeler
GCV	Gross Calorific Value
GTZ	Deutsche Gesellschaft Fur Internationale Zusammenarbeit
IGEN	Indo-German Efficiency Programme
HFHSD	Heavy-Fuel High Speed Diesel
HFO	Heavy Furnace Oil
HHS	Hot Heavy Stock
HPS	Heavy Petroleum Stock
HSD	High Speed Diesel
IC	Installed Capacity
IPP	Independent Power Producer
IGE	International General Electric
Kcal	Kilocalorie
Kg	Kilogram
KJ	Kilo Joule
KL	Kilo liter
KWh	Kilo Watt Hour
LDO	Light Diesel Oil
LSHS	Low Sulphur Heavy Stock
LNG	Liquefied Natural Gas
LSFO	Low Sulphur Furnace Oil
LSD	Low System Demand
MI	Milliliter
MMSCM	Million Metric Standard Cubic Metres
MMSCMD	Million Metric Standard Cubic Metres per Day
MOU	Memorandum of Understanding
MTBF	Mean Time Between Failure
MU	Million Units
MW	Megawatt
Op. Av.	Operating Availability
PLF	Plant Load Factor
PM	Planned Maintenance
Prog.	Program
PU	Partial Unavailability
RSD	Reserve Shutdown
SCM	Standard Cubic Meter
SEBs	State Electricity Boards
SHR	Station Rate Heat
SPL	Sasan Power Limited
STPS	Super Thermal Power Station
UHR	Unit Heat rate
ABAN POWR	Aban Power Company Limited
APL	Adani Power Company Limited
TOR. POW (SUGEN)	Torrent Power Limited (Sugen)
A&N ADM	Andaman and Nicobar Island Electricity Department
APGENCO	Andhra Pradesh Power Generation Corp. Limited

Performance Review of Thermal Power Stations 2015-16

APCPL	Aravali Power Company Private Limited
APGPCL	Assam Power Generation Corporation Limited
APPDCL	Andhra Pradesh Power Distribution Company Ltd.
BSEB	Bihar State Electricity Board
BSES (c)	Bses Kerala Power Limited
BEPL	Baja Energy Pvt. Ltd.
CESC	Calcutta Electric Supply Co. Ltd.
CEPL	Coastal Energy Pvt. Ltd.
CSPGCL	Chhattisgarh State Power Generation Co. Ltd
DBPCL	D.B. Power Corp. Ltd.
DVC	Damodar Valley Corporation
DPSCLTD	Dishergarh Projects Limited
DPL	Durgapur Projects Limited
GCEL	GMR Chattisgarh Energy Ltd.
GAUTAMI	Gautami Power Limited
GMR ENERG	GMR Energy Limited
VASAVI	GMR Power Corporation Pvt. Ltd
VEMAGIRI	GMR Vemagiri Power Generation Limited
GIPCL	Gujarat Industries Power Company Limited
GMDCL	Gujarat Mineral Development Corporation Private Limited
GPEC	Gujarat Peguthan Energy Corporation Private Limited
GSECL	Gujarat State Energy Corporation Limited
GSEGL	Gujarat State Energy Generation Corp. Limited
GTE CORP	GTE Corporation Limited
GVKIL	Gvk Industries Limited
HNPC	Hinduja National Power Corp.
HPGCL	Haryana Power Generation Corporation Limited
HEL	Haldia Energy Ltd.
ITPCL	IL & FS Tamilnadu Power Company Ltd.
IPGPCL	Indraprastha Power Generation Company Limited
JITPL	Jindal India Thermal Power Ltd.
JKPDC	J&K State Power Development Corporation
JSEB	Jharkhand State Electricity Board
JPL	Jindal Power Limited
JPPVL	Jai Prakash Power Venture Ltd.
JSWEL	Jsw Energy Limited
K.B.U.N.L	Kanti Bijlee Utpadan Nigam Ltd.
KPCL	Karnataka Power Corporation Limited
KSEB	Kerala State Electricity Board
KONA	Konaseema Gas Power Limited
LANCO	Lanco Amarkantak Power Pvt. Ltd
LAPPL	Lanco Anpara Power Pvt. Ltd
LPGCL	Lalitpur Power Generation Co. Ltd.
KONDAPALI	Lanco Konadapallj Power Pvt. Ltd
LVSPower	Lvs Power Limited
MBPMPL	M B Power Madhya Pradesh Ltd.
MCCPL	Maruti Clean Coal & Power Ltd.
MPPGCL	M.P. Power Generating Corporation Limited
MADURAI	Madurai Power Corporation Pvt. Limited
MAHAGENCO	Maharashtra State Power Generation Company Limited
MPDC	Manipur Electricity Department
MPL	Maithon Pvt. Ltd
NALCO	National Aluminum Corporation Ltd.
NPL	Nabha Power Ltd.
NLC	Neyveli Lignite Corporation Ltd.
NEEPCO	North-Eastern Electric Power Corporation Limited
NTPL	NLC Tamilnadu Power Corp.
NTPC Ltd.	NTPC Limited
NTECL	NTPC Tamil Nadu Energy Company Limited
NSPCL	NTPC-SAIL Power Co.Pvt. Ltd
OPGC	Orissa Power Generation Corporation Limited
PPGCL(Jaypee)	Prayagraj Power Generation Company Ltd.
PENNA	Penna Power Ltd.
PPNPGCL	Ppn Power Generation Company Pvt. Ltd.

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PPCL	Pondicherry Power Corporation Ltd.
PSPCL	Punjab State Power Corp. Ltd.
RKMPPL	RKM Powergen Pvt. Ltd.
RWPL (JSW)	Raj West Power Ltd. (JSW)
RRVUNL	Rajasthan Rajya Vidyut Utpadan Nigam Limited
RGPPPL	Ratnagiri Gas Power Projects Limited
RIL	Reliance Infrastructure Ltd.
RPSCL	Rosa Power Supply Co. Ltd
SAMALPATI	Samalpatti Power Company Private Limited
RAYALSEEMA	Shri Rayalaseema Pvt. Limited
SPL	Sasan Power Ltd.
SPGL	Spectrum Power Generation Limited
ST-CMSECP	ST-CMS ELECTRIC Company Private Limited
SEL	Sterlite Energy Limited
SEIL	Sembcorp Energy India Ltd.
SEPL	Simhapuri Energy Pvt.Ltd.
TNGDCL	Tamil Nadu Generation & Distribution Corp. Ltd.
TAT PCL	Tata Power Company Ltd.
TSPL	Talwandi Sabo Power Ltd.
TSGENCO	Telangana State Genco
TVNL	Tenughat Vidyut Nigam Limited
TOR. POW.	Torrent Power Ltd.
TRIPURA	Tripura State Electricity Corporation Limited
UPCL	Udupi Power Corp. Ltd.
UPRVUNL	Uttar Pradesh Rajya Vidyut Utpandan Nigam Limited
VESPL	Vanada Energy & Steel Pvt. Ltd.
WPCL	Wardha Power Company Ltd.
WBPDC	West Bengal Power Development Corp. Limited

SECTION-1

SCOPE OF THE REVIEW

1.1.SCOPE

The total installed capacity of thermal power stations in the country as on 31-03-2016 was 210834.20 MW comprising 185326.50 MW coal/lignite, 24454.13 MW gas turbines and 1053.57 MW diesel plants.

The Review 2015-16 covers the performance of 617 coal / lignite based thermal units (above 25 MW capacity) of 175 thermal power stations aggregating to 173291.5 MW. New units which attained stabilization and considered for computation of PLF during the year 2015-16 have been included in the Review for performance analysis.

The 617 coal / lignite based thermal units includes 570 number of units considered in the previous publication, 50 new units of capacity 26275.0 MW capacity, which were synchronized and reckoned for Plant Load Factor (PLF) calculation during the year 2015-16. However, it excludes 3 such units of capacity 302.5 MW, retired during 2014-15. Details of units covered in the review are as under:

S. No.	Unit Details	No. of Units	Capacity (MW)
1	Units considered in Review 2014-2015	570	147297.0
2	New units Synchronized during 2014-2015 and 2015-2016 and considered in the review and IPP units consider for the first time (details is given in the Annexure 1.1)	50	26275.0
3	Units covered in Review of 2014-15 but not considered in the present review due to retirement (details is given in the Annexure 1.2)	03	302.5
4	Capacity upration/deration of units subsequently and considered in the review (details is given in the Annexure 1.3)	02	22.0
5.	Units Considered in the review (details is given in the Annexure 1.4)	617	173291.5

Details of new units synchronized during 2014-15 and 2015-16 and considered in the review for the first time is given in Annexure-1.1.

Details of Units retired during 2014-15 and not considered in the present review are given in Annexure- 1.2.

Details of units retired during the year 2015-16 but considered in the review is given Annexure-1.3. These units will not be considered in subsequent publications.

Details of capacity changes in units during the year 2015-16 due to upration/deration are given Annexure-1.4.

The details of total units (different make) considered in the review are given at Annexure 1.5.

Details of new units which although commissioned during 2015-16 but not considered in the review as the stabilization was not achieved during this period are given at Annexure 1.6.

Annexure-1.1

**DETAILS OF NEW UNITS SYNCHRONISED DURING 2014-2015 & 2015-2016
AND CONSIDERED IN THE REVIEW FOR THE FIRST TIME**

S. No.	Name of Station	Unit No	Organization	Capacity	Make Boiler/Turbine	Date of Synchroniz ation	Date of Reckoning of PLF
2014-15							
1	RAJPURA TPP	2	NPL	700	Larsen and Toubro/Larsen and Toubro	06-Jul-14	01-Aug-14
2	SIKKA REP. TPS	3	GSECL	250	BHEL/BHEL	29-Mar-15	14-Sep-15
3	SHREE SINGAJI TPP	2	MPPGCL	600	BHEL/BHEL	15-Oct-14	01-Jan-15
4	SASAN UMTTP	1	SPL	660	SEC CHINA/SEC CHINA	21-May-14	27-May-14
5	SASAN UMTTP	5	SPL	660	Chinese/Chinese	24-Aug-14	26-Dec-14
6	SASAN UMTTP	6	SPL	660	Chinese/Chinese	19-Mar-15	27-Mar-15
7	NIGRI TPP	1	JPPVL	660	Larsen and Toubro/Larsen and Toubro	29-Aug-14	03-Sep-14
8	NIGRI TPP	2	JPPVL	660	Larsen and Toubro/Larsen and Toubro	17-Feb-15	21-Feb-15
9	RAIKHEDA TPP	1	GCEL	685	Chinese/Chinese	02-Mar-15	01-Jun-15
10	AKALTARA TPS	4	WPCL	600	Chinese/Chinese	22-Aug-14	26-Aug-14
11	BARADARHA TPS	2	DBPCL	600	BHEL/BHEL	24-Mar-15	26-Mar-16
12	TAMNAR TPP	3	JPL	600	BHEL/BHEL	07-Jan-15	15-Jan-15
13	KORADI TPS	8	MAHAGENCO	660	Larsen and Toubro/Larsen and Toubro	30-Mar-15	16-Dec-15
14	TIRORA TPS	5	APL	660	CHINESE/CHINESE	25-Sep-14	11-Oct-14
15	AMARAVATI TPS	3	RattanIndia	270	BHEL/BHEL	29-Jan-15	03-Feb-15
16	AMARAVATI TPS	4	RattanIndia	270	BHEL/BHEL	04-Mar-15	08-Mar-15
17	AMARAVATI TPS	5	RattanIndia	270	BHEL/BHEL	12-Mar-15	13-Mar-15
18	DHARIWAL TPP	2	DIPL	300	SEC CHINA/SEC CHINA	04-Jun-14	02-Aug-14
19	DAMODARAM SANJEEVAIAH TPS	1	APPDCL	800	BHEL	28-Aug-14	05-Feb-15
20	DAMODARAM SANJEEVAIAH TPS	2	APPDCL	800	BHEL	17-Mar-15	24-Aug-15
21	SIMHAPURI TPS	4	SEPL	150	Chinese/Chinese	07-Mar-15	31-Mar-15
22	PAINAMPURAM TPP	1	SEIL	660	Chinese/Chinese	07-Feb-15	02-Mar-15

S. No.	Name of Station	Unit No	Organization	Capacity	Make Boiler/Turbine	Date of Synchroniz ation	Date of Reckoning of PLF
23	MUTHIARA TPP	1	CEPL	600	Chinese/Chinese	02-Dec-14	23-Dec-14
24	NEYVELI TPS-II EXP	2	NLC	250	BHEL/BHEL	24-Jan-15	22-Apr-15
25	TUTICORIN (JV) TPP	1	NTPL	500	BHEL	10-Mar-15	18-Jun-15
26	BARH II	5	NTPC Ltd.	660	BHEL/BHEL	04-Mar-15	18-Feb-16
27	RAGHUNATHPUR TPP	1	DVC	600	Chinese/Chinese	24-Aug-14	31-Mar-16
28	DERANG TPP	2	JITPL	600	BHEL/BHEL	24-Jan-15	12-Feb-15
29	HALDIA TPP	1	HEL	300	Chinese/Chinese	14-Jan-15	28-Jan-15
30	HALDIA TPP	2	HEL	300	Chinese/Chinese	16-Feb-15	21-Feb-15
31	TALWANDI SABO	1	TSPL	660	Chinese/Chinese	29-March-16	25-Aug-16
	SUB TOTAL	31		16645			
2015-16							
32	TALWANDI SABO TPP	3	TSPL	660	SEPCO/SEPCO	30-Oct-15	25-Nov-15
33	KALISINDH TPS	2	RRVUNL	600	Chinese/Chinese	06-Jun-15	25-Jul-15
34	PRAYAGRAJ TPP	1	PPGCL (Jaypee)	660	BHEL/BHEL	25-Dec-15	29-Feb-16
35	LALITPUR TPS	1	LPGCL	660	BHEL/BHEL	26-Mar-16	01-Oct-15
36	SIKKA REP. TPS	4	GSECL	250	BHEL/BHEL	25-Sep-15	28-Dec-15
37	ANUPPUR TPP	1	MBPMPL	600	Chinese/Chinese	20-Apr-15	20-May-15
38	VINDHYACHAL STPS	13	NTPC Ltd.	500	BHEL/BHEL	06-Aug-15	30-Oct-15
39	BALCO TPS	1	BALCO	300	Chinese/Chinese	04-Jun-15	11-Jul-15
40	BALCO TPS	2	BALCO	300	Chinese Harbin/Chinese Harbin	24-Mar-16	30-Mar-16
41	BANDAKHAR TPP	1	MCCPL	300	Chinese/Chinese	19-Jun-15	31-Jul-15
42	UCHPINDA TPP	1	RKMPPL	360	HARBIN/CHINA WESTERN	28-Oct-15	27-Nov-15
43	UCHPINDA TPP	2	RKMPPL	360	HARBIN/CHINA WESTERN	28-Jan-16	12-Feb-16
44	KAKATIYA TPS	2	TSGENCO	600	BHEL/BHEL	31-Dec-15	24-Mar-16
45	VIZAG TPP	1	HNPC	520	BHEL	27-Dec-15	11-Jan-16
46	PAINAMPURAM TPP	2	SEIL	660	Chinese/Chinese	03-Sep-15	15-Sep-15
47	MUTHIARA TPP	2	CEPL	600	Chinese/Chinese	02-Jan-16	15-Jan-16
48	TUTICORIN (JV) TPP	2	NTPL	500	BHEL	09-Jul-15	29-Aug-15
49	ITPCL TPP	1	ITPCL	600	Chinese/Chinese	19-Sep-15	29-Sep-15

S. No.	Name of Station	Unit No	Organization	Capacity	Make Boiler/Turbine	Date of Synchroniz ation	Date of Reckoning of PLF
50	RAGHUNATHPUR TPP	2	DVC	600	Chinese/Chinese	18-Jan-16	31-Mar-16
	SUB TOTAL	19		9630			
	TOTAL	50		26275			

Annexure-1.2

**UNITS RETIRED DURING 2014-15 AND ARE NOT CONSIDERED IN THE REVIEW DUE TO
RETIREMENT/DERATION**

S. No.	Name of Station	Unit No	Capacity	Make Boiler/Turbine	Date of Retirement
1	SATPURA TPS	1	62.5	ABB/GE USA	07-Aug-14
2	AMARKANTAK EXT TPS	1	120	ABL/BHEL	13-Jan-15
3	AMARKANTAK EXT TPS	2	120	ABL/BHEL	01-May-14
	SUB TOTAL	3	302.5		

Annexure-1.3

DETAILS OF UNITS RETIRED DURING THE YEAR 2015-16 BUT CONSIDERED IN THE REVIEW

S. No.	Name of Station	Unit No	Capacity	Make Boiler/Turbine	Date of Retirement
1	PANIPAT TPS	1	110	BHEL/BHEL	09-Dec-15
2	PANIPAT TPS	2	110	BHEL/BHEL	09-Dec-15
3	PANIPAT TPS	3	110	BHEL/BHEL	09-Dec-15
4	PANIPAT TPS	4	110	BHEL/BHEL	09-Dec-15
	SUB TOTAL	4	440		

Annexure-1.4**DETAILS OF CAPACITY CHANGES IN UNITS DURING THE YEAR 2015-16 DUE TO
UPRATIION/DERATION**

S. No.	Name of Station	Unit no.	Old Capacity(MW)	New Capacity(MW)	Make Boiler/Turbine
1	Sabarmati(D-F Stations)	2	110	121	BHEL/BHEL
2	Sabarmati(D-F Stations)	3	110	121	BHEL/BHEL
	Total	2	220	242	

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
BHEL/ABL						
1	BANDEL TPS	5	WEST BENGAL	WBPDC	STATE	210
2	BOKARO `B` TPS	1	JHARKHAND	DVC	CENTRAL	210
3	BOKARO `B` TPS	2	JHARKHAND	DVC	CENTRAL	210
4	CHANDRAPUR(MAHARASHTRA) STPS	1	MAHARASHTRA	MAHAGENCO	STATE	210
5	CHANDRAPUR(MAHARASHTRA) STPS	2	MAHARASHTRA	MAHAGENCO	STATE	210
6	D.P.L. TPS	6	WEST BENGAL	DPL	STATE	110
7	KOLAGHAT TPS	1	WEST BENGAL	WBPDC	STATE	210
8	KOLAGHAT TPS	2	WEST BENGAL	WBPDC	STATE	210
9	KOLAGHAT TPS	3	WEST BENGAL	WBPDC	STATE	210
10	KOLAGHAT TPS	4	WEST BENGAL	WBPDC	STATE	210
11	KORBA-III	1	CHHATTISGARH	CSPGCL	STATE	120
12	KORBA-WEST TPS	3	CHHATTISGARH	CSPGCL	STATE	210
13	KORBA-WEST TPS	4	CHHATTISGARH	CSPGCL	STATE	210
14	SANTALDIH TPS	1	WEST BENGAL	WBPDC	STATE	120
15	SANTALDIH TPS	2	WEST BENGAL	WBPDC	STATE	120
16	SANTALDIH TPS	3	WEST BENGAL	WBPDC	STATE	120
17	SANTALDIH TPS	4	WEST BENGAL	WBPDC	STATE	120
	Sub-Total	17				3020
BHEL/BHEL						
18	AMARAVATI TPS	2	MAHARASHTRA	RattanIndia	PVT	270
19	AMARAVATI TPS	3	MAHARASHTRA	RattanIndia	PVT	270
20	AMARAVATI TPS	4	MAHARASHTRA	RattanIndia	PVT	270
21	AMARAVATI TPS	5	MAHARASHTRA	RattanIndia	PVT	270
22	AMARKANTAK EXT TPS	3	MADHYA PRADESH	MPPGCL	STATE	210

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
23	ANPARA TPS	1	UTTAR PRADESH	UPRVUNL	STATE	210
24	ANPARA TPS	2	UTTAR PRADESH	UPRVUNL	STATE	210
25	ANPARA TPS	3	UTTAR PRADESH	UPRVUNL	STATE	210
26	AVANTHA BHANDAR	1	CHHATTISGARH	KWPCL	PVT	600
27	BADARPUR TPS	1	DELHI	NTPC Ltd.	CENTRAL	95
28	BADARPUR TPS	2	DELHI	NTPC Ltd.	CENTRAL	95
29	BADARPUR TPS	3	DELHI	NTPC Ltd.	CENTRAL	95
30	BADARPUR TPS	4	DELHI	NTPC Ltd.	CENTRAL	210
31	BADARPUR TPS	5	DELHI	NTPC Ltd.	CENTRAL	210
32	BAKRESWAR TPS	1	WEST BENGAL	WBPDC	STATE	210
33	BAKRESWAR TPS	2	WEST BENGAL	WBPDC	STATE	210
34	BAKRESWAR TPS	3	WEST BENGAL	WBPDC	STATE	210
35	BAKRESWAR TPS	4	WEST BENGAL	WBPDC	STATE	210
36	BAKRESWAR TPS	5	WEST BENGAL	WBPDC	STATE	210
37	BARADARHA TPS	1	CHHATTISGARH	DBPCL	PVT	600
38	BARADARHA TPS	2	CHHATTISGARH	DBPCL	PVT	600
39	BARAUNI TPS	6	BIHAR	NTPC Ltd.	CENTRAL	105
40	BARAUNI TPS	7	BIHAR	NTPC Ltd.	CENTRAL	105
41	BARH II	4	BIHAR	NTPC Ltd.	CENTRAL	660
42	BARH II	5	BIHAR	NTPC Ltd.	CENTRAL	660
43	BARSINGSAR LIGNITE	1	RAJASTHAN	NLC	CENTRAL	125
44	BARSINGSAR LIGNITE	2	RAJASTHAN	NLC	CENTRAL	125
45	BELA TPS	1	MAHARASHTRA	IEPL	PVT	270
46	BELLARY TPS	1	KARNATAKA	KPCL	STATE	500
47	BELLARY TPS	2	KARNATAKA	KPCL	STATE	500
48	BHILAI TPS	1	CHHATTISGARH	NSPCL	CENTRAL	250

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
49	BHILAI TPS	2	CHHATTISGARH	NSPCL	CENTRAL	250
50	BHUSAWAL TPS	2	MAHARASHTRA	MAHAGENCO	STATE	210
51	BHUSAWAL TPS	3	MAHARASHTRA	MAHAGENCO	STATE	210
52	BHUSAWAL TPS	4	MAHARASHTRA	MAHAGENCO	STATE	500
53	BHUSAWAL TPS	5	MAHARASHTRA	MAHAGENCO	STATE	500
54	BINA TPS	1	MADHYA PRADESH	JPPVL	PVT	250
55	BINA TPS	2	MADHYA PRADESH	JPPVL	PVT	250
56	BOKARO `B` TPS	3	JHARKHAND	DVC	CENTRAL	210
57	BUDGE BUDGE TPS	3	WEST BENGAL	CESC	PVT	250
58	CHANDRAPUR(ASSAM) TPS	2	ASSAM	APGPCL	STATE	30
59	CHANDRAPUR(MAHARASHTRA) STPS	3	MAHARASHTRA	MAHAGENCO	STATE	210
60	CHANDRAPUR(MAHARASHTRA) STPS	4	MAHARASHTRA	MAHAGENCO	STATE	210
61	CHANDRAPUR(MAHARASHTRA) STPS	5	MAHARASHTRA	MAHAGENCO	STATE	500
62	CHANDRAPUR(MAHARASHTRA) STPS	6	MAHARASHTRA	MAHAGENCO	STATE	500
63	CHANDRAPUR(MAHARASHTRA) STPS	7	MAHARASHTRA	MAHAGENCO	STATE	500
64	CHANDRAPURA(DVC) TPS	7	JHARKHAND	DVC	CENTRAL	250
65	CHANDRAPURA(DVC) TPS	8	JHARKHAND	DVC	CENTRAL	250
66	CHHABRA TPP	1	RAJASTHAN	RRVUNL	STATE	250
67	CHHABRA TPP	2	RAJASTHAN	RRVUNL	STATE	250
68	CHHABRA TPP	3	RAJASTHAN	RRVUNL	STATE	250
69	CHHABRA TPP	4	RAJASTHAN	RRVUNL	STATE	250
70	D.P.L. TPS	8	WEST BENGAL	DPL	STATE	250
71	DADRI (NCTPP)	1	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
72	DADRI (NCTPP)	2	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
73	DADRI (NCTPP)	3	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
74	DADRI (NCTPP)	4	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
75	DADRI (NCTPP)	5	UTTAR PRADESH	NTPC Ltd.	CENTRAL	490
76	DADRI (NCTPP)	6	UTTAR PRADESH	NTPC Ltd.	CENTRAL	490
77	DAHANU TPS	1	MAHARASHTRA	RIL (DAHANU)	PVT	250
78	DAHANU TPS	2	MAHARASHTRA	RIL (DAHANU)	PVT	250
79	DERANG TPP	1	ORISSA	JITPL	PVT	600
80	DERANG TPP	2	ORISSA	JITPL	PVT	600
81	DSPM TPS	1	CHHATTISGARH	CSPGCL	STATE	250
82	DSPM TPS	2	CHHATTISGARH	CSPGCL	STATE	250
83	DURGAPUR STEEL TPS	1	WEST BENGAL	DVC	CENTRAL	500
84	DURGAPUR STEEL TPS	2	WEST BENGAL	DVC	CENTRAL	500
85	DURGAPUR TPS	4	WEST BENGAL	DVC	CENTRAL	210
86	Dr. N.TATA RAO TPS	1	ANDHRA PRADESH	APGENCO	STATE	210
87	Dr. N.TATA RAO TPS	2	ANDHRA PRADESH	APGENCO	STATE	210
88	Dr. N.TATA RAO TPS	3	ANDHRA PRADESH	APGENCO	STATE	210
89	Dr. N.TATA RAO TPS	4	ANDHRA PRADESH	APGENCO	STATE	210
90	Dr. N.TATA RAO TPS	5	ANDHRA PRADESH	APGENCO	STATE	210
91	Dr. N.TATA RAO TPS	6	ANDHRA PRADESH	APGENCO	STATE	210
92	Dr. N.TATA RAO TPS	7	ANDHRA PRADESH	APGENCO	STATE	500
93	ENNORE TPS	5	TAMIL NADU	TNGDCL	STATE	110
94	FARAKKA STPS	1	WEST BENGAL	NTPC Ltd.	CENTRAL	200
95	FARAKKA STPS	2	WEST BENGAL	NTPC Ltd.	CENTRAL	200
96	FARAKKA STPS	3	WEST BENGAL	NTPC Ltd.	CENTRAL	200
97	FARAKKA STPS	6	WEST BENGAL	NTPC Ltd.	CENTRAL	500

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
98	GANDHI NAGAR TPS	1	GUJARAT	GSECL	STATE	120
99	GANDHI NAGAR TPS	2	GUJARAT	GSECL	STATE	120
100	GANDHI NAGAR TPS	3	GUJARAT	GSECL	STATE	210
101	GANDHI NAGAR TPS	4	GUJARAT	GSECL	STATE	210
102	GANDHI NAGAR TPS	5	GUJARAT	GSECL	STATE	210
103	GH TPS (LEH.MOH.)	1	PUNJAB	PSPCL	STATE	210
104	GH TPS (LEH.MOH.)	2	PUNJAB	PSPCL	STATE	210
105	GH TPS (LEH.MOH.)	3	PUNJAB	PSPCL	STATE	250
106	GH TPS (LEH.MOH.)	4	PUNJAB	PSPCL	STATE	250
107	GIRAL TPS	1	RAJASTHAN	RRVUNL	STATE	125
108	GIRAL TPS	2	RAJASTHAN	RRVUNL	STATE	125
109	GND TPS(BHATINDA)	1	PUNJAB	PSPCL	STATE	110
110	GND TPS(BHATINDA)	2	PUNJAB	PSPCL	STATE	110
111	GND TPS(BHATINDA)	3	PUNJAB	PSPCL	STATE	110
112	GND TPS(BHATINDA)	4	PUNJAB	PSPCL	STATE	110
113	HARDUAGANJ TPS	5	UTTAR PRADESH	UPRVUNL	STATE	60
114	HARDUAGANJ TPS	7	UTTAR PRADESH	UPRVUNL	STATE	105
115	HARDUAGANJ TPS	8	UTTAR PRADESH	UPRVUNL	STATE	250
116	HARDUAGANJ TPS	9	UTTAR PRADESH	UPRVUNL	STATE	250
117	IB VALLEY TPS	1	ORISSA	OPGC	STATE	210
118	IB VALLEY TPS	2	ORISSA	OPGC	STATE	210
119	INDIRA GANDHI STPP	1	HARYANA	APCPL	CENTRAL	500
120	INDIRA GANDHI STPP	2	HARYANA	APCPL	CENTRAL	500
121	INDIRA GANDHI STPP	3	HARYANA	APCPL	CENTRAL	500
122	JOJOBBERA TPS	2	JHARKHAND	TATA PCL	PVT	120
123	JOJOBBERA TPS	3	JHARKHAND	TATA PCL	PVT	120

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
124	JOJOBERA TPS	4	JHARKHAND	TATA PCL	PVT	120
125	KAHALGAON TPS	5	BIHAR	NTPC Ltd.	CENTRAL	500
126	KAHALGAON TPS	6	BIHAR	NTPC Ltd.	CENTRAL	500
127	KAHALGAON TPS	7	BIHAR	NTPC Ltd.	CENTRAL	500
128	KAKATIYA TPS	1	TELANGANA	TSGENCO	STATE	500
129	KAKATIYA TPS	2	TELANGANA	TSGENCO	STATE	600
130	KHAPARKHEDA TPS	1	MAHARASHTRA	MAHAGENCO	STATE	210
131	KHAPARKHEDA TPS	2	MAHARASHTRA	MAHAGENCO	STATE	210
132	KHAPARKHEDA TPS	3	MAHARASHTRA	MAHAGENCO	STATE	210
133	KHAPARKHEDA TPS	4	MAHARASHTRA	MAHAGENCO	STATE	210
134	KHAPARKHEDA TPS	5	MAHARASHTRA	MAHAGENCO	STATE	500
135	KODARMA TPP	1	JHARKHAND	DVC	CENTRAL	500
136	KODARMA TPP	2	JHARKHAND	DVC	CENTRAL	500
137	KOLAGHAT TPS	5	WEST BENGAL	WBPDC	STATE	210
138	KOLAGHAT TPS	6	WEST BENGAL	WBPDC	STATE	210
139	KORADI TPS	5	MAHARASHTRA	MAHAGENCO	STATE	200
140	KORADI TPS	6	MAHARASHTRA	MAHAGENCO	STATE	210
141	KORADI TPS	7	MAHARASHTRA	MAHAGENCO	STATE	210
142	KORBA STPS	1	CHHATTISGARH	NTPC Ltd.	CENTRAL	200
143	KORBA STPS	2	CHHATTISGARH	NTPC Ltd.	CENTRAL	200
144	KORBA STPS	3	CHHATTISGARH	NTPC Ltd.	CENTRAL	200
145	KORBA STPS	4	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
146	KORBA STPS	5	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
147	KORBA STPS	6	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
148	KORBA STPS	7	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
149	KORBA-III	2	CHHATTISGARH	CSPGCL	STATE	120

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
150	KORBA-WEST TPS	1	CHHATTISGARH	CSPGCL	STATE	210
151	KORBA-WEST TPS	2	CHHATTISGARH	CSPGCL	STATE	210
152	KORBA-WEST TPS	5	CHHATTISGARH	CSPGCL	STATE	500
153	KOTA TPS	1	RAJASTHAN	RRVUNL	STATE	110
154	KOTA TPS	2	RAJASTHAN	RRVUNL	STATE	110
155	KOTA TPS	3	RAJASTHAN	RRVUNL	STATE	210
156	KOTA TPS	4	RAJASTHAN	RRVUNL	STATE	210
157	KOTA TPS	5	RAJASTHAN	RRVUNL	STATE	210
158	KOTA TPS	6	RAJASTHAN	RRVUNL	STATE	195
159	KOTA TPS	7	RAJASTHAN	RRVUNL	STATE	195
160	KOTHAGUDEM TPS	1	TELANGANA	TSGENCO	STATE	60
161	KOTHAGUDEM TPS	5	TELANGANA	TSGENCO	STATE	120
162	KOTHAGUDEM TPS	6	TELANGANA	TSGENCO	STATE	120
163	KOTHAGUDEM TPS	7	TELANGANA	TSGENCO	STATE	120
164	KOTHAGUDEM TPS	8	TELANGANA	TSGENCO	STATE	120
165	KOTHAGUDEM TPS (NEW)	1	TELANGANA	TSGENCO	STATE	250
166	KOTHAGUDEM TPS (NEW)	2	TELANGANA	TSGENCO	STATE	250
167	KOTHAGUDEM TPS (NEW)	3	TELANGANA	TSGENCO	STATE	500
168	KUTCH LIG. TPS	1	GUJARAT	GSECL	STATE	70
169	KUTCH LIG. TPS	2	GUJARAT	GSECL	STATE	70
170	KUTCH LIG. TPS	4	GUJARAT	GSECL	STATE	75
171	LALITPUR TPS	1	UTTAR PRADESH	LPGCL	PVT	660
172	MAHADEV PRASAD STPP	1	JHARKHAND	ADHUNIK	PVT	270
173	MAHADEV PRASAD STPP	2	JHARKHAND	ADHUNIK	PVT	270
174	MAITHON RB TPP	1	JHARKHAND	MPL	PVT	525
175	MAITHON RB TPP	2	JHARKHAND	MPL	PVT	525

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
176	MARWA TPS	1	CHHATTISGARH	CSPGCL	STATE	500
177	MAUDA TPS	1	MAHARASHTRA	NTPC Ltd.	CENTRAL	500
178	MAUDA TPS	2	MAHARASHTRA	NTPC Ltd.	CENTRAL	500
179	MEJIA TPS	1	WEST BENGAL	DVC	CENTRAL	210
180	MEJIA TPS	2	WEST BENGAL	DVC	CENTRAL	210
181	MEJIA TPS	3	WEST BENGAL	DVC	CENTRAL	210
182	MEJIA TPS	4	WEST BENGAL	DVC	CENTRAL	210
183	MEJIA TPS	5	WEST BENGAL	DVC	CENTRAL	250
184	MEJIA TPS	6	WEST BENGAL	DVC	CENTRAL	250
185	MEJIA TPS	7	WEST BENGAL	DVC	CENTRAL	500
186	MEJIA TPS	8	WEST BENGAL	DVC	CENTRAL	500
187	METTUR TPS	1	TAMIL NADU	TNGDCL	STATE	210
188	METTUR TPS	2	TAMIL NADU	TNGDCL	STATE	210
189	METTUR TPS	3	TAMIL NADU	TNGDCL	STATE	210
190	METTUR TPS	4	TAMIL NADU	TNGDCL	STATE	210
191	MUZAFFARPUR TPS	1	BIHAR	K.B.U.N.L	CENTRAL	110
192	MUZAFFARPUR TPS	2	BIHAR	K.B.U.N.L	CENTRAL	110
193	NASIK (P) TPS	1	MAHARASHTRA	STPL	PVT	270
194	NASIK TPS	3	MAHARASHTRA	MAHAGENCO	STATE	210
195	NASIK TPS	4	MAHARASHTRA	MAHAGENCO	STATE	210
196	NASIK TPS	5	MAHARASHTRA	MAHAGENCO	STATE	210
197	NEYVELI TPS-II	4	TAMIL NADU	NLC	CENTRAL	210
198	NEYVELI TPS-II	5	TAMIL NADU	NLC	CENTRAL	210
199	NEYVELI TPS-II	6	TAMIL NADU	NLC	CENTRAL	210
200	NEYVELI TPS-II	7	TAMIL NADU	NLC	CENTRAL	210
201	NEYVELI TPS-II EXP	1	TAMIL NADU	NLC	CENTRAL	250

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
202	NEYVELI TPS-II EXP	2	TAMIL NADU	NLC	CENTRAL	250
203	NORTH CHENNAI TPS	1	TAMIL NADU	TNGDCL	STATE	210
204	NORTH CHENNAI TPS	2	TAMIL NADU	TNGDCL	STATE	210
205	NORTH CHENNAI TPS	3	TAMIL NADU	TNGDCL	STATE	210
206	NORTH CHENNAI TPS	4	TAMIL NADU	TNGDCL	STATE	600
207	NORTH CHENNAI TPS	5	TAMIL NADU	TNGDCL	STATE	600
208	OBRA TPS	7	UTTAR PRADESH	UPRVUNL	STATE	94
209	OBRA TPS	8	UTTAR PRADESH	UPRVUNL	STATE	94
210	OBRA TPS	9	UTTAR PRADESH	UPRVUNL	STATE	200
211	OBRA TPS	10	UTTAR PRADESH	UPRVUNL	STATE	200
212	OBRA TPS	11	UTTAR PRADESH	UPRVUNL	STATE	200
213	OBRA TPS	12	UTTAR PRADESH	UPRVUNL	STATE	200
214	OBRA TPS	13	UTTAR PRADESH	UPRVUNL	STATE	200
215	OP JINDAL TPS	1	CHHATTISGARH	JPL	PVT	250
216	OP JINDAL TPS	2	CHHATTISGARH	JPL	PVT	250
217	OP JINDAL TPS	3	CHHATTISGARH	JPL	PVT	250
218	OP JINDAL TPS	4	CHHATTISGARH	JPL	PVT	250
219	PANIPAT TPS	1	HARYANA	HPGCL	STATE	110
220	PANIPAT TPS	2	HARYANA	HPGCL	STATE	110
221	PANIPAT TPS	3	HARYANA	HPGCL	STATE	110
222	PANIPAT TPS	4	HARYANA	HPGCL	STATE	110
223	PANIPAT TPS	5	HARYANA	HPGCL	STATE	210
224	PANIPAT TPS	6	HARYANA	HPGCL	STATE	210
225	PANIPAT TPS	7	HARYANA	HPGCL	STATE	250
226	PANIPAT TPS	8	HARYANA	HPGCL	STATE	250
227	PANKI TPS	3	UTTAR PRADESH	UPRVUNL	STATE	105

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
228	PANKI TPS	4	UTTAR PRADESH	UPRVUNL	STATE	105
229	PARAS TPS	3	MAHARASHTRA	MAHAGENCO	STATE	250
230	PARAS TPS	4	MAHARASHTRA	MAHAGENCO	STATE	250
231	PARICHHA TPS	1	UTTAR PRADESH	UPRVUNL	STATE	110
232	PARICHHA TPS	2	UTTAR PRADESH	UPRVUNL	STATE	110
233	PARICHHA TPS	3	UTTAR PRADESH	UPRVUNL	STATE	210
234	PARICHHA TPS	4	UTTAR PRADESH	UPRVUNL	STATE	210
235	PARICHHA TPS	5	UTTAR PRADESH	UPRVUNL	STATE	250
236	PARICHHA TPS	6	UTTAR PRADESH	UPRVUNL	STATE	250
237	PARLI TPS	3	MAHARASHTRA	MAHAGENCO	STATE	210
238	PARLI TPS	4	MAHARASHTRA	MAHAGENCO	STATE	210
239	PARLI TPS	5	MAHARASHTRA	MAHAGENCO	STATE	210
240	PARLI TPS	6	MAHARASHTRA	MAHAGENCO	STATE	250
241	PARLI TPS	7	MAHARASHTRA	MAHAGENCO	STATE	250
242	PATRATU TPS	7	JHARKHAND	PVUNL	CENTRAL	105
243	PATRATU TPS	8	JHARKHAND	PVUNL	CENTRAL	105
244	PATRATU TPS	9	JHARKHAND	PVUNL	CENTRAL	110
245	PATRATU TPS	10	JHARKHAND	PVUNL	CENTRAL	110
246	PRAYAGRAJ TPP	1	UTTAR PRADESH	PPGCL (Jaypee)	PVT	660
247	RAICHUR TPS	1	KARNATAKA	KPCL	STATE	210
248	RAICHUR TPS	2	KARNATAKA	KPCL	STATE	210
249	RAICHUR TPS	3	KARNATAKA	KPCL	STATE	210
250	RAICHUR TPS	4	KARNATAKA	KPCL	STATE	210
251	RAICHUR TPS	5	KARNATAKA	KPCL	STATE	210
252	RAICHUR TPS	6	KARNATAKA	KPCL	STATE	210
253	RAICHUR TPS	7	KARNATAKA	KPCL	STATE	210

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
254	RAICHUR TPS	8	KARNATAKA	KPCL	STATE	250
255	RAJGHAT TPS	1	DELHI	IPGPCL	STATE	67.5
256	RAJGHAT TPS	2	DELHI	IPGPCL	STATE	67.5
257	RAMAGUNDEM STPS	4	TELANGANA	NTPC Ltd.	CENTRAL	500
258	RAMAGUNDEM STPS	5	TELANGANA	NTPC Ltd.	CENTRAL	500
259	RAMAGUNDEM STPS	6	TELANGANA	NTPC Ltd.	CENTRAL	500
260	RAMAGUNDEM STPS	7	TELANGANA	NTPC Ltd.	CENTRAL	500
261	RAYALASEEMA TPS	1	ANDHRA PRADESH	APGENCO	STATE	210
262	RAYALASEEMA TPS	2	ANDHRA PRADESH	APGENCO	STATE	210
263	RAYALASEEMA TPS	3	ANDHRA PRADESH	APGENCO	STATE	210
264	RAYALASEEMA TPS	4	ANDHRA PRADESH	APGENCO	STATE	210
265	RAYALASEEMA TPS	5	ANDHRA PRADESH	APGENCO	STATE	210
266	RIHAND STPS	3	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
267	RIHAND STPS	4	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
268	RIHAND STPS	5	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
269	RIHAND STPS	6	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
270	ROPAR TPS	1	PUNJAB	PSPCL	STATE	210
271	ROPAR TPS	2	PUNJAB	PSPCL	STATE	210
272	ROPAR TPS	3	PUNJAB	PSPCL	STATE	210
273	ROPAR TPS	4	PUNJAB	PSPCL	STATE	210
274	ROPAR TPS	5	PUNJAB	PSPCL	STATE	210
275	ROPAR TPS	6	PUNJAB	PSPCL	STATE	210
276	SABARMATI (D-F STATIONS)	1	GUJARAT	TOR. POW.	PVT	120
277	SABARMATI (D-F STATIONS)	2	GUJARAT	TOR. POW.	PVT	121
278	SABARMATI (D-F STATIONS)	3	GUJARAT	TOR. POW.	PVT	121
279	SANJAY GANDHI TPS	1	MADHYA PRADESH	MPPGCL	STATE	210

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
280	SANJAY GANDHI TPS	2	MADHYA PRADESH	MPPGCL	STATE	210
281	SANJAY GANDHI TPS	3	MADHYA PRADESH	MPPGCL	STATE	210
282	SANJAY GANDHI TPS	4	MADHYA PRADESH	MPPGCL	STATE	210
283	SANJAY GANDHI TPS	5	MADHYA PRADESH	MPPGCL	STATE	500
284	SANTALDIH TPS	5	WEST BENGAL	WBPDC	STATE	250
285	SANTALDIH TPS	6	WEST BENGAL	WBPDC	STATE	250
286	SATPURA TPS	6	MADHYA PRADESH	MPPGCL	STATE	200
287	SATPURA TPS	7	MADHYA PRADESH	MPPGCL	STATE	210
288	SATPURA TPS	8	MADHYA PRADESH	MPPGCL	STATE	210
289	SATPURA TPS	9	MADHYA PRADESH	MPPGCL	STATE	210
290	SATPURA TPS	11	MADHYA PRADESH	MPPGCL	STATE	250
291	SHREE SINGAJI TPP	1	MADHYA PRADESH	MPPGCL	STATE	600
292	SHREE SINGAJI TPP	2	MADHYA PRADESH	MPPGCL	STATE	600
293	SIKKA REP. TPS	1	GUJARAT	GSECL	STATE	120
294	SIKKA REP. TPS	2	GUJARAT	GSECL	STATE	120
295	SIKKA REP. TPS	3	GUJARAT	GSECL	STATE	250
296	SIKKA REP. TPS	4	GUJARAT	GSECL	STATE	250
297	SIMHADRI	1	ANDHRA PRADESH	NTPC Ltd.	CENTRAL	500
298	SIMHADRI	2	ANDHRA PRADESH	NTPC Ltd.	CENTRAL	500
299	SIMHADRI	3	ANDHRA PRADESH	NTPC Ltd.	CENTRAL	500
300	SIMHADRI	4	ANDHRA PRADESH	NTPC Ltd.	CENTRAL	500
301	SINGRAULI STPS	1	UTTAR PRADESH	NTPC Ltd.	CENTRAL	200
302	SINGRAULI STPS	2	UTTAR PRADESH	NTPC Ltd.	CENTRAL	200
303	SINGRAULI STPS	3	UTTAR PRADESH	NTPC Ltd.	CENTRAL	200
304	SINGRAULI STPS	4	UTTAR PRADESH	NTPC Ltd.	CENTRAL	200
305	SINGRAULI STPS	5	UTTAR PRADESH	NTPC Ltd.	CENTRAL	200

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
306	SINGRAULI STPS	6	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
307	SINGRAULI STPS	7	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
308	SIPAT STPS	4	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
309	SIPAT STPS	5	CHHATTISGARH	NTPC Ltd.	CENTRAL	500
310	SOUTHERN REPL. TPS	1	WEST BENGAL	CESC	PVT	67.5
311	SOUTHERN REPL. TPS	2	WEST BENGAL	CESC	PVT	67.5
312	SURAT LIG. TPS	1	GUJARAT	GIPCL	PVT	125
313	SURAT LIG. TPS	2	GUJARAT	GIPCL	PVT	125
314	SURAT LIG. TPS	3	GUJARAT	GIPCL	PVT	125
315	SURAT LIG. TPS	4	GUJARAT	GIPCL	PVT	125
316	SURATGARH TPS	1	RAJASTHAN	RRVUNL	STATE	250
317	SURATGARH TPS	2	RAJASTHAN	RRVUNL	STATE	250
318	SURATGARH TPS	3	RAJASTHAN	RRVUNL	STATE	250
319	SURATGARH TPS	4	RAJASTHAN	RRVUNL	STATE	250
320	SURATGARH TPS	5	RAJASTHAN	RRVUNL	STATE	250
321	SURATGARH TPS	6	RAJASTHAN	RRVUNL	STATE	250
322	TALCHER (OLD) TPS	5	ORISSA	NTPC Ltd.	CENTRAL	110
323	TALCHER (OLD) TPS	6	ORISSA	NTPC Ltd.	CENTRAL	110
324	TALCHER STPS	3	ORISSA	NTPC Ltd.	CENTRAL	500
325	TALCHER STPS	4	ORISSA	NTPC Ltd.	CENTRAL	500
326	TALCHER STPS	5	ORISSA	NTPC Ltd.	CENTRAL	500
327	TALCHER STPS	6	ORISSA	NTPC Ltd.	CENTRAL	500
328	TAMNAR TPP	1	CHHATTISGARH	JPL	PVT	600
329	TAMNAR TPP	2	CHHATTISGARH	JPL	PVT	600
330	TAMNAR TPP	3	CHHATTISGARH	JPL	PVT	600
331	TANDA TPS	3	UTTAR PRADESH	NTPC Ltd.	CENTRAL	110

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
332	TANDA TPS	4	UTTAR PRADESH	NTPC Ltd.	CENTRAL	110
333	TENUGHAT TPS	1	JHARKHAND	TVNL	STATE	210
334	TENUGHAT TPS	2	JHARKHAND	TVNL	STATE	210
335	TORANGALLU TPS(SBU-I)	1	KARNATAKA	JSWEL	PVT	130
336	TORANGALLU TPS(SBU-I)	2	KARNATAKA	JSWEL	PVT	130
337	TROMBAY TPS	5	MAHARASHTRA	TATA PCL	PVT	500
338	TROMBAY TPS	6	MAHARASHTRA	TATA PCL	PVT	500
339	TROMBAY TPS	8	MAHARASHTRA	TATA PCL	PVT	250
340	TUTICORIN (JV) TPP	1	TAMIL NADU	NTPL	CENTRAL	500
341	TUTICORIN (JV) TPP	2	TAMIL NADU	NTPL	CENTRAL	500
342	TUTICORIN TPS	1	TAMIL NADU	TNGDCL	STATE	210
343	TUTICORIN TPS	2	TAMIL NADU	TNGDCL	STATE	210
344	TUTICORIN TPS	3	TAMIL NADU	TNGDCL	STATE	210
345	TUTICORIN TPS	4	TAMIL NADU	TNGDCL	STATE	210
346	TUTICORIN TPS	5	TAMIL NADU	TNGDCL	STATE	210
347	UKAI TPS	1	GUJARAT	GSECL	STATE	120
348	UKAI TPS	2	GUJARAT	GSECL	STATE	120
349	UKAI TPS	3	GUJARAT	GSECL	STATE	200
350	UKAI TPS	4	GUJARAT	GSECL	STATE	200
351	UKAI TPS	5	GUJARAT	GSECL	STATE	210
352	UKAI TPS	6	GUJARAT	GSECL	STATE	500
353	UNCHAHAAR TPS	1	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
354	UNCHAHAAR TPS	2	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
355	UNCHAHAAR TPS	3	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
356	UNCHAHAAR TPS	4	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210
357	UNCHAHAAR TPS	5	UTTAR PRADESH	NTPC Ltd.	CENTRAL	210

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
358	VALLUR TPP	1	TAMIL NADU	NTECL	CENTRAL	500
359	VALLUR TPP	2	TAMIL NADU	NTECL	CENTRAL	500
360	VALLUR TPP	3	TAMIL NADU	NTECL	CENTRAL	500
361	VINDHYACHAL STPS	7	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
362	VINDHYACHAL STPS	8	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
363	VINDHYACHAL STPS	9	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
364	VINDHYACHAL STPS	10	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
365	VINDHYACHAL STPS	11	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
366	VINDHYACHAL STPS	12	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
367	VINDHYACHAL STPS	13	MADHYA PRADESH	NTPC Ltd.	CENTRAL	500
368	VIZAG TPP	1	ANDHRA PRADESH	HNPC	PVT	520
369	WANAKBORI TPS	1	GUJARAT	GSECL	STATE	210
370	WANAKBORI TPS	2	GUJARAT	GSECL	STATE	210
371	WANAKBORI TPS	3	GUJARAT	GSECL	STATE	210
372	WANAKBORI TPS	4	GUJARAT	GSECL	STATE	210
373	WANAKBORI TPS	5	GUJARAT	GSECL	STATE	210
374	WANAKBORI TPS	6	GUJARAT	GSECL	STATE	210
375	WANAKBORI TPS	7	GUJARAT	GSECL	STATE	210
	Sub-Total	358				98315
CHINA/CHINA						
376	AKALTARA TPS	3	CHHATTISGARH	WPCL	PVT	600
377	AKALTARA TPS	4	CHHATTISGARH	WPCL	PVT	600
378	ANPARA C TPS	1	UTTAR PRADESH	LAPPL	PVT	600
379	ANPARA C TPS	2	UTTAR PRADESH	LAPPL	PVT	600
380	ANUPPUR TPP	1	MADHYA PRADESH	MBPMPL	PVT	600
381	BALCO TPS	1	CHHATTISGARH	BALCO	PVT	300

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
382	BALCO TPS	2	CHHATTISGARH	BALCO	PVT	300
383	BANDAKHAR TPP	1	CHHATTISGARH	MCCPL	PVT	300
384	BUTIBORI TPP	1	MAHARASHTRA	VIP	PVT	300
385	BUTIBORI TPP	2	MAHARASHTRA	VIP	PVT	300
386	D.P.L. TPS	7	WEST BENGAL	DPL	STATE	300
387	DHARIWAL TPP	1	MAHARASHTRA	DIPL	PVT	300
388	DHARIWAL TPP	2	MAHARASHTRA	DIPL	PVT	300
389	GEPL TPP Ph-I	1	MAHARASHTRA	GEPL	PVT	60
390	GEPL TPP Ph-I	2	MAHARASHTRA	GEPL	PVT	60
391	GMR WARORA TPS	1	MAHARASHTRA	GMR ENERG	PVT	300
392	GMR WARORA TPS	2	MAHARASHTRA	GMR ENERG	PVT	300
393	HALDIA TPP	1	WEST BENGAL	HEL	PVT	300
394	HALDIA TPP	2	WEST BENGAL	HEL	PVT	300
395	ITPCL TPP	1	TAMIL NADU	ITPCL	PVT	600
396	JALIPA KAPURDI TPP	1	RAJASTHAN	RWPL (JSW)	PVT	135
397	JALIPA KAPURDI TPP	2	RAJASTHAN	RWPL (JSW)	PVT	135
398	JALIPA KAPURDI TPP	3	RAJASTHAN	RWPL (JSW)	PVT	135
399	JALIPA KAPURDI TPP	4	RAJASTHAN	RWPL (JSW)	PVT	135
400	JALIPA KAPURDI TPP	5	RAJASTHAN	RWPL (JSW)	PVT	135
401	JALIPA KAPURDI TPP	6	RAJASTHAN	RWPL (JSW)	PVT	135
402	JALIPA KAPURDI TPP	7	RAJASTHAN	RWPL (JSW)	PVT	135
403	JALIPA KAPURDI TPP	8	RAJASTHAN	RWPL (JSW)	PVT	135
404	JSW RATNAGIRI TPP	1	MAHARASHTRA	JSWEL	PVT	300
405	JSW RATNAGIRI TPP	2	MAHARASHTRA	JSWEL	PVT	300
406	JSW RATNAGIRI TPP	3	MAHARASHTRA	JSWEL	PVT	300
407	JSW RATNAGIRI TPP	4	MAHARASHTRA	JSWEL	PVT	300

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
408	KALISINDH TPS	1	RAJASTHAN	RRVUNL	STATE	600
409	KALISINDH TPS	2	RAJASTHAN	RRVUNL	STATE	600
410	KAMALANGA TPS	1	ORISSA	GMR ENERG	PVT	350
411	KAMALANGA TPS	2	ORISSA	GMR ENERG	PVT	350
412	KAMALANGA TPS	3	ORISSA	GMR ENERG	PVT	350
413	KASAIPALLI TPP	1	CHHATTISGARH	ACB	PVT	135
414	KASAIPALLI TPP	2	CHHATTISGARH	ACB	PVT	135
415	KAWAI TPS	1	RAJASTHAN	APL	PVT	660
416	KAWAI TPS	2	RAJASTHAN	APL	PVT	660
417	MAHAN TPP	1	MADHYA PRADESH	ESSARPMPL	PVT	600
418	MAHATMA GANDHI TPS	1	HARYANA	JhPL(HR)	PVT	660
419	MAHATMA GANDHI TPS	2	HARYANA	JhPL(HR)	PVT	660
420	METTUR TPS - II	1	TAMIL NADU	TNGDCL	STATE	600
421	MIHAN TPS	1	MAHARASHTRA	AMNEPL	PVT	61.5
422	MIHAN TPS	2	MAHARASHTRA	AMNEPL	PVT	61.5
423	MIHAN TPS	3	MAHARASHTRA	AMNEPL	PVT	61.5
424	MIHAN TPS	4	MAHARASHTRA	AMNEPL	PVT	61.5
425	MUNDRA TPS	1	GUJARAT	APL	PVT	330
426	MUNDRA TPS	2	GUJARAT	APL	PVT	330
427	MUNDRA TPS	3	GUJARAT	APL	PVT	330
428	MUNDRA TPS	4	GUJARAT	APL	PVT	330
429	MUNDRA TPS	5	GUJARAT	APL	PVT	660
430	MUNDRA TPS	6	GUJARAT	APL	PVT	660
431	MUNDRA TPS	7	GUJARAT	APL	PVT	660
432	MUNDRA TPS	8	GUJARAT	APL	PVT	660
433	MUNDRA TPS	9	GUJARAT	APL	PVT	660

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
434	MUTHIARA TPP	1	TAMIL NADU	CEPL	PVT	600
435	MUTHIARA TPP	2	TAMIL NADU	CEPL	PVT	600
436	PAINAMPURAM TPP	1	ANDHRA PRADESH	SEIL	PVT	660
437	PAINAMPURAM TPP	2	ANDHRA PRADESH	SEIL	PVT	660
438	PATHADI TPP	1	CHHATTISGARH	LANCO	PVT	300
439	PATHADI TPP	2	CHHATTISGARH	LANCO	PVT	300
440	RAGHUNATHPUR TPP	1	WEST BENGAL	DVC	CENTRAL	600
441	RAGHUNATHPUR TPP	2	WEST BENGAL	DVC	CENTRAL	600
442	RAJIV GANDHI TPS	1	HARYANA	HPGCL	STATE	600
443	RAJIV GANDHI TPS	2	HARYANA	HPGCL	STATE	600
444	ROSA TPP Ph-I	1	UTTAR PRADESH	RPSCL	PVT	300
445	ROSA TPP Ph-I	2	UTTAR PRADESH	RPSCL	PVT	300
446	ROSA TPP Ph-I	3	UTTAR PRADESH	RPSCL	PVT	300
447	ROSA TPP Ph-I	4	UTTAR PRADESH	RPSCL	PVT	300
448	SAGARDIGHI TPS	1	WEST BENGAL	WBPDC	STATE	300
449	SAGARDIGHI TPS	2	WEST BENGAL	WBPDC	STATE	300
450	SALAYA TPP	1	GUJARAT	EPGL	PVT	600
451	SALAYA TPP	2	GUJARAT	EPGL	PVT	600
452	SALORA TPP	1	CHHATTISGARH	VVL	PVT	135
453	SASAN UMTTP	1	MADHYA PRADESH	SPL	PVT	660
454	SASAN UMTTP	2	MADHYA PRADESH	SPL	PVT	660
455	SASAN UMTTP	3	MADHYA PRADESH	SPL	PVT	660
456	SASAN UMTTP	4	MADHYA PRADESH	SPL	PVT	660
457	SASAN UMTTP	5	MADHYA PRADESH	SPL	PVT	660
458	SASAN UMTTP	6	MADHYA PRADESH	SPL	PVT	660
459	SIMHAPURI TPS	1	ANDHRA PRADESH	SEPL	PVT	150

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
460	SIMHAPURI TPS	2	ANDHRA PRADESH	SEPL	PVT	150
461	STERLITE TPP	1	ORISSA	SEL	PVT	600
462	STERLITE TPP	2	ORISSA	SEL	PVT	600
463	STERLITE TPP	3	ORISSA	SEL	PVT	600
464	STERLITE TPP	4	ORISSA	SEL	PVT	600
465	SVPL TPP	1	CHHATTISGARH	SVPPPL	PVT	63
466	TALWANDI SABO TPP	1	PUNJAB	TSPL	PVT	660
467	TALWANDI SABO TPP	2	PUNJAB	TSPL	PVT	660
468	TALWANDI SABO TPP	3	PUNJAB	TSPL	PVT	660
469	TIRORA TPS	1	MAHARASHTRA	APL	PVT	660
470	TIRORA TPS	2	MAHARASHTRA	APL	PVT	660
471	TIRORA TPS	3	MAHARASHTRA	APL	PVT	660
472	TIRORA TPS	4	MAHARASHTRA	APL	PVT	660
473	TIRORA TPS	5	MAHARASHTRA	APL	PVT	660
474	TORANGALLU TPS(SBU-II)	3	KARNATAKA	JSWEL	PVT	300
475	TORANGALLU TPS(SBU-II)	4	KARNATAKA	JSWEL	PVT	300
476	TUTICORIN (P) TPP	1	TAMIL NADU	IBPIL	PVT	150
477	UCHPINDA TPP	1	CHHATTISGARH	RKMPPL	PVT	360
478	UCHPINDA TPP	2	CHHATTISGARH	RKMPPL	PVT	360
479	UDUPI TPP	1	KARNATAKA	UPCL	PVT	600
480	UDUPI TPP	2	KARNATAKA	UPCL	PVT	600
481	WARDHA WARORA TPP	1	MAHARASHTRA	WPCL	PVT	135
482	WARDHA WARORA TPP	2	MAHARASHTRA	WPCL	PVT	135
483	WARDHA WARORA TPP	3	MAHARASHTRA	WPCL	PVT	135
484	WARDHA WARORA TPP	4	MAHARASHTRA	WPCL	PVT	135
485	YAMUNA NAGAR TPS	1	HARYANA	HPGCL	STATE	300

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
486	YAMUNA NAGAR TPS	2	HARYANA	HPGCL	STATE	300
	Sub-Total	111				45294
OTHERS/OTHERS						
487	AKRIMOTA LIG TPS	1	GUJARAT	GMDCL	STATE	125
488	AKRIMOTA LIG TPS	2	GUJARAT	GMDCL	STATE	125
489	AMARAVATI TPS	1	MAHARASHTRA	RattanIndia	PVT	270
490	ANPARA TPS	4	UTTAR PRADESH	UPRVUNL	STATE	500
491	ANPARA TPS	5	UTTAR PRADESH	UPRVUNL	STATE	500
492	BANDEL TPS	1	WEST BENGAL	WBPDC	STATE	60
493	BANDEL TPS	2	WEST BENGAL	WBPDC	STATE	60
494	BANDEL TPS	3	WEST BENGAL	WBPDC	STATE	60
495	BANDEL TPS	4	WEST BENGAL	WBPDC	STATE	60
496	BARKHERA TPS	1	UTTAR PRADESH	BEPL	PVT	45
497	BARKHERA TPS	2	UTTAR PRADESH	BEPL	PVT	45
498	BUDGE BUDGE TPS	1	WEST BENGAL	CESC	PVT	250
499	BUDGE BUDGE TPS	2	WEST BENGAL	CESC	PVT	250
500	CHAKABURA TPP	2	CHHATTISGARH	ACB	PVT	30
501	CHANDRAPUR(ASSAM) TPS	1	ASSAM	APGPCL	STATE	30
502	CHANDRAPURA(DVC) TPS	1	JHARKHAND	DVC	CENTRAL	130
503	CHANDRAPURA(DVC) TPS	2	JHARKHAND	DVC	CENTRAL	130
504	CHANDRAPURA(DVC) TPS	3	JHARKHAND	DVC	CENTRAL	130
505	D.P.L. TPS	3	WEST BENGAL	DPL	STATE	70
506	D.P.L. TPS	4	WEST BENGAL	DPL	STATE	75
507	D.P.L. TPS	5	WEST BENGAL	DPL	STATE	75
508	DAMODARAM SANJEEVAIAH TPS	1	ANDHRA PRADESH	APPDCL	STATE	800

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
509	DAMODARAM SANJEEVAIAH TPS	2	ANDHRA PRADESH	APPDCL	STATE	800
510	DURGAPUR TPS	3	WEST BENGAL	DVC	CENTRAL	130
511	ENNORE TPS	1	TAMIL NADU	TNGDCL	STATE	60
512	ENNORE TPS	2	TAMIL NADU	TNGDCL	STATE	60
513	ENNORE TPS	3	TAMIL NADU	TNGDCL	STATE	110
514	ENNORE TPS	4	TAMIL NADU	TNGDCL	STATE	110
515	FARAKKA STPS	4	WEST BENGAL	NTPC Ltd.	CENTRAL	500
516	FARAKKA STPS	5	WEST BENGAL	NTPC Ltd.	CENTRAL	500
517	KATGHORA TPP	1	CHHATTISGARH	VESPL	PVT	35
518	KHAMBARKHERA TPS	1	UTTAR PRADESH	BEPL	PVT	45
519	KHAMBARKHERA TPS	2	UTTAR PRADESH	BEPL	PVT	45
520	KORADI TPS	1	MAHARASHTRA	MAHAGENCO	STATE	105
521	KORADI TPS	2	MAHARASHTRA	MAHAGENCO	STATE	105
522	KORADI TPS	3	MAHARASHTRA	MAHAGENCO	STATE	105
523	KORADI TPS	4	MAHARASHTRA	MAHAGENCO	STATE	105
524	KORADI TPS	8	MAHARASHTRA	MAHAGENCO	STATE	660
525	KOTHAGUDEM TPS	2	TELANGANA	TSGENCO	STATE	60
526	KOTHAGUDEM TPS	3	TELANGANA	TSGENCO	STATE	60
527	KOTHAGUDEM TPS	4	TELANGANA	TSGENCO	STATE	60
528	KUNDARKI TPS	1	UTTAR PRADESH	BEPL	PVT	45
529	KUNDARKI TPS	2	UTTAR PRADESH	BEPL	PVT	45
530	KUTCH LIG. TPS	3	GUJARAT	GSECL	STATE	75
531	MAQSOODPUR TPS	1	UTTAR PRADESH	BEPL	PVT	45
532	MAQSOODPUR TPS	2	UTTAR PRADESH	BEPL	PVT	45
533	MUNDRA UMTPP	1	GUJARAT	CGPL	PVT	800

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
534	MUNDRA UMTTP	2	GUJARAT	CGPL	PVT	800
535	MUNDRA UMTTP	3	GUJARAT	CGPL	PVT	800
536	MUNDRA UMTTP	4	GUJARAT	CGPL	PVT	800
537	MUNDRA UMTTP	5	GUJARAT	CGPL	PVT	800
538	NEW COSSIPORE TPS	1	WEST BENGAL	CESC	PVT	30
539	NEW COSSIPORE TPS	2	WEST BENGAL	CESC	PVT	30
540	NEW COSSIPORE TPS	3	WEST BENGAL	CESC	PVT	50
541	NEW COSSIPORE TPS	4	WEST BENGAL	CESC	PVT	50
542	NEYVELI (EXT) TPS	1	TAMIL NADU	NLC	CENTRAL	210
543	NEYVELI (EXT) TPS	2	TAMIL NADU	NLC	CENTRAL	210
544	NEYVELI TPS(Z)	1	TAMIL NADU	ST-CMSECP	PVT	250
545	NEYVELI TPS-II	1	TAMIL NADU	NLC	CENTRAL	210
546	NEYVELI TPS-II	2	TAMIL NADU	NLC	CENTRAL	210
547	NEYVELI TPS-II	3	TAMIL NADU	NLC	CENTRAL	210
548	NIGRI TPP	1	MADHYA PRADESH	JPPVL	PVT	660
549	NIGRI TPP	2	MADHYA PRADESH	JPPVL	PVT	660
550	NIWARI TPP	1	MADHYA PRADESH	BLAPPL	PVT	45
551	RAIKHEDA TPP	1	CHHATTISGARH	GCEL	PVT	685
552	RAJPURA TPP	1	PUNJAB	NPL	PVT	700
553	RAJPURA TPP	2	PUNJAB	NPL	PVT	700
554	RAMAGUNDEM - B TPS	1	TELANGANA	TSGENCO	STATE	62.5
555	RAMAGUNDEM STPS	1	TELANGANA	NTPC Ltd.	CENTRAL	200
556	RAMAGUNDEM STPS	2	TELANGANA	NTPC Ltd.	CENTRAL	200
557	RAMAGUNDEM STPS	3	TELANGANA	NTPC Ltd.	CENTRAL	200
558	RATIJA TPS	1	CHHATTISGARH	SCPL	PVT	50
559	RIHAND STPS	1	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
560	RIHAND STPS	2	UTTAR PRADESH	NTPC Ltd.	CENTRAL	500
561	SABARMATI (C STATION)	15	GUJARAT	TOR. POW.	PVT	30
562	SABARMATI (C STATION)	16	GUJARAT	TOR. POW.	PVT	30
563	SATPURA TPS	10	MADHYA PRADESH	MPPGCL	STATE	250
564	SIMHAPURI TPS	3	ANDHRA PRADESH	SEPL	PVT	150
565	SIMHAPURI TPS	4	ANDHRA PRADESH	SEPL	PVT	150
566	SIPAT STPS	1	CHHATTISGARH	NTPC Ltd.	CENTRAL	660
567	SIPAT STPS	2	CHHATTISGARH	NTPC Ltd.	CENTRAL	660
568	SIPAT STPS	3	CHHATTISGARH	NTPC Ltd.	CENTRAL	660
569	TALCHER (OLD) TPS	1	ORISSA	NTPC Ltd.	CENTRAL	60
570	TALCHER (OLD) TPS	2	ORISSA	NTPC Ltd.	CENTRAL	60
571	TALCHER (OLD) TPS	3	ORISSA	NTPC Ltd.	CENTRAL	60
572	TALCHER (OLD) TPS	4	ORISSA	NTPC Ltd.	CENTRAL	60
573	TALCHER STPS	1	ORISSA	NTPC Ltd.	CENTRAL	500
574	TALCHER STPS	2	ORISSA	NTPC Ltd.	CENTRAL	500
575	TANDA TPS	1	UTTAR PRADESH	NTPC Ltd.	CENTRAL	110
576	TANDA TPS	2	UTTAR PRADESH	NTPC Ltd.	CENTRAL	110
577	THAMMINAPATNAM TPS	1	ANDHRA PRADESH	MEL	PVT	150
578	THAMMINAPATNAM TPS	2	ANDHRA PRADESH	MEL	PVT	150
579	TITAGARH TPS	1	WEST BENGAL	CESC	PVT	60
580	TITAGARH TPS	2	WEST BENGAL	CESC	PVT	60
581	TITAGARH TPS	3	WEST BENGAL	CESC	PVT	60
582	TITAGARH TPS	4	WEST BENGAL	CESC	PVT	60
583	TROMBAY TPS	4	MAHARASHTRA	TATA PCL	PVT	150
584	TUTICORIN (P) TPP	2	TAMIL NADU	IBPIL	PVT	150
585	UTRAULA TPS	1	UTTAR PRADESH	BEPL	PVT	45

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
586	UTRAULA TPS	2	UTTAR PRADESH	BEPL	PVT	45
	Sub-Total	100				23332.5
RUSSIA/RUSSIA						
587	KAHALGAON TPS	1	BIHAR	NTPC Ltd.	CENTRAL	210
588	KAHALGAON TPS	2	BIHAR	NTPC Ltd.	CENTRAL	210
589	KAHALGAON TPS	3	BIHAR	NTPC Ltd.	CENTRAL	210
590	KAHALGAON TPS	4	BIHAR	NTPC Ltd.	CENTRAL	210
591	KORBA-II	1	CHHATTISGARH	CSPGCL	STATE	50
592	KORBA-II	2	CHHATTISGARH	CSPGCL	STATE	50
593	KORBA-II	3	CHHATTISGARH	CSPGCL	STATE	50
594	KORBA-II	4	CHHATTISGARH	CSPGCL	STATE	50
595	NEYVELI TPS- I	1	TAMIL NADU	NLC	CENTRAL	50
596	NEYVELI TPS- I	2	TAMIL NADU	NLC	CENTRAL	50
597	NEYVELI TPS- I	3	TAMIL NADU	NLC	CENTRAL	50
598	NEYVELI TPS- I	4	TAMIL NADU	NLC	CENTRAL	50
599	NEYVELI TPS- I	5	TAMIL NADU	NLC	CENTRAL	50
600	NEYVELI TPS- I	6	TAMIL NADU	NLC	CENTRAL	50
601	NEYVELI TPS- I	7	TAMIL NADU	NLC	CENTRAL	100
602	NEYVELI TPS- I	8	TAMIL NADU	NLC	CENTRAL	100
603	NEYVELI TPS- I	9	TAMIL NADU	NLC	CENTRAL	100
604	OBRA TPS	1	UTTAR PRADESH	UPRVUNL	STATE	40
605	OBRA TPS	2	UTTAR PRADESH	UPRVUNL	STATE	50
606	PATRATU TPS	1	JHARKHAND	PVUNL	CENTRAL	40
607	PATRATU TPS	2	JHARKHAND	PVUNL	CENTRAL	40
608	PATRATU TPS	3	JHARKHAND	PVUNL	CENTRAL	40
609	PATRATU TPS	4	JHARKHAND	PVUNL	CENTRAL	40

Annexure-1.5**DETAILS OF DIFFERENT MAKE OF UNITS CONSIDERED IN THE REVIEW 2015-2016**

S. NO	NAME	UNIT NO	STATE	ORGANIZATION NAME	SECTOR	CAPACITY (MW)
610	PATRATU TPS	5	JHARKHAND	PVUNL	CENTRAL	90
611	PATRATU TPS	6	JHARKHAND	PVUNL	CENTRAL	90
612	VINDHYACHAL STPS	1	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
613	VINDHYACHAL STPS	2	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
614	VINDHYACHAL STPS	3	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
615	VINDHYACHAL STPS	4	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
616	VINDHYACHAL STPS	5	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
617	VINDHYACHAL STPS	6	MADHYA PRADESH	NTPC Ltd.	CENTRAL	210
	Sub-Total	31				3330

Annexure-1.6**DETAILS OF NEW UNITS COMMISSIONED BUT NOT CONSIDERED IN THE REVIEW 2015-16**

S. No.	Name of Station	Unit No	Organization	Capacity (MW)	Make Boiler/Turbine	Date of Commissioning
1	ANPARA TPS	6	UPRVUNL	500	BHEL/BHEL	08-Jun-15
2	ANPARA TPS	7	UPRVUNL	500	BHEL/BHEL	06-Mar-16
3	ANUPPUR TPP	2	MBPMPL	600	Chinese Harbin/Chinese	30-Mar-16
4	BELLARY TPS	3	KPCL	700	BHEL/BHEL	01-Mar-16
5	BOKARO TPS 'A' EXP	1	DVC	500	BHEL/BHEL	22-Mar-16
6	BONGAIGAON TPP	1	NTPC Ltd.	250	BHEL/BHEL	22-Jun-15
7	CHANDRAPUR(MAHARAS HTRA) STPS	8	MAHAGENCO	500	BHEL/BHEL	29-Mar-15
8	CHANDRAPUR(MAHARAS HTRA) STPS	9	MAHAGENCO	500	BHEL/BHEL	21-Mar-16
9	GOINDWAL SAHIB TPP	1	GPGSL (GVK)	270	BHEL/BHEL	14-Feb-16
10	GOINDWAL SAHIB TPP	2	GPGSL (GVK)	270	BHEL/BHEL	15-Mar-16
11	KORADI TPS	9	MAHAGENCO	660	LnT MHI/LnT MHI	15-Mar-16

DETAILS OF NEW UNITS COMMISSIONED BUT NOT CONSIDERED IN THE REVIEW 2015-16

S. No.	Name of Station	Unit No	Organization	Capacity (MW)	Make Boiler/Turbine	Date of Commissioning
12	LALITPUR TPS	2	LPGL	660	BHEL/BHEL	08-Jan-16
13	MAUDA TPS	3	NTPC Ltd.	660	BHEL/BHEL	28-Mar-16
14	MUZAFFARPUR TPS	3	K.B.U.N.L	195	BHEL/BHEL	31-Mar-15
15	NABI NAGAR TPP	1	BRBCL	250	BHEL/BHEL	20-Mar-16
16	PARLI TPS	8	MAHAGENCO	250	BHEL/BHEL	30-Mar-16
17	RAIKHEDA TPP	2	GCEL	685	DOOSAN/DOOSAN	28-Mar-16
18	SAGARDIGHI TPS	3	WBPDC	500	BHEL/BHEL	14-Dec-15
19	SEIONI TPP	1	JHAPL	600	BHEL/BHEL	22-Mar-16
20	SINGARENI TPP	1	SCCL	600	BHEL/BHEL	13-Mar-16
21	SWASTIK KORBA TPP	1	ACB	25	IJT/SIEMENS	31-Mar-15
22	TAMNAR TPP	4	JPL	600	BHEL/BHEL	28-Mar-15
23	UTKAL TPP (IND	1	IBPIL	350	CHINESE/CHINESE	25-Feb-16
24	VIZAG TPP	2	HNPC	520	BHEL/BHEL	31-Mar-16
25	YERMARUS TPP	1	RPCL	800	BHEL/BHEL	29-Mar-16
	Total	25		11945		

SECTION-2

GENERATION PERFORMANCE

2.1 OVERALL GENERATION PERFORMANCE

In making performance assessment, several indices like Forced Outage (FO), Planned Maintenance (PM), Operating Availability (Op. Av.), Partial unavailability (Partial loss) and the Plant Load Factor (PLF) have been considered for evaluating the overall performance of thermal power station for the purpose of analysis. No single performance index has been taken as the sole indication of overall performance. A detailed review of generation with reference to the program and PLF is brought out in this section while the other performance indices are covered in Sections 3 to 7.

All India program³ for electricity generation for the year 2015-16 was fixed at **1137.50** BU and Generation achieved during the year was **1107.82** BU, which was 97.39% of the program; indicating a growth rate of 5.64% over the year 2014-15. Details of program and actual generation, are given below:

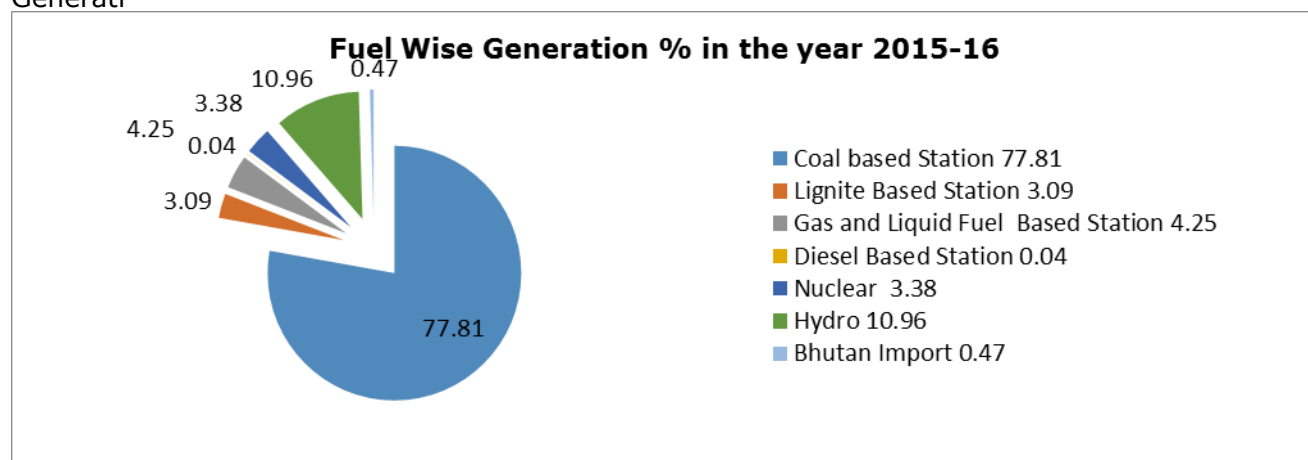
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+ Category	Program Generation (BU)	Actual Generation (BU)	Short fall (-) / Surplus (+) (BU)	% of Program 2015-16	Actual 2014-15 (Vs Program 2014-15)%	Growth (%)
Thermal						
Coal based Stations	888.18	862.02	(-)26.16	97.05	102.06	7.71
Lignite based Stations	36.72	34.24	(-)2.48	93.25	106.5	(-)3.55
Multi fuel based Stations	0	0	0	0	0	0
Gas based Stations	40.28	46.97	6.69	116.6	103	17.18
Liquid Fuel based Stations	0.55	0.15	(-)0.4	27.54	163.79	(-)84.69
Diesel based Stations	0.97	0.41	(-)0.57	41.8	92.29	(-)71.16
Thermal(total)	966.7	943.79	(-)22.91	97.63	102.3	7.45
Nuclear	38	37.41	(-)0.59	98.46	102.27	3.63
Hydro	128	121.38	(-)6.62	94.83	103.98	(-)6.09

+ Category	Program Generation (BU)	Actual Generation (BU)	Short fall (-) / Surplus (+) (BU)	% of Program 2015-16	Actual 2014-15 (Vs Program 2014-15)%	Growth (%)
Bhutan Import	4.8	5.24	0.44	109.25	104.33	4.72
Total	1137.5	1107.82	(-)29.68	97.39	102.51	5.64

Details of generation share of various fuels in total generation during the year 2015-16, are presented in the figure below

All Program and
Generati



n figures in this Section refer to generation from conventional sources (thermal/hydro/nuclear) of capacity greater than 25 MW

Salient observations on fuel wise performance of generating stations in the country during the year 2015-16 are as follows:

- Total thermal generation was lower by 22.91 BU than program for the year - major contributors being coal and lignite based plants with short falls of 26.16 BU and 2.48 BU respectively vis-à-vis program.
- Total thermal generation has achieved a growth rate of 7.45 % over the last year. Coal and lignite based generation recorded a growth rate of 7.71 % and (-) 3.55% respectively.
- Nuclear generation achieved a growth of 3.63% while hydro generation achieved a growth of (-) 6.09%.

2.2 PERFORMANCE OF THERMAL GENERATION AND REASONS FOR SHORTFALL

Region wise performance

Thermal generation in Northern, Eastern and North Eastern Regions remained below their respective program. However, the generation in Southern & Western Regions exceeded their respective program. Region-wise generation performance of thermal power stations during the year under review is given below: -

Region/ Category	Program(MU)	Actual (MU)	Short fall(-)/ Surplus(+)(MU)
NORTHERN	231,799	198,924	(-)32,875
WESTERN	373,266	382,153	8,887
SOUTHERN	189,643	192,291	2,648
EASTERN	162,051	16,1978	(-)73
NORTH EASTERN	9,941	8,441	(-)1,500
TOTAL THERMAL	966,700	943,788	(-)22,912

Sector wise performance

Sector-wise generation performance during 2015-16 is given below. Thermal power stations in Central Sector and State Sector have generated 98.55% and 87.03% of their generation program. Generation in Private sector Stations was 108 % of the program.

Category / Sectors	Monitored Capacityas on 31.03.2015 (MW)	April 2015 - March 2016		Actual Generation 2014-15 (MU)	% of Program	Growth (%)
		Program (MU)	Actual (MU)			
CENTRAL SECTOR						
NTECL	1500.00	8924	7716.79	5912.65	86.47	30.51
APCPL	1500.00	6500	5798.20	7022.93	89.2	(-)17.44
NTPC Ltd.	39102.23	238148	239475.05	241138.43	100.56	(-)0.69
NLC	3240.00	19980	19149.87	19708.50	95.85	(-)2.83
NEEPCO.	501.50	2481	2649.53	2369.58	106.79	11.81
RGPPL	2220.00	0	1233.67	0	0	0
NSPCL	500.00	3734	3549.63	3241.10	95.06	9.52

Category / Sectors	Monitored Capacity as on 31.03.2015 (MW)	April 2015 - March 2016		Actual Generation 2014-15 (MU)	% of Program	Growth (%)
		Program (MU)	Actual (MU)			
K.B.U.N.L	415.00	1638	781.87	895.52	47.73	(-)12.69
DVC	7990.00	30673	27853.42	25283.81	90.81	10.16
ONGC	726.60	4800	3479.46	2469.44	72.49	40.9
CENTRAL SEC.	58945.33	319878	315245.73	308048.75	98.55	2.34
STATE SEC.	71814.37	335320	291831.36	299258.36	87.03	(-)2.48
IPP SEC.	76287.50	290273	316847.41	249427.98	109.15	27.03
PVT. UTL. SEC.	3787.00	21229	19863.20	21584.96	93.57	(-)7.98
TOTAL THERMAL	210834.20	966700	943787.70	878320.05	97.63	7.45

Month wise generation performance

Month-wise and cumulative thermal generation performance vis-à-vis program generation is given below: -

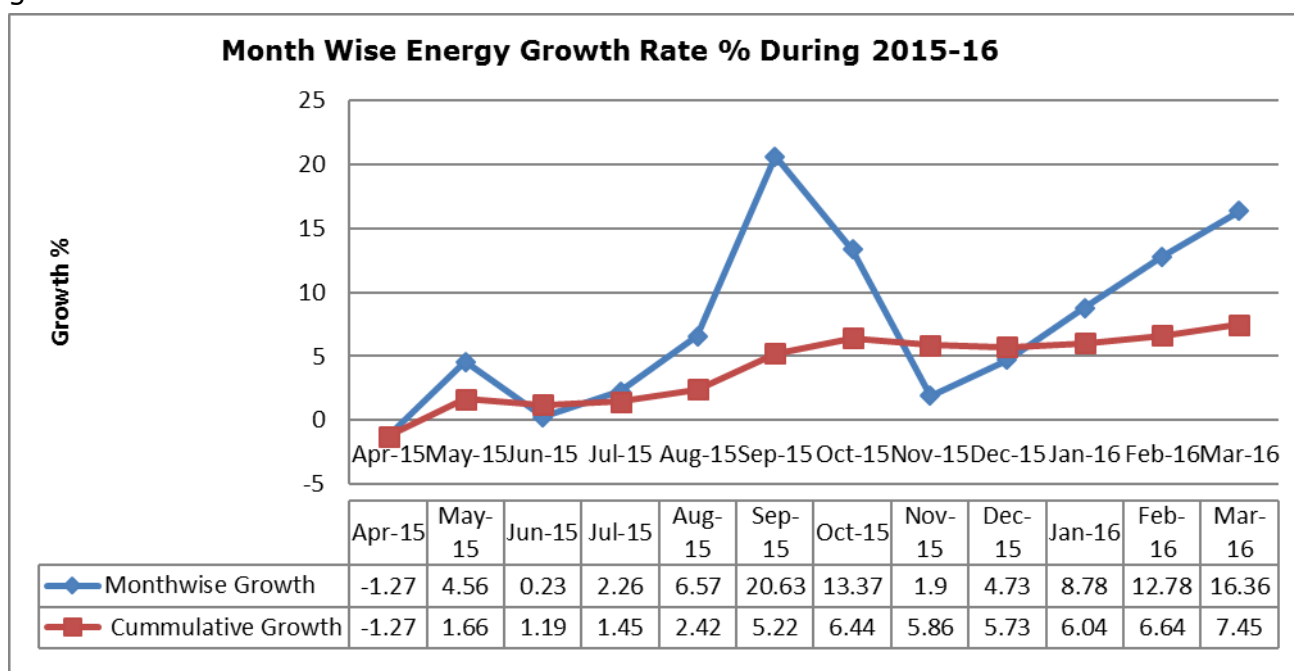
Figures in MU

Month	Thermal Generation Program(2015-16)		Actual Generation (2015-16)		Previous Year Generation (2014-15)	
	Monthly	Cumulative	Monthly	Cumulative	Monthly	Cumulative
April 2015	79,635	79,635	73,540	73,540	74,486	74,486
May 2015	83,418	163,053	78,671	152,211	75,238	149,723
June 2015	79,109	242,162	73,301	225,512	73,135	222,858
July 2015	75,836	317,998	74,069	299,582	72,435	295,293
August 2015	75,189	393,187	73,515	373,097	68,986	364,279
September 2015	73,326	466,513	79,685	452,781	66,056	430,335
October 2015	81,984	548,497	86,166	538,948	76,006	506,341
November 2015	80,285	628,782	75,992	614,940	74,577	580,918
December 2015	84,299	713,081	80,234	695,174	76,607	657,525
January 2016	86,089	799,170	82,835	778,009	76,148	733,673
February 2016	80,208	879,378	79,893	857,903	70,839	804,513

Month	Thermal Generation Program(2015-16)		Actual Generation (2015-16)		Previous Year Generation (2014-15)	
	Monthly	Cumulative	Monthly	Cumulative	Monthly	Cumulative
March 2016	87,322	966,700	85,885	943,788	73,807	878,320

Month-wise and cumulative thermal generation growth during the year 2015-16 vis-à-vis last year 2014-15 is depicted in the following chart: -

- Total monthly thermal generation



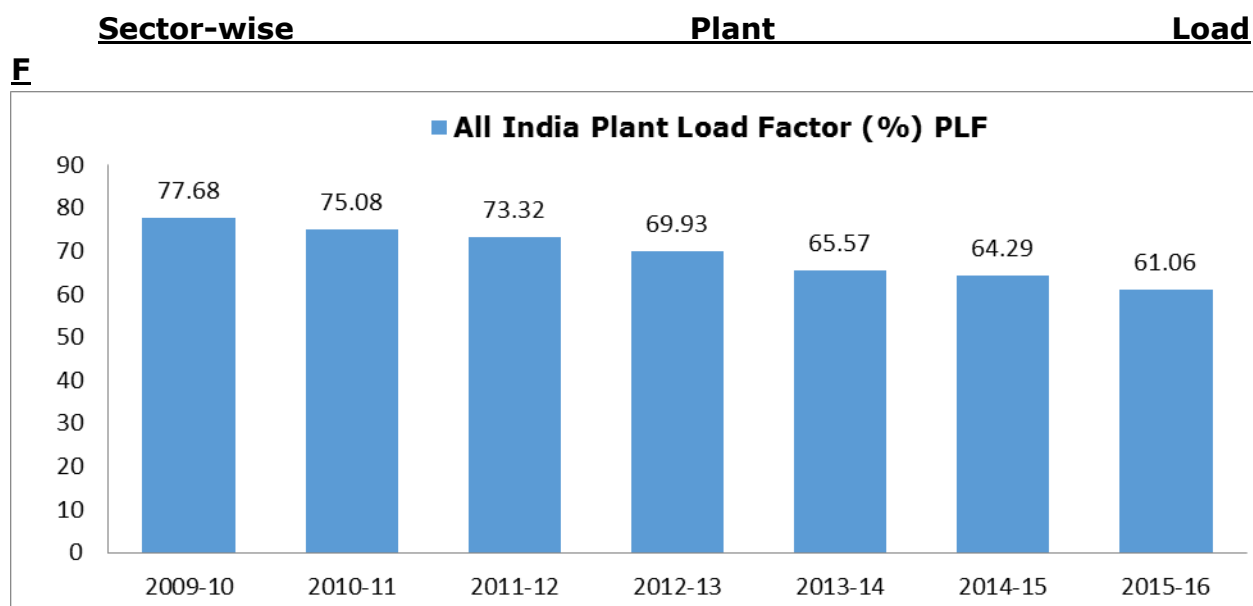
eration varied from 73.30BU in June'15 to the maximum of 86.17 BU in Oct'15.

- Thermal generation achieved a growth rate of 7.45% during the year 2015-16 and generation was less than the program by 22.91 BU.
- Unitwise and stationwise performance indices for the year 2015-16 are given in Annexure-2.1

2.3 PLANT LOAD FACTOR (PLF %)

National average PLF of coal/lignite based plants under review during the financial year 2015-16 reduced to 61.06% against 64.29% during 2014-15.

The details of PLF from financial year 2009-10 onwards are depicted in the following chart:



Factor (PLF) is for Units Considered in the Review

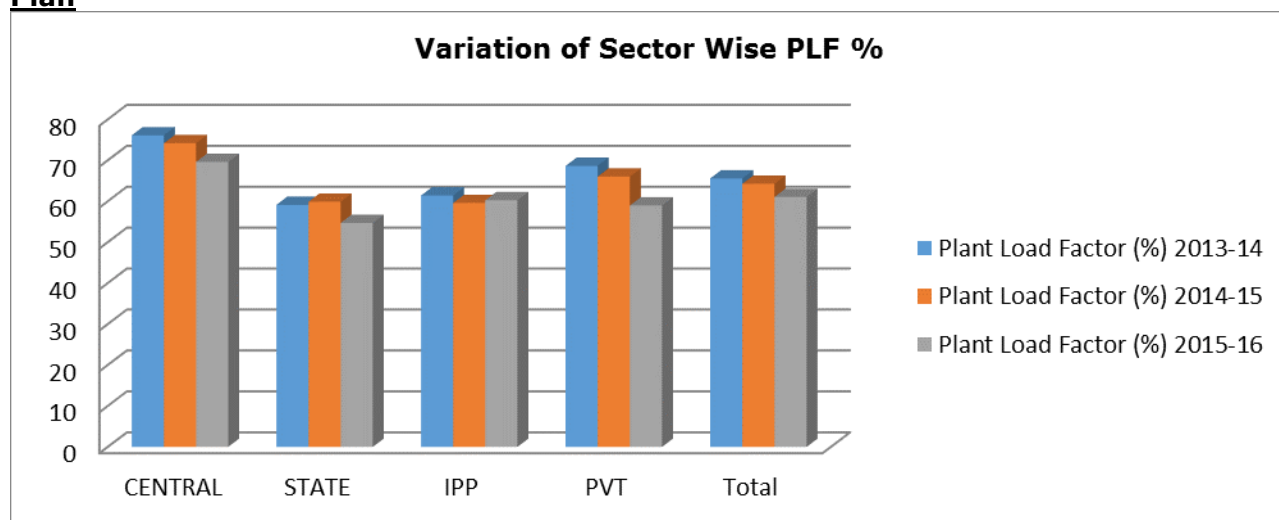
During 2015-16, Central Sector Stations achieved highest PLF of 69.63 % amongst all the Sectors. The overall PLF of thermal generating units was lower (61.06 %) as compared to previous year (64.29%). Sector wise PLF of thermal power plants during the last three years are given in the following table:

Sector	Capacity (MW)			Plant Load Factor (%)		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
CENTRAL	42,515	45,925	50,515	76.11	74.2	69.63
STATE	51,430.5	54,543	57,820.5	59.13	59.89	54.72
IPP	35,094	43,274	61,349	61.4	59.59	60.26

PVT	3,585	3,585	3,607	68.67	66.05	59
Total	132,625	147,297	173,291.5	65.57	64.29	61.06

Capacity Plan

group-wise

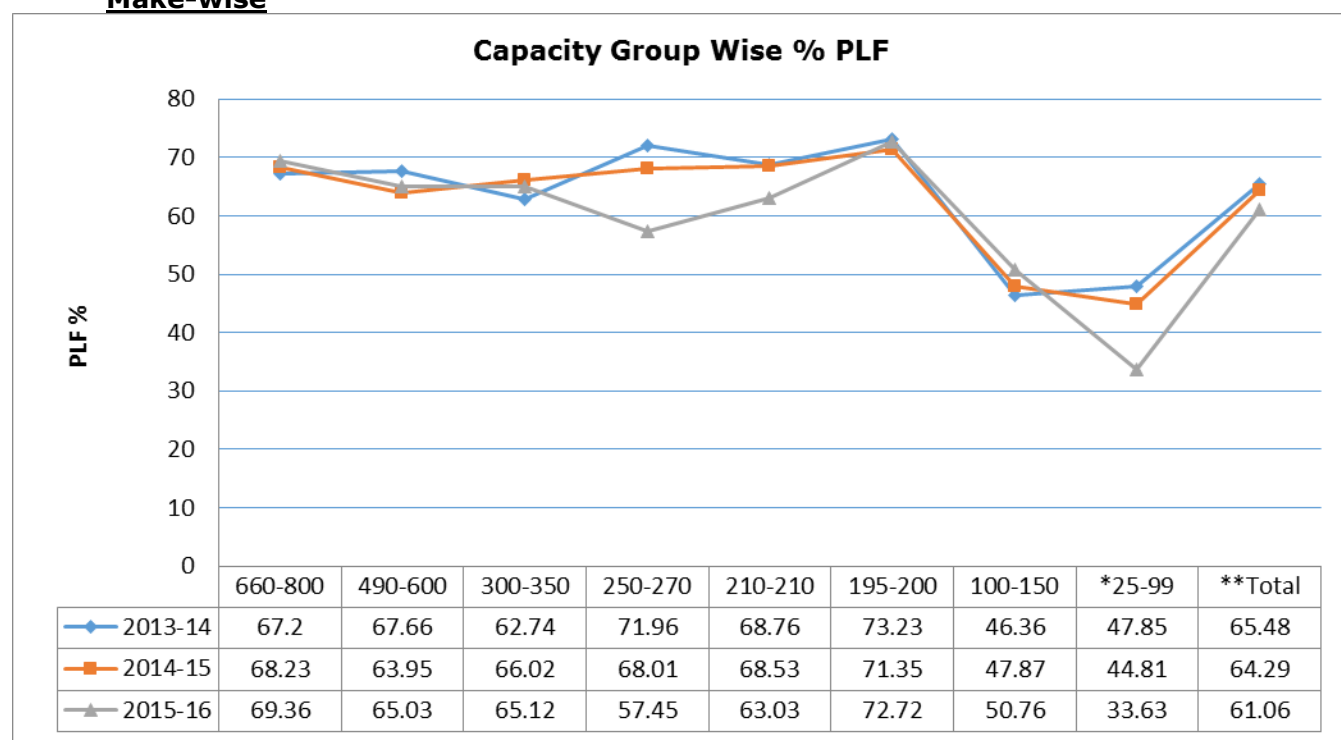


Load Factor

Details of PLF of thermal units under review falling under various capacity groups are given below. Though the supercritical units have been newly installed, the 660-800 MW Supercritical units' group achieved a high plant load factor of 69.36% amongst large size units.

Capacity Group (MW)	Units commissioned as on 31-MAR-2016		Units Reviewed		PLF (%) of units Reviewed		
	No. of Units	Capacity (MW)	No. of Units	Capacity (MW)	2013-14	2014-15	2015-16
660-800	51	34,950	45	30,785	67.2	68.23	69.36
490-600	129	68,670	118	62,750	67.66	63.95	65.03
300-360	38	11,840	37	11,490	62.74	66.02	65.12
250-270	69	17,470	64	16,180	71.96	68.01	57.45
210-210	143	30,030	143	30,030	68.76	68.53	63.03
195-200	26	5,185	25	4,990	73.23	71.35	72.72

Capacity Group (MW)	Units commissioned as on 31-MAR-2016		Units Reviewed		PLF (%) of units Reviewed		
	No. of Units	Capacity (MW)	No. of Units	Capacity (MW)	2013-14	2014-15	2015-16
100-150	98	11,922	102	12,362	46.36	47.87	50.76
25-99	84	47,295	83	4,704.5	47.85	44.81	33.63
Total	638	184,796.50	617	173,291.5	65.48	64.29	61.06

Make-wise**LF**

The PLF of different makes wise units taken in the review during last three years is given as under. The PLF of BHEL/BHEL make units reduced from 66.99% during 2014-15 to 60.68% during 2015-16. Reduction is also seen in PLF of BHEL/ABL and Russia/Russia make.

As may be seen, out of 617 units reviewed, the highest numbers of units (374 numbers with aggregate capacity 107500 MW) were of BHEL/BHEL make.

Make TG/Boiler	Units operating as on 31-03-2016		Reviewed during 2015-16		PLF Of units Reviewed		
	No. of units	Capacity (MW)	No. of units	Capacity (MW)	13-14	14-15	15-16
BHEL/BHEL	374	107500.00	358	98315.00	68.82	66.99	60.68
BHEL/ABL	17	3020.00	17	3020.00	41.67	40.57	29.49
RUSSIA/RUSSIA	31	3330.00	31	3330.00	72.32	68.19	60.12
CHINA/CHINA	112	45894.00	111	45294.00	59.39	63.94	64.32
OTHERS/OTHERS	104	25052.50	100	23332.50	63.91	61.57	63.44
TOTAL	638	184796.50	617	173,291.5	65.48	64.29	61.06

Annexure-2.1

Unit Wise and Station Wise Performance Indices for 2015-16

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ity includind Low System Demand (%)	PLF (%)
NORTHERN REGION									
BADARPUR TPS	1	95	0	0	100	0	0	0	0.00
BADARPUR TPS	2	95	27.96	0	95.67	4.33	43.9	0.98	3.40
BADARPUR TPS	3	95	154.06	0	76.65	23.35	23.3	4.89	18.50
BADARPUR TPS	4	210	712.47	5.45	48.43	46.11	46.08	7.49	38.60
BADARPUR TPS	5	210	1346.95	0	14.82	85.18	12.55	12.16	73.00
BADARPUR TPS		705	2241.44	1.62	55.54	42.84	26.52	6.64	36.19
INDIRA GANDHI STPP	1	500	1366.22	11.2	38.38	50.41	38.71	19.31	31.10
INDIRA GANDHI STPP	2	500	2020.63	0	32.53	67.47	36.54	21.47	46.00
INDIRA GANDHI STPP	3	500	2411.35	0	19.54	80.46	22.54	25.56	54.90
INDIRA GANDHI STPP		1500	5798.2	3.73	30.15	66.12	32.6	22.11	44.01
BARSINGSAR LIGNITE	1	125	723.24	5.47	14.07	80.45	5.82	14.59	65.90
BARSINGSAR LIGNITE	2	125	562.32	10.4	20.93	68.67	9.38	17.46	51.20
BARSINGSAR LIGNITE		250	1285.56	7.93	17.5	74.56	7.6	16.02	58.54

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
SINGRAULI STPS	1	200	1753.04	0	0.81	99.19	0	-0.61	99.80
SINGRAULI STPS	2	200	1603.08	6.25	1.37	92.38	0	1.08	91.30
SINGRAULI STPS	3	200	1600.39	6.81	1.44	91.75	0	0.65	91.10
SINGRAULI STPS	4	200	1748.51	0	2.32	97.68	0	-1.82	99.50
SINGRAULI STPS	5	200	1744.48	0	0.56	99.44	0	0.14	99.30
SINGRAULI STPS	6	500	3846.03	0.81	6	93.2	0	5.63	87.60
SINGRAULI STPS	7	500	3974.98	0.81	4.1	95.09	0	4.58	90.50
SINGRAULI STPS		2000	16270.51	1.71	3.17	95.11	0	2.99	92.61
RIHAND STPS	1	500	3218.6	10.74	1.35	87.92	0	14.64	73.30
RIHAND STPS	2	500	3633.38	0	2.47	97.53	0	14.81	82.70
RIHAND STPS	3	500	3733.79	7.22	0.23	92.56	0	7.54	85.00
RIHAND STPS	4	500	3670.07	6.6	2.01	91.39	0	7.83	83.60
RIHAND STPS	5	500	3928.32	0	2.37	97.63	0	8.19	89.40
RIHAND STPS	6	500	2870.5	4.16	24.39	71.44	0	6.09	65.40
RIHAND STPS		3000	21054.66	4.79	5.47	89.75	0	9.85	79.90
UNCHAHAAR TPS	1	210	1325.4	10.93	0.98	88.09	0.21	16.24	71.90
UNCHAHAAR TPS	2	210	1537.63	0	0.48	99.52	0	16.16	83.40
UNCHAHAAR TPS	3	210	1447.25	0	0.79	99.21	0	20.76	78.50
UNCHAHAAR TPS	4	210	1382.69	6.65	0.63	92.72	0	17.76	75.00
UNCHAHAAR TPS	5	210	1320.13	9.55	0.26	90.2	0	18.63	71.60
UNCHAHAAR TPS		1050	7013.1	5.42	0.63	93.95	0.04	17.91	76.04
DADRI (NCTPP)	1	210	858.89	9.08	32.53	58.38	32.02	11.82	46.60
DADRI (NCTPP)	2	210	981.99	0	34.95	65.05	33.99	11.81	53.20
DADRI (NCTPP)	3	210	1139.94	0	24.28	75.72	24.25	13.93	61.80
DADRI (NCTPP)	4	210	1172.06	9.68	9.97	80.35	6.7	16.81	63.50
DADRI (NCTPP)	5	490	3088.89	1.09	7.59	91.32	7.45	19.56	71.80
DADRI (NCTPP)	6	490	2805.88	0	17.58	82.42	15.77	17.23	65.20

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
DADRI (NCTPP)		1820	10047.65	2.46	18.51	79.03	17.44	16.18	62.85
TANDA TPS	1	110	746.14	9.41	4.3	86.29	3.08	9.06	77.20
TANDA TPS	2	110	837.23	0	4.87	95.13	3.15	8.49	86.60
TANDA TPS	3	110	680.97	15.84	6.54	77.61	3.65	7.14	70.50
TANDA TPS	4	110	861.64	0	4.06	95.94	2.42	6.77	89.20
TANDA TPS		440	3125.98	6.31	4.94	88.74	3.08	7.86	80.88
RAJGHAT TPS	1	67.5	5.35	0	98.82	1.18	98.59	0.28	0.90
RAJGHAT TPS	2	67.5	41.25	0	91.17	8.83	87.22	1.87	7.00
RAJGHAT TPS		135	46.6	0	94.99	5.01	92.91	1.08	3.93
PANIPAT TPS	1	110	0.1	0	91.99	8.01	91.99	8.01	0.00
PANIPAT TPS	2	110	5.12	0	91.03	8.97	91.03	8.27	0.70
PANIPAT TPS	3	110	4.67	0	91.21	8.79	91.21	8.19	0.60
PANIPAT TPS	4	110	2.06	0	91.62	8.38	91.62	8.08	0.30
PANIPAT TPS	5	210	170.4	0	90.05	9.95	55.12	0.71	9.20
PANIPAT TPS	6	210	161.35	0	90.75	9.25	90.29	0.5	8.70
PANIPAT TPS	7	250	537.73	15.37	57.95	26.68	56.9	2.19	24.50
PANIPAT TPS	8	250	823.46	0	60.68	39.32	59.79	1.82	37.50
PANIPAT TPS		1360	1704.89	3.07	78.26	18.67	71.92	1.04	15.41
YAMUNA NAGAR TPS	1	300	1998.14	0	14.59	85.41	10.26	9.59	75.80
YAMUNA NAGAR TPS	2	300	2058.56	0	12.26	87.74	12.63	9.62	78.10
YAMUNA NAGAR TPS		600	4056.7	0	13.42	86.58	11.44	9.61	76.97
RAJIV GANDHI TPS	1	600	2272.02	0	38.55	61.45	15.4	18.35	43.10
RAJIV GANDHI TPS	2	600	2362.47	0	31.7	68.3	25.26	23.50	44.80
RAJIV GANDHI TPS		1200	4634.49	0	35.12	64.88	20.33	20.3	43.97
GND TPS(BHATINDA)	1	110	180.58	0	77.09	22.91	66.2	4.22	18.70
GND TPS(BHATINDA)	2	110	224.04	0	73.19	26.81	74.13	3.62	23.20
GND TPS(BHATINDA)	3	110	314.39	4.09	60.91	34.99	58.15	2.46	32.50

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
GND TPS(BHATINDA)	4	110	199.29	0	77.39	22.61	54.55	1.98	20.60
GND TPS(BHATINDA)		440	918.3	1.02	72.15	26.83	63.26	3.07	23.76
GH TPS (LEH.MOH.)	1	210	683.13	0	60.17	39.83	47.63	2.8	37.00
GH TPS (LEH.MOH.)	2	210	566.78	0	67.04	32.96	60.71	2.24	30.70
GH TPS (LEH.MOH.)	3	250	971.54	5.89	45.16	48.95	46.62	4.71	44.20
GH TPS (LEH.MOH.)	4	250	916.77	0	53.47	46.53	56.42	4.79	41.70
GH TPS (LEH.MOH.)		920	3138.22	1.6	55.84	42.56	52.73	3.73	38.83
ROPAR TPS	1	210	696.45	0	56.21	43.79	50.72	6.03	37.80
ROPAR TPS	2	210	885.06	0	44.67	55.33	38.39	7.35	48.00
ROPAR TPS	3	210	605.79	0	61.6	38.4	55.67	5.56	32.80
ROPAR TPS	4	210	609.46	10.34	52.31	37.35	49.78	4.31	33.00
ROPAR TPS	5	210	634.05	0	60.41	39.59	61.04	5.21	34.40
ROPAR TPS	6	210	528.22	0	70.18	29.82	47.43	1.19	28.60
ROPAR TPS		1260	3959.03	1.72	57.56	40.71	50.5	4.94	21.48
KOTA TPS	1	110	572.42	7.26	29.11	63.64	25.74	4.4	59.20
KOTA TPS	2	110	567.4	0	34.75	65.25	26.14	6.52	58.70
KOTA TPS	3	210	1265.37	8.66	16.43	74.91	13.26	6.31	68.60
KOTA TPS	4	210	1406.2	0	17.78	82.22	18.59	5.98	76.20
KOTA TPS	5	210	1253.22	0	27.2	72.8	21.06	4.86	67.90
KOTA TPS	6	195	1417.21	5.46	10.83	83.71	7.68	1.01	82.70
KOTA TPS	7	195	1308.13	9.2	12.62	78.19	9.22	1.79	76.40
KOTA TPS		1240	7789.95	4.41	19.75	75.83	16.22	4.83	71.52
SURATGARH TPS	1	250	800.05	28.8	31.15	40.05	29.55	3.62	36.40
SURATGARH TPS	2	250	900.41	0	53.12	46.88	24.81	5.88	41.00
SURATGARH TPS	3	250	1135.89	0	40.53	59.47	32.35	7.75	51.70
SURATGARH TPS	4	250	1052.15	15.42	29.7	54.88	30.85	6.96	47.90
SURATGARH TPS	5	250	1140.83	0	42.96	57.04	43.48	5.04	52.00

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
SURATGARH TPS	6	250	923.99	0	53.88	46.12	35.28	4.04	42.10
SURATGARH TPS		1500	5953.32	7.37	41.89	50.74	32.72	5.77	45.18
GIRAL TPS	1	125	0	100	0	0	0	0	0.00
GIRAL TPS	2	125	275.15	17.58	41.57	40.85	0	15.79	25.10
GIRAL TPS		250	275.15	58.79	20.78	20.43	0	7.9	12.53
CHHABRA TPP	1	250	271.73	22.93	62.59	14.48	2.77	2.1	12.40
CHHABRA TPP	2	250	1392.9	16.46	12.09	71.45	6.85	8.02	63.40
CHHABRA TPP	3	250	1329.28	6.74	20.68	72.57	6.71	12.04	60.50
CHHABRA TPP	4	250	1478.16	0	21.37	78.63	14.92	11.32	67.30
CHHABRA TPP		1000	4472.07	11.53	29.18	59.28	7.81	8.37	50.91
KALISINDH TPS	1	600	3546.02	0	17.95	82.05	13.18	14.77	67.30
KALISINDH TPS	2	600	2436.74	0	22.41	77.59	26.77	12.59	65.00
KALISINDH TPS		1200	5982.76	0	19.73	80.27	18.62	20.08	66.36
OBRA TPS	1	40	156.55	0	34.17	65.83	4.22	21.28	44.60
OBRA TPS	2	50	213.8	0	20.37	79.63	9.74	30.95	48.70
OBRA TPS	7	94	0	100	0	0	0	0	0.00
OBRA TPS	8	94	0	0	100	0	0	0	0.00
OBRA TPS	9	200	1538.88	1.16	2.31	96.53	4.06	8.93	87.60
OBRA TPS	10	200	0	100	0	0	0	0	0.00
OBRA TPS	11	200	0	100	0	0	0	0	0.00
OBRA TPS	12	200	950.45	0	8.78	91.22	13.19	37.12	54.10
OBRA TPS	13	200	1100.18	0	7.17	92.83	9.72	30.21	62.60
OBRA TPS		1278	3959.86	38.84	12.08	49.08	4.73	13.81	31.98
PANKI TPS	3	105	358.82	0	39.32	60.68	34.06	21.78	38.90
PANKI TPS	4	105	177.17	20.23	50.48	29.29	0.39	10.08	19.20
PANKI TPS		210	535.99	10.11	44.9	44.99	17.23	15.93	0.00
HARDUAGANJ TPS	5	60	0	0	100	0	0	0	0.00

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
HARDUAGANJ TPS	7	105	422.12	7.93	41.49	50.58	15.06	4.78	45.80
HARDUAGANJ TPS	8	250	1659.56	14.37	5.56	80.07	3.04	4.5	75.60
HARDUAGANJ TPS	9	250	1704.67	11.51	5.32	83.16	2.96	5.54	77.60
HARDUAGANJ TPS		665	3786.35	10.98	19.67	69.35	4.63	4.56	64.82
PARICHHA TPS	1	110	561.75	0	16.04	83.96	3.1	25.82	58.10
PARICHHA TPS	2	110	219.1	0	72.04	27.96	0.5	5.28	22.70
PARICHHA TPS	3	210	1495.02	3.7	5.9	90.4	2.43	9.36	81.00
PARICHHA TPS	4	210	1336.26	12.6	3.57	83.83	2.33	11.39	72.40
PARICHHA TPS	5	250	1840.1	0	4.83	95.17	2.97	11.37	83.80
PARICHHA TPS	6	250	1315.4	0	32.12	67.88	3.56	8.03	59.90
PARICHHA TPS		1140	6767.63	3	18.35	78.65	2.66	11.15	67.58
ANPARA TPS	1	210	1251.75	10.89	3.16	85.95	4.59	18.09	67.90
ANPARA TPS	2	210	1376.58	3.04	2.87	94.09	3.93	19.47	74.60
ANPARA TPS	3	210	1447.06	0	5.54	94.46	4.3	16.01	78.40
ANPARA TPS	4	500	3933.67	0	6.17	93.83	0.92	4.26	89.60
ANPARA TPS	5	500	3986.49	0	5.5	94.5	0.73	3.73	90.80
ANPARA TPS		1630	11995.55	1.8	5.07	93.13	2.16	9.35	83.78
MAHATMA GANDHI TPS	1	660	2386.16	0	40.48	59.52	44.64	18.36	41.20
MAHATMA GANDHI TPS	2	660	2566.06	0	37.32	62.68	47.37	18.42	44.30
MAHATMA GANDHI TPS		1320	4952.22	0	38.9	61.1	46	18.39	42.71
RAJPURA TPP	1	700	3600.39	5.98	15.73	78.28	16.16	19.73	58.60
RAJPURA TPP	2	700	4102.92	2.73	5.31	91.95	4.31	25.23	66.70
RAJPURA TPP		1400	7703.31	4.36	10.52	85.12	10.23	22.48	62.64
TALWANDI SABO TPP	1	660	0	0	0	100	0	0	0.00
TALWANDI SABO TPP	2	660	2296.89	0	38.02	61.98	20.17	22.36	39.60
TALWANDI SABO TPP	3	660	944.91	0	47.89	52.11	13.44	12.31	39.80
TALWANDI SABO TPP		1980	3241.8	0	40.49	59.51	18.48	22.76	39.65

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
JALIPA KAPURDI TPP	1	135	860.26	1.93	14.49	83.58	0	11.04	72.50
JALIPA KAPURDI TPP	2	135	838.04	8.65	12.14	79.21	0	8.54	70.70
JALIPA KAPURDI TPP	3	135	853.53	1.43	17.43	81.15	0	9.17	72.00
JALIPA KAPURDI TPP	4	135	930.24	8.36	4.58	87.06	0	8.61	78.40
JALIPA KAPURDI TPP	5	135	979.18	2.66	4.75	92.59	0	10.02	82.60
JALIPA KAPURDI TPP	6	135	921.01	0	13.15	86.85	0	9.18	77.70
JALIPA KAPURDI TPP	7	135	915.06	2.01	8.41	89.58	0.7	12.42	77.20
JALIPA KAPURDI TPP	8	135	918.5	0	12.49	87.51	0	10.06	77.50
JALIPA KAPURDI TPP		1080	7215.82	3.13	10.93	85.94	0.09	9.88	76.06
KAWAI TPS	1	660	4160.95	12.09	3.32	84.59	1.88	12.82	71.80
KAWAI TPS	2	660	4523.87	0	6.95	93.05	0	15.02	78.00
KAWAI TPS		1320	8684.82	6.04	5.14	88.82	0.94	13.92	74.90
PRAYAGRAJ TPP	1	660	234.78	0	78.16	21.84	0	3.84	18.00
PRAYAGRAJ TPP		660	234.78	0	78.16	21.84	0	0	17.99
LALITPUR TPS	1	660	27.76	0	176.59	-76.59	176.59	-82.29	5.70
LALITPUR TPS		660	27.76	0	176.59	-76.59	176.59	0	5.65
ANPARA C TPS	1	600	4493.33	0	8.1	91.9	0.4	6.65	85.30
ANPARA C TPS	2	600	4144.97	5.88	7.8	86.32	0.49	7.67	78.60
ANPARA C TPS		1200	8638.3	2.94	7.95	89.11	0.44	7.16	81.95
ROSA TPP Ph-I	1	300	2085.86	7.07	6.8	86.13	6.01	6.93	79.20
ROSA TPP Ph-I	2	300	1596.73	0	34.43	65.57	6.39	4.98	60.60
ROSA TPP Ph-I	3	300	1532.63	9.14	28.38	62.49	30.5	4.33	58.20
ROSA TPP Ph-I	4	300	1844.42	0	23.39	76.61	15.44	6.62	70.00
ROSA TPP Ph-I		1200	7059.64	4.05	23.25	72.7	14.59	5.74	66.97
MAQSOODPUR TPS	1	45	151.05	0	56.8	43.2	48.16	4.99	38.20
MAQSOODPUR TPS	2	45	161.54	11.06	42.92	46.01	38.93	5.15	40.90
MAQSOODPUR TPS		90	312.59	5.53	49.86	44.61	43.55	5.07	39.54

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
KHAMBARKHERA TPS	1	45	162.21	13.05	41.23	45.72	37.83	4.69	41.00
KHAMBARKHERA TPS	2	45	158.57	17.1	37.35	45.55	33.88	5.43	40.10
KHAMBARKHERA TPS		90	320.78	15.08	39.29	45.64	35.86	5.06	40.58
BARKHERA TPS	1	45	169.24	13.83	38.03	48.14	35.19	5.32	42.80
BARKHERA TPS	2	45	171.09	14.69	36.85	48.46	27.83	5.18	43.30
BARKHERA TPS		90	340.33	14.26	37.44	48.3	31.51	5.25	43.05
KUNDARKI TPS	1	45	187.4	39.65	6.18	54.16	6.26	6.75	47.40
KUNDARKI TPS	2	45	187.04	11.47	34.7	53.83	33.83	6.51	47.30
KUNDARKI TPS		90	374.44	25.56	20.44	54	20.05	6.63	47.36
UTRAULA TPS	1	45	199.73	16.23	35.06	48.7	31	-1.80	50.50
UTRAULA TPS	2	45	211.64	12.99	32.63	54.38	28.78	0.88	53.50
UTRAULA TPS		90	411.37	14.61	33.85	51.54	29.89	5.64	52.04
WESTERN REGION									
KORBA STPS	1	200	1562.09	8.7	1.28	90.02	0	1.12	88.90
KORBA STPS	2	200	1521.06	10.74	2.84	86.42	0	-0.18	86.60
KORBA STPS	3	200	1801.25	0	1.04	98.96	0	-3.54	102.50
KORBA STPS	4	500	4090.05	0	2.13	97.87	0	4.74	93.10
KORBA STPS	5	500	3708.26	9.59	2.4	88.02	0	3.58	84.40
KORBA STPS	6	500	3859.16	6.64	1.88	91.48	0	3.61	87.90
KORBA STPS	7	500	3887.3	9.25	1.09	89.67	0	1.19	88.50
KORBA STPS		2600	20429.17	6.39	1.84	91.77	0	2.72	89.45
SIPAT STPS	1	660	4336.64	10.39	11.73	77.88	1.69	3.08	74.80
SIPAT STPS	2	660	5326.04	0	4.63	95.37	0.56	3.47	91.90
SIPAT STPS	3	660	4693.68	11.54	2.8	85.66	0	4.7	81.00
SIPAT STPS	4	500	4127.08	0	1.61	98.39	1.2	4.42	94.00
SIPAT STPS	5	500	3802.87	9.22	0.83	89.95	0	3.37	86.60
SIPAT STPS		2980	22286.31	6.4	4.65	88.94	0.7	3.86	85.14

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
VINDHYACHAL STPS	1	210	1598.38	1.85	1.85	96.3	1.81	9.74	86.60
VINDHYACHAL STPS	2	210	1350.82	5.79	10.56	83.66	9.78	10.43	73.20
VINDHYACHAL STPS	3	210	1451.17	5.4	3.06	91.53	2.03	12.87	78.70
VINDHYACHAL STPS	4	210	1301.53	11.88	6.22	81.9	4.47	11.34	70.60
VINDHYACHAL STPS	5	210	1409.57	5.38	6.75	87.88	5.96	11.46	76.40
VINDHYACHAL STPS	6	210	1381.63	9.58	5.83	84.59	5.14	9.69	74.90
VINDHYACHAL STPS	7	500	3193.96	14.69	2.63	82.69	1.66	9.97	72.70
VINDHYACHAL STPS	8	500	3434.87	0	6.04	93.96	4.32	15.76	78.20
VINDHYACHAL STPS	9	500	3942.87	0	2.29	97.71	0	7.93	89.80
VINDHYACHAL STPS	10	500	3490.35	10.25	2.41	87.34	1.04	7.87	79.50
VINDHYACHAL STPS	11	500	3781.45	0	2.02	97.98	0	11.88	86.10
VINDHYACHAL STPS	12	500	3507.84	7.1	2.27	90.63	0.76	10.76	79.90
VINDHYACHAL STPS	13	500	1475.49	0	22.08	77.92	17.48	4.42	73.50
VINDHYACHAL STPS		4760	31319.93	5.46	4.61	89.93	3.06	12.34	79.46
BHILAI TPS	1	250	1830.75	7.28	0	92.72	0	9.38	83.40
BHILAI TPS	2	250	1718.88	9.02	0	90.98	0	12.7	78.30
BHILAI TPS		500	3549.63	8.15	0	91.85	0	11.04	80.82
MAUDA TPS	1	500	1067.95	0	65.87	34.13	64.06	9.81	24.30
MAUDA TPS	2	500	803.82	4.83	68.2	26.96	68.02	8.66	18.30
MAUDA TPS		1000	1871.77	2.42	67.04	30.54	66.04	9.24	21.31
UKAI TPS	1	120	63.91	0	90.91	9.09	88.23	3.02	6.10
UKAI TPS	2	120	0	0	100	0	100	0	0.00
UKAI TPS	3	200	827.61	24.86	17.4	57.74	19.61	10.63	47.10
UKAI TPS	4	200	927.65	6.4	29.38	64.23	30.41	11.42	52.80
UKAI TPS	5	210	1283.56	5.05	11.17	83.78	11.44	14.2	69.60
UKAI TPS	6	500	2452.28	0	27.43	72.57	27.76	16.74	55.80
UKAI TPS		1350	5555.01	5.42	35.79	58.79	36.2	11.94	46.31

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GANDHI NAGAR TPS	1	120	0	0	100	0	100	0	0.00
GANDHI NAGAR TPS	2	120	0	0	100	0	100	0	0.00
GANDHI NAGAR TPS	3	210	662.05	0	53.79	46.21	54.97	10.32	35.90
GANDHI NAGAR TPS	4	210	652.39	1.31	53.08	45.61	51.6	10.24	35.40
GANDHI NAGAR TPS	5	210	1417.5	8.67	0.61	90.72	0	13.87	76.80
GANDHI NAGAR TPS		870	2731.94	2.41	53.53	44.06	53.31	8.31	35.75
WANAKBORI TPS	1	210	1135.82	0	22.57	77.43	35.96	15.86	61.60
WANAKBORI TPS	2	210	1143.08	7.66	15.64	76.7	28.94	14.73	62.00
WANAKBORI TPS	3	210	1070.77	8.71	17.56	73.73	24.26	15.68	58.00
WANAKBORI TPS	4	210	621.1	0	58.26	41.74	64.66	8.07	33.70
WANAKBORI TPS	5	210	416.25	0	70.61	29.39	75.41	6.82	22.60
WANAKBORI TPS	6	210	196.47	0	87.02	12.98	51.34	2.33	10.70
WANAKBORI TPS	7	210	1080.46	0	27.66	72.34	27.49	13.77	58.60
WANAKBORI TPS		1470	5663.95	2.34	42.76	54.9	44.01	11.04	43.86
SIKKA REP. TPS	1	120	118.21	0	84.27	15.73	33.87	4.51	11.20
SIKKA REP. TPS	2	120	246.35	0	73.14	26.86	72.43	3.46	23.40
SIKKA REP. TPS	3	250	699.13	0	27.92	72.08	24.27	36.78	35.30
SIKKA REP. TPS	4	250	140.06	0	86.68	13.32	23.11	6.42	6.90
SIKKA REP. TPS		740	1203.75	0	63.31	36.69	39.59	15.5	15.13
KUTCH LIG. TPS	1	70	431.02	9.39	11.09	79.52	1.45	9.42	70.10
KUTCH LIG. TPS	2	70	400.7	10.81	15.54	73.66	0.51	8.46	65.20
KUTCH LIG. TPS	3	75	467.08	8.12	10.05	81.83	1.46	10.95	70.90
KUTCH LIG. TPS	4	75	322.58	20.02	13.66	66.32	0.15	17.35	49.00
KUTCH LIG. TPS		290	1621.38	12.15	12.56	75.29	0.89	12.04	63.65
AKRIMOTA LIG TPS	1	125	721.82	4.09	4.86	91.05	0.31	25.31	65.70
AKRIMOTA LIG TPS	2	125	705.6	2.87	12.19	84.93	0.2	20.67	64.30
AKRIMOTA LIG TPS		250	1427.42	3.48	8.53	87.99	0.25	22.99	65.00

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SATPURA TPS	6	200	1041.53	0	28.35	71.65	14.77	12.37	59.30
SATPURA TPS	7	210	1005.45	0	30.54	69.46	25.96	14.95	54.50
SATPURA TPS	8	210	956.72	18.4	18.83	62.78	4.48	10.91	51.90
SATPURA TPS	9	210	529.47	0	62.98	37.02	11.31	8.32	28.70
SATPURA TPS	10	250	1480.73	0.52	17.92	81.56	8.14	14.13	67.40
SATPURA TPS	11	250	494.96	0	70.44	29.56	4.78	7.02	22.50
SATPURA TPS		1330	5508.86	3	38.61	58.39	11.24	11.23	47.15
SHREE SINGAJI TPP	1	600	2097.33	0	43.02	56.98	21.13	17.19	39.80
SHREE SINGAJI TPP	2	600	2153.15	0	43.26	56.74	29.84	15.88	40.90
SHREE SINGAJI TPP		1200	4250.48	0	43.14	56.86	25.49	16.54	40.32
KORBA-II	1	50	145.51	0	52.6	47.4	1.56	14.27	33.10
KORBA-II	2	50	194.62	0	39.13	60.87	0	16.56	44.30
KORBA-II	3	50	276.87	0	15.81	84.19	0.26	21.15	63.00
KORBA-II	4	50	177.47	7.23	36.83	55.94	0	15.54	40.40
KORBA-II		200	794.47	1.81	36.09	62.1	0.46	16.88	45.22
KORBA-III	1	120	702.51	0	9.3	90.7	0.23	24.05	66.60
KORBA-III	2	120	741.72	0	5.24	94.76	0.04	24.39	70.40
KORBA-III		240	1444.23	0	7.27	92.73	0.14	24.22	68.51
DSPM TPS	1	250	1902.94	7.65	3.46	88.89	0.45	2.19	86.70
DSPM TPS	2	250	2082.58	0	2.46	97.54	0.15	2.71	94.80
DSPM TPS		500	3985.52	3.82	2.96	93.22	0.3	2.59	90.74
KORBA-WEST TPS	1	210	1542.54	6.59	3.76	89.65	0	6.05	83.60
KORBA-WEST TPS	2	210	1604.78	1.42	1.14	97.44	0.02	10.44	87.00
KORBA-WEST TPS	3	210	1410.14	0	8.73	91.27	0.01	14.82	76.40
KORBA-WEST TPS	4	210	1278.77	9.58	6.6	83.82	0.02	14.5	69.30
KORBA-WEST TPS	5	500	3209.36	0	8.29	91.71	0.15	18.63	73.10
KORBA-WEST TPS		1340	9045.59	2.76	6.27	90.98	0.06	14.65	76.85

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MARWA TPS	1	500	10.69	0	0	100	0	99.70	0.30
MARWA TPS		500	10.69	0	0	100	0	0	0.32
AMARKANTAK EXT TPS	3	210	1785.72	0	1.53	98.47	0.19	1.7	96.80
AMARKANTAK EXT TPS		210	1785.72	0	1.53	98.47	0.19	1.7	96.81
SANJAY GANDHI TPS	1	210	896.02	0	33.65	66.35	30.84	17.78	48.60
SANJAY GANDHI TPS	2	210	857.68	21.62	17.25	61.13	15.08	14.64	46.50
SANJAY GANDHI TPS	3	210	756.17	8.15	37.08	54.77	36.95	13.78	41.00
SANJAY GANDHI TPS	4	210	958.14	0	31.26	68.74	30.38	16.8	51.90
SANJAY GANDHI TPS	5	500	3584.75	3.26	2.95	93.8	9.35	12.18	81.60
SANJAY GANDHI TPS		1340	7052.76	5.88	19.79	74.33	21.24	14.41	59.92
NASIK TPS	3	210	1447.37	0	11.22	88.78	9.18	10.32	78.50
NASIK TPS	4	210	1443.79	0.64	9.09	90.27	9.2	12	78.30
NASIK TPS	5	210	1436.65	8.09	2.95	88.96	6.49	11.08	77.90
NASIK TPS		630	4327.81	2.91	7.75	89.34	8.29	11.13	78.21
KORADI TPS	1	105	0	0	100	0	0	0	0.00
KORADI TPS	2	105	0	0	100	0	0	0	0.00
KORADI TPS	3	105	0	0	100	0	0	0	0.00
KORADI TPS	4	105	0	0	100	0	0	0	0.00
KORADI TPS	5	200	804.27	0	32.06	67.94	13.45	22.16	45.80
KORADI TPS	6	210	0	72.95	27.05	0	0	0	0.00
KORADI TPS	7	210	1041.06	0.74	22.26	77.01	17.49	20.57	56.40
KORADI TPS	8	660	1124.86	0	43.94	56.06	8.11	19.96	36.10
KORADI TPS		1700	2970.19	12.85	54.79	32.36	6.39	10.39	22.37
KHAPARKHEDA TPS	1	210	1301.22	0	4.66	95.34	7.83	24.8	70.50
KHAPARKHEDA TPS	2	210	1239.14	6.44	1.11	92.45	7.05	25.27	67.20
KHAPARKHEDA TPS	3	210	1234.82	0	13.9	86.1	7.29	19.2	66.90
KHAPARKHEDA TPS	4	210	1155.86	7.4	11.56	81.05	7.9	18.39	62.70

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KHAPARKHEDA TPS	5	500	3226.46	5.36	4.22	90.43	9.7	16.96	73.50
KHAPARKHEDA TPS		1340	8157.5	4.17	6.47	89.37	8.33	20.03	69.30
PARAS TPS	3	250	1750.48	0	3.89	96.11	2.77	16.4	79.70
PARAS TPS	4	250	1761.96	1.84	3.11	95.04	3.71	14.81	80.20
PARAS TPS		500	3512.44	0.92	3.5	95.58	3.24	15.6	79.97
BHUSAWAL TPS	2	210	545.74	0	62.73	37.27	2.77	7.68	29.60
BHUSAWAL TPS	3	210	1175.22	0	20.38	79.62	16.5	15.91	63.70
BHUSAWAL TPS	4	500	3268.01	0	12.03	87.97	10.26	13.56	74.40
BHUSAWAL TPS	5	500	3097.7	10.09	4.25	85.66	2.6	15.13	70.50
BHUSAWAL TPS		1420	8086.67	3.55	18.02	78.42	7.38	13.59	64.83
PARLI TPS	3	210	118.9	0	90.22	9.78	0.54	3.33	6.40
PARLI TPS	4	210	25.64	22.73	74.94	2.33	73.85	0.94	1.40
PARLI TPS	5	210	305.94	0	75.93	24.07	73.81	7.49	16.60
PARLI TPS	6	250	394.63	0	78.38	21.62	0.82	3.65	18.00
PARLI TPS	7	250	475.1	0.72	73.58	25.69	1.19	4.06	21.60
PARLI TPS		1130	1320.21	4.38	78.43	17.19	27.99	3.89	13.30
CHANDRAPUR(MAHARASHTRA) STPS	1	210	0	0	100	0	0	0	0.00
CHANDRAPUR(MAHARASHTRA) STPS	2	210	867.71	0	25.98	74.02	22.51	26.98	47.00
CHANDRAPUR(MAHARASHTRA) STPS	3	210	1467.91	0	5.89	94.11	0.96	14.53	79.60
CHANDRAPUR(MAHARASHTRA) STPS	4	210	1401.35	7.81	1.56	90.63	1.12	14.66	76.00
CHANDRAPUR(MAHARASHTRA) STPS	5	500	2756.5	9.1	9.02	81.88	1.21	19.12	62.80
CHANDRAPUR(MAHARASHTRA) STPS	6	500	2504.17	11.51	14.28	74.21	0.53	17.19	57.00
CHANDRAPUR(MAHARASHTRA) STPS	7	500	3167.18	0	4.17	95.83	1.34	23.71	72.10
CHANDRAPUR(MAHARASHTR		2340	12164.82	5.11	17.84	77.05	2.86	17.87	59.18

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A) STPS									
SABARMATI (C STATION)	15	30	25.59	0	87.1	12.9	87.04	3.19	9.70
SABARMATI (C STATION)	16	30	26.22	0	87.06	12.94	88.72	2.99	9.90
SABARMATI (C STATION)		60	51.81	0	87.08	12.92	87.88	3.09	9.83
SALAYA TPP	1	600	3040.47	7.02	11.44	81.54	1.63	23.85	57.70
SALAYA TPP	2	600	1945.37	17.54	25.61	56.85	4.42	19.94	36.90
SALAYA TPP		1200	4985.84	12.28	18.52	69.2	3.03	21.9	47.30
SABARMATI (D-F STATIONS)	1	120	774.51	3.74	2.56	93.7	15.95	20.22	73.50
SABARMATI (D-F STATIONS)	2	121	773.99	5.32	1.48	93.2	14.31	19.80	73.40
SABARMATI (D-F STATIONS)	3	121	840.96	3.63	1.11	95.26	11.71	15.56	79.70
SABARMATI (D-F STATIONS)		362	2389.46	4.23	1.72	94.06	13.99	18.98	75.52
SURAT LIG. TPS	1	125	813.81	0	11.38	88.62	2.26	14.52	74.10
SURAT LIG. TPS	2	125	823.48	6.49	7.64	85.87	1.31	10.87	75.00
SURAT LIG. TPS	3	125	599.39	5.41	33.09	61.5	0	6.91	54.60
SURAT LIG. TPS	4	125	841.31	6.7	5.14	88.15	2.84	11.61	76.60
SURAT LIG. TPS		500	3077.99	4.65	14.31	81.04	1.6	11.25	70.08
MUNDRA TPS	1	330	1908.62	9.61	10.5	79.88	10.93	14.04	65.80
MUNDRA TPS	2	330	2282.99	0	0.71	99.29	0	20.53	78.80
MUNDRA TPS	3	330	2386.31	0	6.35	93.65	5.56	11.33	82.30
MUNDRA TPS	4	330	2403.4	0	5.08	94.92	4.99	12.01	82.90
MUNDRA TPS	5	660	4928.25	0	4.33	95.67	0	10.66	85.00
MUNDRA TPS	6	660	4835.5	6.87	2.11	91.02	0	7.61	83.40
MUNDRA TPS	7	660	4859.88	0	2.54	97.46	0	13.63	83.80
MUNDRA TPS	8	660	4489.73	9.2	2.25	88.55	0	11.1	77.40
MUNDRA TPS	9	660	4898.28	0	2.89	97.11	0	12.62	84.50
MUNDRA TPS		4620	32992.96	2.98	3.63	93.38	1.53	12.08	81.30
MUNDRA UMTTP	1	800	5177.55	0	18.06	81.94	5.03	8.26	73.70

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MUNDRA UMTTP	2	800	4983.93	17.06	3.64	79.3	4.86	8.38	70.90
MUNDRA UMTTP	3	800	5146.76	0	14.61	85.39	7.25	12.15	73.20
MUNDRA UMTTP	4	800	4621.27	0	25.6	74.4	8.76	8.63	65.80
MUNDRA UMTTP	5	800	5750.24	6.41	3.5	90.09	6.87	8.3	81.80
MUNDRA UMTTP		4000	25679.75	4.69	13.08	82.22	6.56	9.14	73.09
BINA TPS	1	250	624.85	0	60.69	39.31	60.07	10.85	28.50
BINA TPS	2	250	682.92	0	56.93	43.07	56.9	11.97	31.10
BINA TPS		500	1307.77	0	58.81	41.19	58.48	11.41	29.78
MAHAN TPP	1	600	0	0	100	0	0	0	0.00
MAHAN TPP		600	0	0	100	0	0	0	0.00
SASAN UMTTP	1	660	5210.81	0	5.76	94.24	1.09	4.36	89.90
SASAN UMTTP	2	660	5172.72	0	7.1	92.9	0.95	3.69	89.20
SASAN UMTTP	3	660	4923.05	0	12.05	87.95	0.88	3.14	84.90
SASAN UMTTP	4	660	5359.53	0	3.24	96.76	1.35	4.31	92.40
SASAN UMTTP	5	660	5321.77	0	5.15	94.85	1.11	3.05	91.80
SASAN UMTTP	6	660	5274.46	0	5.92	94.08	0.98	3.14	91.00
SASAN UMTTP		3960	31262.34	0	6.54	93.46	1.06	3.64	89.87
NIWARI TPP	1	45	141.96	0	46.37	53.63	60.08	17.72	35.90
NIWARI TPP		45	141.96	0	46.37	53.63	60.08	17.72	35.91
NIGRI TPP	1	660	2788.08	0	29.4	70.6	26.94	22.51	48.10
NIGRI TPP	2	660	2558.1	4.68	30.55	64.78	44.6	20.65	44.10
NIGRI TPP		1320	5346.18	2.34	29.97	67.69	35.77	21.58	46.11
ANUPPUR TPP	1	600	2873.04	0	32.4	67.6	14.4	6.1	61.50
ANUPPUR TPP		600	2873.04	0	32.4	67.6	14.4	8.86	61.51
OP JINDAL TPS	1	250	987.13	9.56	40.66	49.78	44.55	4.78	45.00
OP JINDAL TPS	2	250	1394.02	0	27.6	72.4	35.45	8.92	63.50
OP JINDAL TPS	3	250	1664.04	0	10.52	89.48	20.57	13.7	75.80

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
OP JINDAL TPS	4	250	1101.03	0	43.24	56.76	22.34	6.62	50.10
OP JINDAL TPS		1000	5146.22	2.39	30.5	67.1	30.73	8.54	58.59
PATHADI TPP	1	300	2227.08	4.62	0.62	94.76	3.77	10.35	84.50
PATHADI TPP	2	300	757.57	0	69.3	30.7	0.88	1.95	28.70
PATHADI TPP		600	2984.65	2.31	34.96	62.73	2.32	6.15	56.63
KASAIPALLI TPP	1	135	914.56	4.37	11.26	84.37	0	7.25	77.10
KASAIPALLI TPP	2	135	991.79	5.44	8.73	85.83	0	2.23	83.60
KASAIPALLI TPP		270	1906.35	4.9	9.99	85.1	0	5.01	80.38
RATIJA TPS	1	50	272.67	0.74	30.17	69.1	0	7.00	62.10
RATIJA TPS		50	272.67	0.74	30.17	69.1	0	7.13	62.08
CHAKABURA TPP	2	30	241.03	0	6.72	93.28	0	1.78	91.50
CHAKABURA TPP		30	241.03	0	6.72	93.28	0	1.97	91.47
SVPL TPP	1	63	59.03	0	84.08	15.92	4.91	5.22	10.70
SVPL TPP		63	59.03	0	84.08	15.92	4.91	5.76	10.67
RAIKHEDA TPP	1	685	701.94	0	79.68	20.32	36.31	7.34	13.00
RAIKHEDA TPP		685	701.94	0	79.68	20.32	36.31	7.34	12.98
KATGHORA TPP	1	35	0	0	100	0	0	0	0.00
KATGHORA TPP		35	0	0	100	0	0	0	0.00
BALCO TPS	1	300	1521.34	0	14.74	85.26	0	19.26	66.00
BALCO TPS	2	300	59.63	0	0	100	0	100.00	0.00
BALCO TPS		600	1580.97	0	14.74	85.26	0	18.92	72.83
SALORA TPP	1	135	0	0	100	0	0	0	0.00
SALORA TPP		135	0	0	100	0	0	0	0.00
AKALTARA TPS	3	600	3473.3	0	16.1	83.9	1.04	18	65.90
AKALTARA TPS	4	600	2894.36	0	37.09	62.91	0	7.99	54.90
AKALTARA TPS		1200	6367.66	0	26.59	73.41	0.52	13	60.41
BARADARHA TPS	1	600	2384.6	1.71	34.82	63.47	50.03	18.22	45.20

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
BARADARHA TPS	2	600	92.52	0	0	100	0	0	*
BARADARHA TPS		1200	2477.12	1.71	34.82	63.47	50.03	18.22	45.25
AVANTHA BHANDAR	1	600	1054.81	0	76.83	23.17	1.99	3.16	20.00
AVANTHA BHANDAR		600	1054.81	0	76.83	23.17	1.99	3.16	20.01
TAMNAR TPP	1	600	2097.01	0	46.5	53.5	24.9	13.71	39.80
TAMNAR TPP	2	600	2242.11	0	48.23	51.77	41.24	9.27	42.50
TAMNAR TPP	3	600	66.36	0	97.96	2.04	98.64	0.78	1.30
TAMNAR TPP		1800	4405.48	0	64.23	35.77	54.92	8.92	27.86
BANDAKHAR TPP	1	300	216.22	0	24.45	75.55	0	66.25	9.30
BANDAKHAR TPP		300	216.22	0	24.45	75.55	0	8.22	9.25
UCHPINDA TPP	1	360	87.7	0	0	100	0	96.00	4.00
UCHPINDA TPP	2	360	35.34	0	0	100	0	94.96	5.04
UCHPINDA TPP		720	123.04	0	0	100	0	0	4.52
TROMBAY TPS	4	150	0	0	100	0	0	0	0.00
TROMBAY TPS	5	500	3503.46	2.91	0.48	96.62	0.79	16.85	79.80
TROMBAY TPS	6	500	42.13	0	96.8	3.2	10.45	2.24	1.00
TROMBAY TPS	8	250	1883.33	6.59	0.78	92.62	0	6.86	85.80
TROMBAY TPS		1400	5428.92	2.22	45.59	52.19	4.01	8.04	44.15
DAHANU TPS	1	250	1873.85	4.88	4.37	90.76	5.44	5.44	85.30
DAHANU TPS	2	250	1950.99	0	5.35	94.65	5.81	5.81	88.80
DAHANU TPS		500	3824.84	2.44	4.86	92.7	5.63	5.63	87.09
JSW RATNAGIRI TPP	1	300	1959.45	10.96	8.52	80.51	3.68	6.11	74.40
JSW RATNAGIRI TPP	2	300	2474.36	0	3.5	96.5	0	2.6	93.90
JSW RATNAGIRI TPP	3	300	2034.9	0	7.41	92.59	0	15.37	77.20
JSW RATNAGIRI TPP	4	300	1926.39	0	3.94	96.06	0	22.96	73.10
JSW RATNAGIRI TPP		1200	8395.1	2.74	5.84	91.41	0.92	12.17	79.64
WARDHA WARORA TPP	1	135	276.02	0	69.11	30.89	0.15	7.61	23.30

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
WARDHA WARORA TPP	2	135	125.88	0	85.76	14.24	5.31	3.62	10.60
WARDHA WARORA TPP	3	135	761.08	0	17.02	82.98	0.87	18.8	64.20
WARDHA WARORA TPP	4	135	694.46	0	24.37	75.63	0	17.07	58.60
WARDHA WARORA TPP		540	1857.44	0	49.06	50.94	1.58	11.78	39.16
MIHAN TPS	1	61.5	0	0	100	0	0	8.47	0.00
MIHAN TPS	2	61.5	0	0	100	0	0	8.47	0.00
MIHAN TPS	3	61.5	0	0	100	0	0	8.47	0.00
MIHAN TPS	4	61.5	0	0	100	0	0	8.47	0.00
MIHAN TPS		246	0	0	100	0	0	8.47	0.00
TIRORA TPS	1	660	4155.82	9.73	3.1	87.16	8.38	15.48	71.70
TIRORA TPS	2	660	4248.05	0	16.97	83.03	5.9	9.75	73.30
TIRORA TPS	3	660	3993.75	0	20.1	79.9	5.51	11.01	68.90
TIRORA TPS	4	660	3454.19	0	29.95	70.05	5.87	10.47	59.60
TIRORA TPS	5	660	4227.89	0	13.14	86.86	8.44	13.93	72.90
TIRORA TPS		3300	20079.7	1.95	16.65	81.4	6.82	12.13	69.27
BELA TPS	1	270	0	0	100	0	0	0	0.00
BELA TPS		270	0	0	100	0	0	0	0.00
GMR WARORA TPS	1	300	2113.83	0	1.84	98.16	1.68	17.95	80.20
GMR WARORA TPS	2	300	1892.95	4.98	3.65	91.36	0	19.53	71.80
GMR WARORA TPS		600	4006.78	2.49	2.74	94.76	0.84	18.74	76.02
AMARAVATI TPS	1	270	1489.75	0	24.83	75.17	31.72	12.35	62.80
AMARAVATI TPS	2	270	1594.3	0	20.92	79.08	20.21	11.86	67.20
AMARAVATI TPS	3	270	1278.42	0	35.23	64.77	18.62	10.86	53.90
AMARAVATI TPS	4	270	1183.68	0	37.09	62.91	13	13	49.90
AMARAVATI TPS	5	270	633.4	0	64.33	35.67	8.96	8.96	26.70
AMARAVATI TPS		1350	6179.55	0	36.48	63.52	18.5	11.41	52.11
NASIK (P) TPS	1	270	0	0	100	0	0	0	0.00

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
NASIK (P) TPS		270	0	0	100	0	0	0	0.00
GEPL TPP Ph-I	1	60	0	0	100	0	0	0	0.00
GEPL TPP Ph-I	2	60	0	0	100	0	0	0	0.00
GEPL TPP Ph-I		120	0	0	100	0	0	0	0.00
BUTIBORI TPP	1	300	1976.41	8.19	1.27	90.54	11.83	15.54	75.00
BUTIBORI TPP	2	300	2053.76	1.35	3.3	95.35	12.19	17.41	77.90
BUTIBORI TPP		600	4030.17	4.77	2.29	92.94	12.01	16.47	76.47
DHARIWAL TPP	1	300	0	0	100	0	0	0	0.00
DHARIWAL TPP	2	300	369.16	0	70.89	29.11	70.31	15.1	14.00
DHARIWAL TPP		600	369.16	0	85.45	14.55	35.15	7.55	7.00
SOUTHERN REGION									
RAMAGUNDEM STPS	1	200	1516.56	6.18	1.86	91.96	0	5.64	86.30
RAMAGUNDEM STPS	2	200	1516.92	7.46	0.79	91.75	0	5.4	86.30
RAMAGUNDEM STPS	3	200	1663.3	0	0.34	99.66	0	4.98	94.70
RAMAGUNDEM STPS	4	500	3532.31	12.52	1.38	86.09	0	5.67	80.40
RAMAGUNDEM STPS	5	500	3866.11	0	6.73	93.27	0	5.27	88.00
RAMAGUNDEM STPS	6	500	4049.02	0	2.11	97.89	0	5.72	92.20
RAMAGUNDEM STPS	7	500	4106.37	0	1.12	98.88	0	5.38	93.50
RAMAGUNDEM STPS		2600	20250.59	3.46	2.41	94.13	0	5.53	88.67
SIMHADRI	1	500	3859.05	0	0.2	99.8	0	11.93	87.90
SIMHADRI	2	500	3346.21	12.17	0.17	87.65	0	11.46	76.20
SIMHADRI	3	500	3446.8	8.47	0.58	90.95	0	12.47	78.50
SIMHADRI	4	500	3817.58	0	0.63	99.37	0	12.45	86.90
SIMHADRI		2000	14469.64	5.16	0.4	94.44	0	12.08	82.36
NEYVELI TPS- I	1	50	302.1	5.48	7.22	87.3	0	18.52	68.80
NEYVELI TPS- I	2	50	257.9	5.83	19.5	74.67	0	15.95	58.70
NEYVELI TPS- I	3	50	279.85	5.69	11.66	82.65	0	18.93	63.70

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generation (MW)	Planned Maintenance (%)	Forced Outage (%)	Operating Availability. (%)	Reserve Shutdown due to low system demand (%)(Complete Shutdown)	Partial unavailability including Low System Demand (%)	PLF (%)
NEYVELI TPS- I	4	50	305.55	5.8	11.58	82.62	0	13.05	69.60
NEYVELI TPS- I	5	50	263.28	5.79	19.71	74.5	0	14.56	59.90
NEYVELI TPS- I	6	50	294.03	6.01	10.53	83.46	1.56	16.52	66.90
NEYVELI TPS- I	7	100	464.64	1.41	20.2	78.39	2.54	25.5	52.90
NEYVELI TPS- I	8	100	526	0	18.89	81.11	2.68	21.22	59.90
NEYVELI TPS- I	9	100	467.69	6.56	21.96	71.48	1.72	18.24	53.20
NEYVELI TPS- I		600	3161.04	4.21	16.86	78.93	1.29	18.95	51.16
NEYVELI TPS-II	1	210	1594.85	7.52	2.33	90.15	1.43	3.69	86.50
NEYVELI TPS-II	2	210	1542.1	9.12	2.39	88.49	1	4.91	83.60
NEYVELI TPS-II	3	210	1521.17	8.11	5.88	86.01	1.19	3.6	82.50
NEYVELI TPS-II	4	210	1523.03	6.35	4.97	88.69	1.89	6.12	82.60
NEYVELI TPS-II	5	210	1361	12.43	7.34	80.23	2.05	6.45	73.80
NEYVELI TPS-II	6	210	1533.32	9.44	2.34	88.22	1.66	5.1	83.10
NEYVELI TPS-II	7	210	1507.15	7.79	4.84	87.37	1.91	5.67	81.70
NEYVELI TPS-II		1470	10582.62	8.68	4.3	87.02	1.59	5.08	81.96
NEYVELI (EXT) TPS	1	210	1666.38	5.9	1.15	92.95	0.78	2.65	90.30
NEYVELI (EXT) TPS	2	210	1603.14	12.04	0.11	87.85	0.19	0.95	86.90
NEYVELI (EXT) TPS		420	3269.52	8.97	0.63	90.4	0.48	1.99	88.62
NEYVELI TPS-II EXP	1	250	427.8	0	53.03	46.97	0	27.67	19.30
NEYVELI TPS-II EXP	2	250	423.33	0	66.26	33.74	0	17.54	16.20
NEYVELI TPS-II EXP		500	851.13	0	60.31	39.69	0	6.41	20.17
VALLUR TPP	1	500	2849.89	2.75	13.2	84.04	0.05	19.15	64.90
VALLUR TPP	2	500	2551.6	12.19	12.19	75.62	0	17.53	58.10
VALLUR TPP	3	500	2315.3	0	31.85	68.15	0	15.43	52.70
VALLUR TPP		1500	7716.79	4.98	19.08	75.94	0.02	17.37	58.57
TUTICORIN (JV) TPP	1	500	1904.33	0	38.2	61.8	0	11.3	50.50
TUTICORIN (JV) TPP	2	500	1653.78	0.41	33.43	66.15	0	2.55	63.60

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
TUTICORIN (JV) TPP		1000	3558.11	0.18	36.12	63.7	0	0	56.18
KOTHAGUDEM TPS	1	60	378.33	3.86	2.39	93.76	1.5	21.97	71.80
KOTHAGUDEM TPS	2	60	394.5	4	3.16	92.84	1.12	17.99	74.90
KOTHAGUDEM TPS	3	60	373.45	2.21	2.37	95.42	1.32	24.56	70.90
KOTHAGUDEM TPS	4	60	346.49	11.02	3.58	85.4	1.32	19.66	65.70
KOTHAGUDEM TPS	5	120	694.38	5.5	3.25	91.25	1.31	25.37	65.90
KOTHAGUDEM TPS	6	120	724.69	4.86	2.48	92.65	1.52	23.9	68.80
KOTHAGUDEM TPS	7	120	770.55	4.16	3.5	92.34	1.3	19.24	73.10
KOTHAGUDEM TPS	8	120	750.9	3.87	4.44	91.7	1.45	20.46	71.20
KOTHAGUDEM TPS		720	4433.29	4.82	3.24	91.94	1.37	21.84	40.86
KOTHAGUDEM TPS (NEW)	1	250	1814.11	5.47	3.17	91.36	2.34	8.75	82.60
KOTHAGUDEM TPS (NEW)	2	250	1784.14	5.89	3.08	91.03	2.36	9.79	81.20
KOTHAGUDEM TPS (NEW)	3	500	3038.03	4.64	3.38	91.97	21.89	22.8	69.20
KOTHAGUDEM TPS (NEW)		1000	6636.28	5.16	3.26	91.58	12.12	16.04	75.55
Dr. N.TATA RAO TPS	1	210	1446.73	3.61	2.67	93.72	2.91	15.29	78.40
Dr. N.TATA RAO TPS	2	210	1467.74	0	2.95	97.05	1.17	17.48	79.60
Dr. N.TATA RAO TPS	3	210	1562.19	3.66	0.5	95.83	2.01	11.15	84.70
Dr. N.TATA RAO TPS	4	210	1616.47	0	0.6	99.4	2.15	11.76	87.60
Dr. N.TATA RAO TPS	5	210	1468.2	5.81	1.72	92.47	2.01	12.87	79.60
Dr. N.TATA RAO TPS	6	210	1503.64	3.77	0.84	95.39	2.2	13.87	81.50
Dr. N.TATA RAO TPS	7	500	3007.56	15.48	4.18	80.34	3.8	11.87	68.50
Dr. N.TATA RAO TPS		1760	12072.53	6.41	2.3	91.3	2.56	13.21	78.09
DAMODARAM SANJEEVAIAH TPS	1	800	2948.11	0	35.47	64.53	0	22.53	42.00
DAMODARAM SANJEEVAIAH TPS	2	800	2065.27	7.16	40.24	52.6	0.18	11.6	41.00
DAMODARAM SANJEEVAIAH TPS		1600	5013.38	2.63	37.23	60.14	0.07	6.75	41.59
RAMAGUNDEM - B TPS	1	62.5	399.4	0	16.13	83.87	0	11.12	72.80
RAMAGUNDEM - B TPS		62.5	399.4	0	16.13	83.87	0	11.12	72.75

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
KAKATIYA TPS	1	500	3204.52	7.47	4.41	88.12	0	15.16	73.00
KAKATIYA TPS	2	600	427.48	0	0	100	0	0	*
KAKATIYA TPS		1100	3632	7.47	4.46	88.07	0	15.16	72.96
RAYALASEEMA TPS	1	210	1489.11	0	2.61	97.39	2.23	16.66	80.70
RAYALASEEMA TPS	2	210	1421.3	3.99	3.78	92.24	0.7	15.19	77.10
RAYALASEEMA TPS	3	210	1471.47	4.37	0.81	94.82	0.27	15.05	79.80
RAYALASEEMA TPS	4	210	1482.89	4.11	1.46	94.42	0	14.03	80.40
RAYALASEEMA TPS	5	210	1427.75	5.28	2.83	91.89	0	14.49	77.40
RAYALASEEMA TPS		1050	7292.52	3.55	2.3	94.15	0.64	15.09	79.07
RAICHUR TPS	1	210	1552.65	6.04	2.5	91.45	0.58	7.25	84.20
RAICHUR TPS	2	210	1394.08	5.4	7.67	86.93	0.65	11.33	75.60
RAICHUR TPS	3	210	933.72	0	46.74	53.26	0.57	2.62	50.60
RAICHUR TPS	4	210	1436.19	5.37	13.01	81.62	0.88	3.66	77.90
RAICHUR TPS	5	210	1524.46	0	10.28	89.72	8.55	7.12	82.60
RAICHUR TPS	6	210	1483.41	6.97	6.03	87	1.17	6.60	80.40
RAICHUR TPS	7	210	1437.64	0	14.64	85.36	0.84	7.46	77.90
RAICHUR TPS	8	250	1661.48	8.93	5	86.07	1.79	10.37	75.70
RAICHUR TPS		1720	11423.63	4.2	13.04	82.75	1.88	6.41	75.61
BELLARY TPS	1	500	2804.54	18.26	8.74	73	1.81	9.14	63.90
BELLARY TPS	2	500	3304.71	5.51	7.95	86.54	5	11.3	75.20
BELLARY TPS		1000	6109.25	11.88	8.35	79.77	3.4	10.22	69.55
ENNORE TPS	1	60	83.39	4.57	52.56	42.87	0.95	27.05	15.80
ENNORE TPS	2	60	0	0	100	0	0	0	0.00
ENNORE TPS	3	110	132.16	0	68.73	31.27	0.33	17.59	13.70
ENNORE TPS	4	110	226.76	0	44.06	55.94	0.57	32.48	23.50
ENNORE TPS	5	110	0	0	100	0	0	0	0.00
ENNORE TPS		450	442.31	0.61	72.36	27.03	0.35	15.84	11.19

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
TUTICORIN TPS	1	210	1469.09	0	9.83	90.17	5.82	10.53	79.60
TUTICORIN TPS	2	210	1401.18	0	13.58	86.42	6.93	10.46	76.00
TUTICORIN TPS	3	210	1395.87	5.54	9.36	85.11	5.48	9.43	75.70
TUTICORIN TPS	4	210	1494.47	0	8.11	91.89	7.4	10.87	81.00
TUTICORIN TPS	5	210	1321.86	11.6	7.86	80.54	7.01	8.88	71.70
TUTICORIN TPS		1050	7082.47	3.43	9.75	86.83	6.53	10.04	76.79
METTUR TPS	1	210	1326.95	13.9	9.31	76.78	7.7	4.85	71.90
METTUR TPS	2	210	1645.65	4.14	3.37	92.49	1.82	3.28	89.20
METTUR TPS	3	210	1509.44	6.02	5.59	88.39	6.59	6.56	81.80
METTUR TPS	4	210	1496.04	4.66	5.23	90.11	6.43	9.01	81.10
METTUR TPS		840	5978.08	7.18	5.88	86.94	5.63	5.92	81.02
METTUR TPS - II	1	600	3925.86	8.39	4.28	87.32	6.44	12.84	74.50
METTUR TPS - II		600	3925.86	8.39	4.28	87.32	6.44	12.84	74.49
NORTH CHENNAI TPS	1	210	1422.29	4.96	7.95	87.1	2.46	10.00	77.10
NORTH CHENNAI TPS	2	210	1494.1	5.17	9.82	85.01	1.35	4.01	81.00
NORTH CHENNAI TPS	3	210	1532.58	4.52	4.2	91.27	2.45	8.17	83.10
NORTH CHENNAI TPS	4	600	3514.92	0	12.8	87.2	5.88	20.50	66.70
NORTH CHENNAI TPS	5	600	2983.62	22.01	7.29	70.7	4.02	14.10	56.60
NORTH CHENNAI TPS		1830	10947.51	8.9	9.11	81.99	3.96	6.15	68.10
SIMHAPURI TPS	1	150	852.75	11.83	17.91	70.26	3.28	5.56	64.70
SIMHAPURI TPS	2	150	1029.52	3.82	11.96	84.22	0	6.09	78.10
SIMHAPURI TPS	3	150	1108.5	0	8.57	91.43	0	7.3	84.10
SIMHAPURI TPS	4	150	1132.08	0	6.57	93.43	0.02	7.53	85.90
SIMHAPURI TPS		600	4122.85	3.91	11.25	84.84	0.82	6.54	78.23
THAMMINAPATNAM TPS	1	150	882.96	7.34	9.62	83.04	6.54	16.07	67.00
THAMMINAPATNAM TPS	2	150	816.13	14.11	9.41	76.48	6.01	14.54	61.90
THAMMINAPATNAM TPS		300	1699.09	10.73	9.51	79.76	6.28	15.3	64.48

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VIZAG TPP	1	520	463.75	0	52.93	47.07	0.77	9.86	37.21
VIZAG TPP		520	463.75	0	52.93	47.07	0.77	0	37.21
PAINAMPURAM TPP	1	660	4233.49	0	16.78	83.22	0	10.22	73.00
PAINAMPURAM TPP	2	660	2655.54	0	10.12	89.88	0	16.88	73.00
PAINAMPURAM TPP		1320	6889.03	0	14.33	85.67	0	0	75.11
TORANGALLU TPS(SBU-I)	1	130	1077.55	0	6	94	3.08	-0.4	94.40
TORANGALLU TPS(SBU-I)	2	130	1107.16	2.78	0.13	97.09	0	0.09	97.00
TORANGALLU TPS(SBU-I)		260	2184.71	1.39	3.07	95.54	1.54	0.49	95.66
TORANGALLU TPS(SBU-II)	3	300	2161.85	11.72	0.13	88.15	1.11	6.15	82.00
TORANGALLU TPS(SBU-II)	4	300	2409.66	0	0.75	99.25	0	7.85	91.40
TORANGALLU TPS(SBU-II)		600	4571.51	5.86	0.44	93.7	0.55	7.61	86.74
UDUPI TPP	1	600	4077.36	0	13.67	86.33	0.14	8.97	77.40
UDUPI TPP	2	600	4009.09	3.56	10.7	85.73	0.16	9.66	76.10
UDUPI TPP		1200	8086.45	1.78	12.19	86.03	0.15	9.32	76.72
TUTICORIN (P) TPP	1	150	434.95	0	55	45	53.17	12.00	33.00
TUTICORIN (P) TPP	2	150	365.45	3.84	51.49	44.67	46.1	16.93	27.70
TUTICORIN (P) TPP		300	800.4	1.92	53.24	44.84	49.63	15.45	30.37
MUTHIARA TPP	1	600	2324.45	12.12	28.4	59.47	28.93	15.37	44.10
MUTHIARA TPP	2	600	464.31	0	43.23	56.77	31.82	40.07	16.70
MUTHIARA TPP		1200	2788.76	9.71	31.36	58.93	29.51	15.69	42.38
NEYVELI TPS(Z)	1	250	1476.81	6.62	6.56	86.83	14.24	19.58	67.30
NEYVELI TPS(Z)		250	1476.81	6.62	6.56	86.83	14.24	19.58	67.25
ITPCL TPP	1	600	1131.38	0	18.69	81.31	17.36	29.61	51.70
ITPCL TPP		600	1131.38	0	18.69	81.31	17.36	0	51.69
EASTERN REGION									
PATRATU TPS	1	40	0	0	100	0	0	0	0.00
PATRATU TPS	2	40	0	0	100	0	0	0	0.00

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PATRATU TPS	3	40	0	0	100	0	0	0	0.00
PATRATU TPS	4	40	0	0	100	0	0	0	0.00
PATRATU TPS	5	90	0	0	100	0	0	0	0.00
PATRATU TPS	6	90	64.05	0	78.54	21.46	0	13.36	8.10
PATRATU TPS	7	105	0	0	100	0	0	0	0.00
PATRATU TPS	8	105	0	0	100	0	0	0	0.00
PATRATU TPS	9	110	0	0	100	0	0	0	0.00
PATRATU TPS	10	110	529.97	0	18.83	81.17	0	26.32	54.80
PATRATU TPS		770	594.02	0	85.9	14.1	0	5.32	8.78
BARAUNI TPS	6	105	0	100	0	0	0	0	0.00
BARAUNI TPS	7	105	0	100	0	0	0	0	0.00
BARAUNI TPS		210	0	100	0	0	0	0	0.00
MUZAFFARPUR TPS	1	110	346.86	0	60.81	39.19	7.62	3.29	35.90
MUZAFFARPUR TPS	2	110	432.13	0	52.67	47.33	0	2.63	44.70
MUZAFFARPUR TPS		220	778.99	0	56.74	43.26	3.81	3.04	40.31
BARH II	4	660	3918.34	0	2.18	97.82	0	30.23	67.59
BARH II	5	660	851.54	0	27.42	72.58	0	2.98	69.60
BARH II		1320	4769.88	0	14.8	85.2	0	181.58	78.10
KAHALGAON TPS	1	210	1394.64	6.82	0.95	92.23	0	16.63	75.60
KAHALGAON TPS	2	210	1348.65	10.35	1.39	88.27	0	15.15	73.10
KAHALGAON TPS	3	210	1502.61	0	0.31	99.69	0	18.23	81.50
KAHALGAON TPS	4	210	1290.3	13.92	1.71	84.37	0	14.42	69.90
KAHALGAON TPS	5	500	3344.87	0	1.81	98.19	0	22.04	76.20
KAHALGAON TPS	6	500	3087.03	7.03	1.44	91.53	0	21.24	70.30
KAHALGAON TPS	7	500	3307.03	0	2.59	97.41	0	22.11	75.30
KAHALGAON TPS		2340	15275.13	4.29	1.64	94.07	0	19.75	74.32
CHANDRAPURA(DVC) TPS	1	130	619.99	0	27.99	72.01	20.32	17.72	54.30

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CHANDRAPURA(DVC) TPS	2	130	778.94	0	15.43	84.57	8.25	16.36	68.20
CHANDRAPURA(DVC) TPS	3	130	812.51	0	14.59	85.41	6.88	14.25	71.20
CHANDRAPURA(DVC) TPS	7	250	1147.8	0	43.88	56.12	0	3.86	52.30
CHANDRAPURA(DVC) TPS	8	250	1719.48	0	16.49	83.51	0	5.21	78.30
CHANDRAPURA(DVC) TPS		890	5078.72	0	25.43	74.57	5.18	9.61	55.00
DURGAPUR TPS	3	130	320.85	8.79	52.96	38.25	2.87	10.15	28.10
DURGAPUR TPS	4	210	583.43	7.49	45.32	47.19	17.68	15.56	31.60
DURGAPUR TPS		340	904.28	7.99	48.24	43.77	12.02	13.49	30.28
BOKARO `B` TPS	1	210	359.64	0	71	29	16.83	9.51	19.50
BOKARO `B` TPS	2	210	961.64	0	34.75	65.25	7.21	13.12	52.10
BOKARO `B` TPS	3	210	538.65	0	64.44	35.56	8.01	6.36	29.20
BOKARO `B` TPS		630	1859.93	0	56.73	43.27	10.68	9.66	9.73
MEJIA TPS	1	210	838.9	0	49.35	50.65	25.5	5.17	45.50
MEJIA TPS	2	210	631.88	0	61.19	38.81	4.56	4.56	34.30
MEJIA TPS	3	210	731.01	0	56.12	43.88	55.32	4.25	39.60
MEJIA TPS	4	210	394.79	0	74.67	25.33	78.42	3.93	21.40
MEJIA TPS	5	250	1395.08	12.55	13.98	73.47	9.94	9.94	63.50
MEJIA TPS	6	250	1799.8	6.15	0.16	93.68	11.72	11.72	82.00
MEJIA TPS	7	500	2748.11	11.97	13.25	74.78	12.21	12.21	62.60
MEJIA TPS	8	500	3445.72	0	7	93	14.54	14.54	78.50
MEJIA TPS		2340	11985.29	4.56	27.5	67.95	22.73	9.64	58.31
KODARMA TPP	1	500	0	0	100	0	0	0	0.00
KODARMA TPP	2	500	3326.82	0	6.03	93.97	16.37	18.22	75.70
KODARMA TPP		1000	3326.82	0	53.01	46.99	8.19	9.11	37.87
DURGAPUR STEEL TPS	1	500	3405.38	0	8.04	91.96	17.18	14.42	77.50
DURGAPUR STEEL TPS	2	500	1035.16	0	71.76	28.24	17.25	4.67	23.60
DURGAPUR STEEL TPS		1000	4440.54	0	39.9	60.1	17.21	9.54	50.55

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RAGHUNATHPUR TPP	1	600	148.56	0	0	100	0	0	*
RAGHUNATHPUR TPP	2	600	108.98	0	0	100	0	0	*
RAGHUNATHPUR TPP		1200	257.54	0	0	100	0	0	*
TALCHER (OLD) TPS	1	60	515.63	3.99	1.02	95	0	-2.8	97.80
TALCHER (OLD) TPS	2	60	491.32	7.28	0.54	92.18	0	-1.02	93.20
TALCHER (OLD) TPS	3	60	488.5	4.15	1.32	94.53	0	1.83	92.70
TALCHER (OLD) TPS	4	60	500.9	3.85	3.91	92.25	0	-2.75	95.00
TALCHER (OLD) TPS	5	110	855.66	7.63	3.16	89.21	0	0.61	88.60
TALCHER (OLD) TPS	6	110	878.74	4.32	3.57	92.11	0	1.21	90.90
TALCHER (OLD) TPS		460	3730.75	5.37	2.5	92.14	0	1.38	92.33
TALCHER STPS	1	500	3623.53	10.32	4.62	85.07	0	2.57	82.50
TALCHER STPS	2	500	4231.52	0	1.81	98.19	0	1.95	96.30
TALCHER STPS	3	500	3895.34	6.75	1.85	91.4	0	2.71	88.70
TALCHER STPS	4	500	3924.7	7.01	2.12	90.87	0	1.51	89.40
TALCHER STPS	5	500	4163.81	0	3.57	96.43	0	1.63	94.80
TALCHER STPS	6	500	4127.63	0	3.93	96.07	0	2.07	94.00
TALCHER STPS		3000	23966.53	4.01	2.98	93	0	2.14	90.95
FARAKKA STPS	1	200	1278.85	0.05	11.16	88.79	1.9	16	72.80
FARAKKA STPS	2	200	1320.43	1.75	5.99	92.26	0	17.1	75.20
FARAKKA STPS	3	200	1329.48	0	7.89	92.11	0	16.43	75.70
FARAKKA STPS	4	500	2441.75	15.68	10.37	73.95	0	18.35	55.60
FARAKKA STPS	5	500	3114.29	0	5.89	94.11	0	23.2	70.90
FARAKKA STPS	6	500	2875.63	8.69	5.85	85.46	0	19.98	65.50
FARAKKA STPS		2100	12360.43	5.98	7.65	86.37	0.18	19.37	67.01
TENUGHAT TPS	1	210	1272.69	0	14.8	85.2	0	16.21	69.00
TENUGHAT TPS	2	210	1364.05	0	10.24	89.76	0	15.82	73.90
TENUGHAT TPS		420	2636.74	0	12.52	87.48	0	16.01	71.47

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IB VALLEY TPS	1	210	1506.66	8.69	3.85	87.46	0	5.78	81.70
IB VALLEY TPS	2	210	1610.67	0	4.14	95.86	0	8.55	87.30
IB VALLEY TPS		420	3117.33	4.34	3.99	91.66	0	7.16	84.50
BANDEL TPS	1	60	151.4	0	44.38	55.62	5.52	26.89	28.70
BANDEL TPS	2	60	164.91	21.48	24.56	53.96	6.26	22.67	31.30
BANDEL TPS	3	60	165.98	0	45.12	54.88	5.62	23.39	31.50
BANDEL TPS	4	60	195.23	0	29.06	70.94	8.86	33.9	37.00
BANDEL TPS	5	210	430.5	40.05	24.25	35.7	0	12.36	23.30
BANDEL TPS		450	1108.02	21.55	30.4	48.05	3.5	20.01	28.03
SANTALDIH TPS	1	120	0	0	100	0	0	0	0.00
SANTALDIH TPS	2	120	0	0	100	0	0	0	0.00
SANTALDIH TPS	3	120	0	0	100	0	0	0	0.00
SANTALDIH TPS	4	120	0	0	100	0	0	0	0.00
SANTALDIH TPS	5	250	1861.53	6.01	2.78	91.21	1.15	6.44	84.80
SANTALDIH TPS	6	250	1835.48	0	7.15	92.85	1.99	9.26	83.60
SANTALDIH TPS		980	3697.01	1.53	51.51	46.95	0.8	4.01	42.95
KOLAGHAT TPS	1	210	762.08	0	31.09	68.91	10.57	27.6	41.30
KOLAGHAT TPS	2	210	776.65	0	29.43	70.57	3.79	28.46	42.10
KOLAGHAT TPS	3	210	804.77	6.37	21.81	71.82	11.86	28.19	43.60
KOLAGHAT TPS	4	210	790.88	0	39.02	60.98	8.34	18.11	42.90
KOLAGHAT TPS	5	210	1432	0	9.92	90.08	4.31	12.45	77.60
KOLAGHAT TPS	6	210	1199.74	2.89	19.39	77.73	1.63	12.69	65.00
KOLAGHAT TPS		1260	5766.12	1.54	25.11	73.35	6.75	21.25	52.10
BAKRESWAR TPS	1	210	1084.69	8.39	21.85	69.76	13.51	10.96	58.80
BAKRESWAR TPS	2	210	1492.09	0	4.39	95.61	4.05	14.72	80.90
BAKRESWAR TPS	3	210	1404.26	0	8.24	91.76	4.14	15.63	76.10
BAKRESWAR TPS	4	210	1362.59	0	18.16	81.84	16.56	7.98	73.90

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BAKRESWAR TPS	5	210	1325.82	10.87	8.73	80.4	4.75	8.52	71.90
BAKRESWAR TPS		1050	6669.45	3.85	12.27	83.87	8.6	11.56	72.31
SAGARDIGHI TPS	1	300	1497.48	0	27.63	72.37	1.89	15.54	56.80
SAGARDIGHI TPS	2	300	1217.74	0	40.68	59.32	22.38	13.11	46.20
SAGARDIGHI TPS		600	2715.22	0	34.15	65.85	12.14	14.33	42.68
D.P.L. TPS	3	70	0	0	100	0	0	0	0.00
D.P.L. TPS	4	75	0	0	100	0	0	0	0.00
D.P.L. TPS	5	75	0	0	100	0	0	0	0.00
D.P.L. TPS	6	110	0	0	100	0	0	0	0.00
D.P.L. TPS	7	300	1199.55	0	40.94	59.06	4.47	13.54	45.50
D.P.L. TPS	8	250	783.8	2.95	52.89	44.16	10.46	8.47	35.70
D.P.L. TPS		880	1983.35	0.84	66.48	32.68	4.49	7.02	25.66
JOJOBBERA TPS	2	120	848.4	0	0.04	99.96	17.93	19.48	80.50
JOJOBBERA TPS	3	120	791.5	0	0.11	99.89	24.81	24.81	75.10
JOJOBBERA TPS	4	120	879.69	0	0.12	99.88	16.42	16.42	83.50
JOJOBBERA TPS		360	2519.59	0	0.09	99.91	19.72	20.24	51.86
MAHADEV PRASAD STPP	1	270	1669.18	19.31	0.27	80.41	8.18	10.03	70.40
MAHADEV PRASAD STPP	2	270	1256.72	0	36.19	63.81	10.82	10.82	53.00
MAHADEV PRASAD STPP		540	2925.9	9.66	18.23	72.11	9.5	10.43	61.68
MAITHON RB TPP	1	525	3527.22	8.54	4.78	86.68	0	10.19	76.50
MAITHON RB TPP	2	525	3678.96	0	5.82	94.18	0.63	14.4	79.80
MAITHON RB TPP		1050	7206.18	4.27	5.3	90.43	0.31	12.3	78.13
STERLITE TPP	1	600	1066.24	24.38	39.5	36.12	5.08	15.89	20.20
STERLITE TPP	2	600	3298.1	0	8.1	91.9	3.35	29.32	62.60
STERLITE TPP	3	600	1604.41	0	51.01	48.99	41.47	18.59	30.40
STERLITE TPP	4	600	2108.28	20.7	15.64	63.66	9.77	23.66	40.00
STERLITE TPP		2400	8077.03	11.27	28.56	60.17	14.92	22.26	20.70

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
KAMALANGA TPS	1	350	2076.98	0	13.07	86.93	18.17	19.37	67.60
KAMALANGA TPS	2	350	2086.72	0	8.6	91.4	14.59	23.53	67.90
KAMALANGA TPS	3	350	2071.31	0	4.77	95.23	22.35	27.86	67.40
KAMALANGA TPS		1050	6235.01	0	8.81	91.19	18.37	23.59	67.60
DERANG TPP	1	600	3245.78	2.49	14.59	82.92	7.07	21.32	61.60
DERANG TPP	2	600	2997.82	0	26.06	73.94	7.59	17.04	56.90
DERANG TPP		1200	6243.6	1.25	20.32	78.43	7.33	0	59.23
NEW COSSIPORE TPS	1	30	0	0	100	0	0	0	0.00
NEW COSSIPORE TPS	2	30	0	0	100	0	0	0	0.00
NEW COSSIPORE TPS	3	50	0	0	100	0	100	0	0.00
NEW COSSIPORE TPS	4	50	0	0	100	0	100	0	0.00
NEW COSSIPORE TPS		160	0	0	100	0	62.5	0	0.00
TITAGARH TPS	1	60	246.47	0	0.07	99.93	51.55	53.17	46.80
TITAGARH TPS	2	60	192.63	0.01	0.39	99.6	62.04	63.05	36.50
TITAGARH TPS	3	60	109.88	0	0.23	99.77	76.81	78.92	20.80
TITAGARH TPS	4	60	114.85	0	1.88	98.12	76.32	76.33	21.80
TITAGARH TPS		240	663.83	0	0.64	99.36	66.68	67.87	31.49
SOUTHERN REPL. TPS	1	67.5	281.15	5.36	0.06	94.58	44.78	47.16	47.40
SOUTHERN REPL. TPS	2	67.5	250.11	0	0.38	99.62	56.87	57.43	42.20
SOUTHERN REPL. TPS		135	531.26	2.68	0.22	97.1	50.83	52.3	44.80
BUDGE BUDGE TPS	1	250	1809.23	8.19	0.41	91.4	9.05	9.05	82.40
BUDGE BUDGE TPS	2	250	1891.6	1.92	0.44	97.64	11.59	11.59	86.10
BUDGE BUDGE TPS	3	250	2092.51	1.34	0.09	98.57	3.68	3.27	95.30
BUDGE BUDGE TPS		750	5793.34	3.82	0.31	95.87	8.11	8.11	87.94
HALDIA TPP	1	300	2045.3	0.45	2.73	96.82	2.17	19.2	77.60
HALDIA TPP	2	300	1587.96	0.37	19.29	80.34	2.31	20.08	60.30
HALDIA TPP		600	3633.26	0.41	11.01	88.58	2.24	19.64	68.94

NAME OF UNIT/ SYSTEM	Unit No.	Capacity (MW)	Generatio n (MW)	Planned Maintaina nce (%)	Forced Outage (%)	Operati ng Availabi lity. (%)	Reserve Shutdown due to low system demand (%)(Compl ete Shutdown)	Partial unavailibil ty includind Low System Demand (%)	PLF (%)
NORTH EASTERN REGION									
CHANDRAPUR(ASSAM) TPS	1	30	0	0	100	0	0	0	0.00
CHANDRAPUR(ASSAM) TPS	2	30	0	0	100	0	0	0	0.00
CHANDRAPUR(ASSAM) TPS		60	0	0	100	0	0	0	0.00
Grand Total		173292	894541.9	4.28	21.9	73.82	11	11.06	61.06

Note: Generation shown in the above table is from the date of reckoning of PLF of the new units.

SECTION-3 PLANNED MAINTENANCE

- 3.1** Planned Maintenance covers maintenance works that are planned/scheduled in advance (before the beginning of the year). The Planned Maintenance works carried out can be broadly classified as – Annual Maintenance (generally covers boiler and auxiliaries) and Capital Maintenance which covers both Boiler and Turbine Generator. The Capital Maintenance is generally carried out once in 5 to 6 years. Generally, a five/six year rolling plan is followed for Planned Maintenance which leads to an average annual outage of 28 days for units of 200/210/500 MW capacity. Other Planned Maintenance works include Boiler inspection/recertification, Renovation & Modernization and Other activities like Performance Guarantee (PG) Test of new units & Residual Life Assessment (RLA) studies on old units.
- 3.2** During 2015-16, the total duration for carrying out various Planned Maintenance works was **259,828** hours. Out of total 617 units analyzed for the year, Capital Maintenance was carried out on **22** generating units and Annual Maintenance was carried out on **226** generating units. The All India energy loss during the year, on account of Planned Maintenance actually carried out was **4.28%** (of the maximum possible generation) against a program of **5.06%** (considering all units scheduled for Planned Maintenance). The average duration of unit outage for Boiler inspection/ Re-Certification was 16 days, which was more than the ⁴Scheduled Duration of 12 days. The average duration of unit outage for Capital Maintenance was 40 days which was less than the schedule duration of 46 days. The details of Planned Maintenance of thermal stations for the year 2015-16 are shown below:

Work	No. of Units	Capacity of the units involved (MW)	Average duration (Days)	Energy Loss (MU)	Energy loss as % of max possible generation of Overall Capacity
1. Annual Maintenance					
i) Programme	283	80,072.00	23	44,415.54	3.11
ii) Actual	226	60,824.50	29	44,373.73	3.11
2. Capital Maintenance					
i) Programme	65	17,947.50	46	19,337.28	1.36
ii) Actual	22	4,665.00	40	4,017.08	0.28
3. Total Annual and Capital Maintenance					
i) Programme	348	98,019.50	27	63,752.82	4.47

⁴ Scheduled/Programme/ durations are based on average of Schedule/Programme durations for individual units furnished by Stations.

Work	No. of Units	Capacity of the units involved (MW)	Average duration (Days)	Energy Loss (MU)	Energy loss as % of max possible generation of Overall Capacity
ii) Actual	248	65,489.50	30	48,390.81	3.39
4. R&M Works					
i) Programme	9	1,860.00	147	4,661.76	0.33
ii) Actual	10	1,539.00	232	8,546.38	0.60
5. Boiler Inspection/ Re-Certification					
i) Programme	42	11,527.50	12	3,791.76	0.27
ii) Actual	26	8,665.00	9	2,108.76	0.15
6. Other Planned Maintenance including PG Test of new units & RLA studies					
ii) Actual	24	6,935.00	34	1,996.47	0.14
7. Grand Total					
i) Programme	399	111,407.00	29	72,206.34	5.06
ii) Actual	308	82,628.50	35	61,042.28	4.28
* Other maintenance work includes miscellaneous Preventative Maintenance, short duration Planned Maintenance and R&M works.					

3.3 Annual Maintenance was carried out on 226 units, out of 283 units scheduled for Annual Maintenance during 2015-16, - thus 79.86% of the thermal units scheduled for Annual Maintenance actually carried out Annual Maintenance. Capital Maintenance was carried out on **22** units out of total **65** units scheduled - thus only 33.85% units scheduled for Capital Maintenance actually carried out Capital Maintenance. Actual Planned Maintenance figures include all such units, which first went under forced outage, & subsequently Annual/Capital Maintenance was taken up on them. Details of units scheduled/programmed for Annual Maintenance and Capital Maintenance and the numbers actually taken out during 2015-16 are given below: -

Particulars	Annual Maintenance				Capital Maintenance			
	2012-13	2013-14	2014-15	2015-16	2012-13	2013-14	2014-15	2015-16
Nos. Programmed for overhaul	219	282	242	283	37	43	84	65
Nos. actually taken out including those taken	201	209	205	226	25	17	18	22

unscheduled								
Percentage of Program	91.78%	74.11%	84.71%	79.86%	67.57%	39.53%	21.43%	33.85%

The Unit wise details of Planned Maintenance durations during 2015-16 are given in **Annexure 3.1**. The maintenance duration mentioned are the duration during the year 2015-16 though maintenance works on certain units had started in the previous year (before 1-4-2015) or have continued beyond the current year (beyond 31-03-2016) thus indicating very low maintenance durations for some of the units. However, for computing the average actual maintenance durations, the total duration of Planned Maintenance for such units have been taken. Also certain units taken exceptionally long to complete maintenance have been excluded while working out average duration.

3.4 CAPACITY GROUPWISE MAINTENANCE (NUMBER OF UNITS)

3.4.1 The All India capacity group wise, Planned Maintenance details in terms of number of units Scheduled for Planned Maintenance and actually taken out for Planned Maintenance during the year 2015-16 are given below:

3.4.2

Particulars	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	Total
	MW	MW	MW	MW	MW	MW	MW	MW	
A. Annual Maintenance									
No. Programmed for Overhaul	14	50	8	29	87	8	58	29	283
No. Actually taken out	10	48	6	21	70	9	28	34	226
SB. Capital Maintenance									
No. Programmed for Overhaul	3	11	5	9	19	4	8	6	65
No. Actually taken out	0	2	2	6	3	1	3	5	22

ails of Planned Maintenance during 2015-16 are furnished below:

No. of Units taken for Maintenance in the Region													
Capacity	AM/ CM	Northern		Western		Southern		Eastern		North -East		All India	
Group (MW)		Program	Actual	Program	Actual	Program	Actual	Program	Actual	Program	Actual	Program	Actual
660-800	A.M.	4	4	9	6	1	0	0	0	0	0	14	10
	C.M.	1	0	2	0	0	0	0	0	0	0	3	0

490-600	A.M.	11	9	12	14	17	15	10	10	0	0	50	48
	C.M.	1	0	6	2	3	0	1	0	0	0	11	2
300-360	A.M.	3	2	4	4	0	0	1	0	0	0	8	6
	C.M.	0	0	3	1	1	1	1	0	0	0	5	2
250-270	A.M.	12	7	7	6	3	5	7	3	0	0	29	21
	C.M.	3	2	3	1	3	0	0	3	0	0	9	6
210-210	A.M.	18	12	23	22	28	30	18	6	0	0	87	70
	C.M.	2	0	3	0	11	1	3	2	0	0	19	3
195-200	A.M.	5	4	1	3	2	2	0	0	0	0	8	9
	C.M.	1	1	3	0	0	0	0	0	0	0	4	1
100-150	A.M.	21	6	20	10	11	10	6	2	0	0	58	28
	C.M.	1	2	3	0	3	0	1	1	0	0	8	3
25-99	A.M.	3	15	6	3	11	10	9	6	0	0	29	34
	C.M.	3	1	2	2	1	1	0	1	0	0	6	5
Overall Capacity	A.M.	77	59	82	68	73	72	51	27	0	0	283	226
	C.M.	12	6	25	6	22	3	6	7	0	0	65	22

A.M. – Annual Maintenance (Boiler Overhaul)

C.M. – Capital Maintenance (Boiler and Turbine-Generator)

3.5 Duration of Annual Maintenance / Capital Maintenance

3.5.1 Capacity group wise Maintenance duration

Capacity Group wise details of average duration of Annual Maintenance and Capital Maintenance vis-à-vis program for the years 2015-16 at national level are given below: -

Average Duration (in days)				
Capacity Group (MW)	Annual Maintenance		Capital Maintenance	
	Program	Actual	Program	Actual
	2015-16		2015-16	
660-800	25	30	45	No maintenance undertaken
490-600	23	32	47	38
300-360	27	27	35	39

Average Duration (in days)				
Capacity Group (MW)	Annual Maintenance		Capital Maintenance	
	Program	Actual	Program	Actual
	2015-16		2015-16	
250-270	19	36	41	34
210-210	24	27	49	38
195-200	27	33	56	4
100-150	19	32	39	29
25-99	19	24	37	66
OVERALL CAPACITY	22	29	44	40

3.5.2 Region-wise actual duration of Annual Maintenance & Capital Maintenance against programmed duration for the year 2015-16 is indicated in the following tables:

Average Duration of Annual Maintenance (in days) in the Region during 2015-16								
Capacity MW	Northern Region		Western Region		Southern Region		Eastern Region	
	Program	Actual	Program	Actual	Program	Actual	Program	Actual
660-800	13	19	30	38	15	**	**	**
490-600	24	20	25	30	17	35	30	42
300-360	38	30	19	26	**	**	20	**
250-270	22	61	19	19	22	20	15	36
210-210	30	31	24	31	20	23	23	28
195-200	28	25	20	49	26	25	**	**
100-150	21	39	19	39	16	23	22	19
25-99	22	27	22	43	19	18	15	15
OVERALL CAPACITY	24	31	23	33	19	25	22	31
Average Duration of Capital Maintenance (in days) in the Region during 2015-16								
Capacity in MW	Northern Region		Western Region		Southern Region		Eastern Region	
	Program	Actual	Program	Actual	Program	Actual	Program	Actual
660-800	46	**	45	**	**	**	**	**
490-600	60	**	43	38	45	0	60	0
300-360	0	**	34	35	40	43	35	0

Average Duration of Annual Maintenance (in days) in the Region during 2015-16								
Capacity MW	Northern Region		Western Region		Southern Region		Eastern Region	
	Program	Actual	Program	Actual	Program	Actual	Program	Actual
250-270	43	39	30	33	46	**	**	30
210-210	40	**	40	**	56	42	37	36
195-200	45	4	60	**	**	**	**	**
100-150	50	27	21	**	47	**	62	32
25-99	32	137	41	37	45	40	0	79
OVERALL CAPACITY	42	46	39	36	50	42	45	39

**** - No Maintenance Undertaken**

3.5.3 SECTOR WISE MAINTENANCE DURATION

The average duration of Annual Maintenance and Capital Maintenance during last four years in different sectors in the country are shown below:

Sector	Average Duration (Days)				
	AM/CM	15-16	14-15	13-14	12-13
		Actual	Actual	Actual	Actual
CENTRAL	A.M.	28	33	40	31
	C.M.	33	52	36	55
PVT IPP	A.M.	29	28	31	25
	C.M.	54	25	33	**
PVT UTILITY	A.M.	49	27	21	32
	C.M.	**	**	**	**
STATE Sector	A.M.	29	31	38	31
	C.M.	37	38	47	52

3.5.4 REGION WISE MAINTENANCE DURATION

Region wise details of the number of units, aggregate capacity and Planned Maintenance of thermal generating units carried out during the year 2015-16 is given below:

REGION	Units considered in the review		Planned Maintenance carried out on units				
	No.	Capacity (MW)	No	Capacity (MW)	Duration (Hrs.)	EnergyLoss (MU)	Energy Loss as % of Max. Poss. gen of Total Region Capacity Reviewed
NORTHERN	148	38,063.00	77	16,979.00	90,105.67	16,528.62	5.31
WESTERN	222	70,781.00	95	30,187.00	68,734.90	19,829.23	3.33
SOUTHERN	115	32,022.50	84	2,198.00	51,132.01	13,007.02	5.07
EASTERN	130	32,365.00	52	13,482.50	49,855.00	11,677.41	4.44
NORTH EASTERN	2	60.00	0	0.00	0.00	0.00	0.00
ALL INDIA	617	173291.50	308	82628.50	259827.58	61042.28	4.28

The average duration of Annual Maintenance and Capital Maintenance during the last four years in different Regions in the country are shown below:

Region	Average Region wise maintenance duration (Days)				
	AM/CM	15-16	14-15	13-14	12-13
Northern Region	A.M.	31	32	29	32
	C.M.	46	25	44	32
Western Region	A.M.	33	33	45	29
	C.M.	36	42	51	78
Southern Region	A.M.	25	25	25	21
	C.M.	42	38	32	43
Eastern Region	A.M.	31	39	57	46
	C.M.	39	40	41	54
All India	A.M.	29	31	37	30
	C.M.	40	35	43	52

3.5.5 UTILITY / ORGANISATION WISE MAINTENANCE DURATION

Sector wise/utility/Organization-wise Planned Maintenance duration of thermal generating units and energy loss due to it during the year 2015-16 is furnished below:

Sl.	Organization/	No. of	Capacity	Planned Maintenance
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No.	Utility	Units	(MW)	No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss (MU)	Energy Loss as % of Max. Poss. gen. of Total Utility Capacity Reviewed
CENTRAL SECTOR								
1	NTPC Ltd.	100	34,385	64	20,050	56,240.7	15,090.6	5.22
2	DVC	24	7,400	7	2,150	4,148.99	1,175.16	2.16
3	NLC	22	3240	19	2,640	12045.36	1847.76	6.66
4	APCPL	3	1,500	1	500	984	492	3.73
5	NTECL	3	1,500	2	1,000	1,312.42	656.21	4.98
6	NTPL	2	1,000	1	500	4,585.28	10.55	0.18
7	PVUNL	10	770	0	0	0	0	0
8	NSPCL	2	500	2	500	1,432.07	358.02	8.15
9	K.B.U.N.L	2	220	0	0	0	0	0
CENTRAL SECTOR		168	50,515	96	27,340	80,749	19,630	4.71
STATE SECTOR								
NORTHERN REGION								
1	HPGCL	12	3160	1	250	1,350.18	337.54	1.26
2	IPGCL	2	135	0	0	0	0	0
3	PSPCL	14	2,620	3	570	1,785.13	359.61	1.56
4	RRVUNL	21	5,190	11	2,210	20,951.2	3,756.27	8.57
5	UPRVUNL	26	4,923	12	2,244	33,856.6	5,745.48	13.29
WESTERN REGION								
6	CSPGCL	14	2,780	5	930	2,851.66	524.16	2.25
7	GMDCL	2	250	2	250	611.84	76.48	3.48
8	GSECL	26	4,720	14	2,235	9749.91	1,437.95	3.7
9	MAHAGENCO	34	9,060	15	4,680	14,530.5	3,978.99	5.29
10	MPPGCL	14	4,080	6	1,590	4,563.01	1,043.09	2.91
SOUTHERN REGION								
11	APGENCO	12	2,810	10	2,390	4,399.29	1,318.16	5.34
12	APPDCL	2	1,600	1	800	366.02	292.82	2.63
13	KPCL	10	2,720	9	2,550	4,961.43	1,678.65	7.03
14	TNGDCL	20	4,770	14	4,350	8,386.29	2,742.27	6.54

Sl. No.	Organization/Utility	No. of Units	Capacity (MW)	Planned Maintenance				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss (MU)	Energy Loss as % of Max. Poss. gen. of Total Utility Capacity Reviewed
15	TSGENCO	14	2,882.5	13	2,720	5,529.28	1,086.27	5.42
EASTERN REGION								
16	DPL	6	880	1	250	258.77	64.69	0.84
17	OPGC	2	420	1	210	763.27	160.29	4.34
18	TVNL	2	420	0	0	0	0	0
19	WBPDC	24	4340	7	1,360	8,437.71	1,510.02	3.96
NORTH -EASTERN REGION								
20	APGPCL	2	60	0	0	0	0	0
STATE SECTOR		259	57820.5	125	29589	123352	26113	5.34
PVT UTILITIES								
WESTERN REGION								
1	RIL (DAHANU)	2	500	1	250	428.23	107.06	2.44
2	TATA PCL	4	1400	2	750	834.53	272.44	2.22
3	TOR. POW. (UNOSUGEN)	5	422	3	362	6376.07	133.69	3.62
EASTERN REGION								
4	CESC	13	1285	5	877.5	1477.41	283.27	2.51
PVT UTILITY		24	3607	11	2239.5	9116.2	796.47	2.52
IPPs								
NORTHERN REGION								
1	APL	2	1320	2	1320	1061.75	700.76	6.04
2	BEPL	10	450	9	405	13182.5	593.21	15.01
3	JhPL(HR)	2	1320	0	0	0	0	0
4	LAPPL	2	1200	1	600	516.37	309.82	2.94
5	LPGCL	1	660	0	0	0	0	0
6	NPL	2	1400	2	1400	765.65	535.96	4.36
7	PPGCL	1	660	0	0	0	0	0

Sl. No.	Organization/ Utility	No. of Units	Capacity (MW)	Planned Maintenance				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss (MU)	Energy Loss as % of Max. Poss. gen. of Total Utility Capacity Reviewed
	(Jaypee)							
8	RPSCL	4	1200	2	600	1423.73	427.12	4.05
9	RWPL (JSW)	8	1080	7	945	2199.35	296.91	3.13
10	TSPL	3	1980	0	0	0	0	0
WESTERN REGION								
11	ACB	3	300	2	270	861.47	116.3	4.41
12	AMNEPL	4	246	0	0	0	0	0
12	APL	14	7920	4	2310	3111.16	1774.7	2.55
13	BALCO	2	600	0	0	0	0	0
14	BLAPPL	1	45	0	0	0	0	0
15	CGPL	5	4000	3	2400	2061	1648.8	4.69
16	DBPCL	2	1200	1	600	150	90	1.71
17	DIPL	2	600	0	0	0	0	0
18	EPGL	2	1200	3	1800	2157.15	1294.29	12.28
19	ESSARPMPL	1	600	0	0	0	0	0
20	GCEL	1	685	0	0	0	0	0
21	GEPL	2	120	0	0	0	0	0
22	GIPCL	4	500	4	500	1633.71	204.21	4.65
23	GMR ENERG	2	600	1	300	437.85	131.36	2.49
24	IEPL	1	270	0	0	0	0	0
25	JPL	7	2800	1	250	840	210	0.85
26	JPPVL	4	1820	2	1320	410.75	271.1	1.7
27	JSWEL	4	1200	1	300	963.1	288.93	2.74
28	KWPCL	1	600	0	0	0	0	0
29	LANCO	2	600	1	300	406.17	121.85	2.31
30	MBPMPL	1	600	0	0	0	0	0
31	MCCPL	1	300	0	0	0	0	0
32	RKMPPL	2	720	0	0	0	0	0

Sl. No.	Organization/Utility	No. of Units	Capacity (MW)	Planned Maintenance				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss (MU)	Energy Loss as % of Max. Poss. gen. of Total Utility Capacity Reviewed
33	Rattan India	5	1350	0	0	0	0	0
34	SCPL	1	50	1	50	64.68	3.23	0.74
35	SPL	6	3960	0	0	0	0	0
36	STPL	1	270	0	0	0	0	0
37	SVPPPL	1	63	0	0	0	0	0
38	VESPL	1	35	0	0	0	0	0
39	VIP	2	600	2	600	837.98	251.39	4.77
40	VVL	1	135	0	0	0	0	0
41	WPCL	6	1740	0	0	0	0	0
SOUTHERN REGION								
42	CEPL	2	1200	2	1200	1065.05	639.03	9.71
43	HNPC	1	520	0	0	0	0	0
44	IBPIL	2	300	1	150	337.45	50.62	1.92
45	ITPCL	1	600	0	0	0	0	0
45	JSWEL	4	860	2	430	1273.37	340.56	4.51
46	MEL	2	300	3	450	1884.52	282.68	10.73
47	SEIL	2	1320	0	0	0	0	0
48	SEPL	4	600	2	300	1374.16	206.12	3.91
49	ST-CMSECP	1	250	1	250	581.1	145.28	6.62
50	UPCL	2	1200	1	600	313.08	187.85	1.78
EASTERN REGION								
51	ADHUNIK	2	540	1	270	1696.57	458.07	9.66
51	GMR ENERG	3	1050	0	0	0	0	0
52	HEL	2	600	3	900	71.89	21.57	0.41
53	JITPL	2	1200	1	600	219.07	131.44	1.25
54	MPL	2	1050	1	525	750.28	393.9	4.27
55	SEL	4	2400	2	1200	3959.6	2375.76	11.27
56	TATA PCL	3	360	0	0	0	0	0

Sl. No.	Organization/ Utility	No. of Units	Capacity (MW)	Planned Maintenance				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss (MU)	Energy Loss as % of Max. Poss. gen. of Total Utility Capacity Reviewed
PVT IPP		166	61349	76	23460	46610	14503	2.96
ALL INDIA		617	173292	308	82629	259828	61042	4.28

- Panipat TPS Unit-1 to Unit-4 retired during 2015-16 but considered in the review.

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
ANNUAL MAINTENANCE								
NORTHERN REGION								
BADARPUR TPS	4	210	20-SEP-2015	10-OCT-2015	479.13	20	100.62	5.45
PANIPAT TPS	7	250	30-JAN-2016	27-MAR-2016	1350.18	56	337.54	15.37
INDIRA GANDHI STPP	1	500	20-FEB-2016	31-MAR-2016	984	41	492	11.2
GND TPS(BHATINDA)	3	110	01-APR-2015	15-APR-2015	359.58	15	39.55	4.09
ROPAR TPS	4	210	01-APR-2015	08-MAY-2015	908.33	38	190.75	10.34
RAJPURA TPP	1	700	15-NOV-2015	07-DEC-2015	525.65	22	367.96	5.98
RAJPURA TPP	2	700	22-MAR-2016	31-MAR-2016	240	10	168	2.73
KOTA TPS	1	110	01-SEP-2015	27-SEP-2015	637.45	27	70.12	7.26
KOTA TPS	3	210	19-SEP-2015	21-OCT-2015	760.58	32	159.72	8.66
KOTA TPS	6	195	01-APR-2015	20-APR-2015	479.48	20	93.5	5.46
KOTA TPS	7	195	07-MAY-2015	09-JUN-2015	807.73	34	157.51	9.2
SURATGARH TPS	1	250	17-DEC-2015	31-MAR-2016	2529.78	105	632.44	28.8
KAWAI TPS	1	660	02-SEP-2015	04-SEP-2015	55.28	2	36.48	0.63
KAWAI TPS	1	660	31-MAY-2015	12-JUL-2015	1006.47	42	664.27	11.46
BARSINGSAR LIGNITE	1	125	16-JUL-2015	05-AUG-2015	480.83	20	60.1	5.47
BARSINGSAR LIGNITE	2	125	28-MAY-2015	05-JUL-2015	913.13	38	114.14	10.4

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
CHHABRA TPP	1	250	24-MAY-2015	16-AUG-2015	2014.48	84	503.62	22.93
CHHABRA TPP	2	250	24-JUL-2015	22-SEP-2015	1446	60	361.5	16.46
CHHABRA TPP	3	250	01-OCT-2015	25-OCT-2015	592.38	25	148.1	6.74
PANKI TPS	4	105	11-AUG-2015	24-OCT-2015	1776.97	74	186.58	20.23
HARDUAGANJ TPS	8	250	01-APR-2015	23-MAY-2015	1262.37	53	315.59	14.37
HARDUAGANJ TPS	9	250	18-FEB-2016	31-MAR-2016	1011.37	42	252.84	11.51
PARICHHA TPS	3	210	01-APR-2015	14-APR-2015	324.72	14	68.19	3.7
PARICHHA TPS	4	210	02-FEB-2016	19-MAR-2016	1106.85	46	232.44	12.6
ANPARA TPS	1	210	21-FEB-2016	31-MAR-2016	956.95	40	200.96	10.89
ANPARA TPS	2	210	05-FEB-2016	16-FEB-2016	267.15	11	56.1	3.04
ANPARA C TPS	2	600	15-FEB-2016	08-MAR-2016	516.37	22	309.82	5.88
SINGRAULI STPS	2	200	10-MAY-2015	01-JUN-2015	549.02	23	109.8	6.25
SINGRAULI STPS	3	200	05-APR-2015	29-APR-2015	598	25	119.6	6.81
SINGRAULI STPS	6	500	29-MAR-2016	31-MAR-2016	71	3	35.5	0.81
SINGRAULI STPS	7	500	29-MAR-2016	31-MAR-2016	71.43	3	35.72	0.81
RIHAND STPS	1	500	18-MAY-2015	26-JUN-2015	942.98	39	471.49	10.74
RIHAND STPS	3	500	20-JUL-2015	15-AUG-2015	633.97	26	316.98	7.22
RIHAND STPS	4	500	01-APR-2015	25-APR-2015	579.55	24	289.78	6.6
RIHAND STPS	6	500	29-JUN-2015	14-JUL-2015	365.78	15	182.89	4.16
UNCHAHAH TPS	1	210	18-SEP-2015	28-OCT-2015	959.78	40	201.55	10.93
UNCHAHAH TPS	4	210	01-JUL-2015	25-JUL-2015	584.03	24	122.65	6.65
UNCHAHAH TPS	5	210	04-APR-2015	09-MAY-2015	838.5	35	176.08	9.55
DADRI (NCTPP)	1	210	17-APR-2015	20-MAY-2015	797.93	33	167.57	9.08
DADRI (NCTPP)	4	210	15-AUG-2015	20-SEP-2015	850.22	35	178.55	9.68
DADRI (NCTPP)	5	490	28-MAR-2016	31-MAR-2016	95.75	4	46.92	1.09
TANDA TPS	3	110	07-AUG-2015	04-OCT-2015	1391.65	58	153.08	15.84
ROSA TPP Ph-I	1	300	14-NOV-2015	10-DEC-2015	621.23	26	186.37	7.07
ROSA TPP Ph-I	3	300	14-FEB-2016	18-MAR-2016	802.5	33	240.75	9.14

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
MAQSOODPUR TPS	2	45	01-MAR-2016	31-MAR-2016	733.87	31	33.02	8.35
MAQSOODPUR TPS	2	45	05-OCT-2015	14-OCT-2015	237.75	10	10.7	2.71
KHAMBARKHERA TPS	1	45	25-SEP-2015	03-OCT-2015	193.73	8	8.72	2.21
KHAMBARKHERA TPS	1	45	21-FEB-2016	31-MAR-2016	952.42	40	42.86	10.84
KHAMBARKHERA TPS	2	45	20-SEP-2015	28-SEP-2015	193.32	8	8.7	2.2
KHAMBARKHERA TPS	2	45	05-FEB-2016	31-MAR-2016	1309.07	55	58.91	14.9
BARKHERA TPS	1	45	10-FEB-2016	31-MAR-2016	1214.77	51	54.66	13.83
BARKHERA TPS	2	45	05-FEB-2016	30-MAR-2016	1289.95	54	58.05	14.69
KUNDARKI TPS	1	45	16-AUG-2015	24-AUG-2015	191.65	8	8.62	2.18
KUNDARKI TPS	2	45	21-AUG-2015	01-SEP-2015	273.27	11	12.3	3.11
KUNDARKI TPS	2	45	29-FEB-2016	31-MAR-2016	733.9	31	33.03	8.35
UTRAULA TPS	1	45	30-OCT-2015	04-NOV-2015	138.9	6	6.25	1.58
UTRAULA TPS	1	45	06-FEB-2016	30-MAR-2016	1286.95	54	57.91	14.65
UTRAULA TPS	2	45	25-OCT-2015	02-NOV-2015	191.4	8	8.61	2.18
UTRAULA TPS	2	45	21-FEB-2016	31-MAR-2016	949.88	40	42.74	10.81
WESTERN REGION								
UKAI TPS	3	200	01-JAN-2016	31-MAR-2016	2184	91	436.8	24.86
UKAI TPS	4	200	13-JUL-2015	05-AUG-2015	562.12	23	112.42	6.4
UKAI TPS	5	210	15-FEB-2016	04-MAR-2016	443.57	18	93.15	5.05
GANDHI NAGAR TPS	4	210	01-APR-2015	05-APR-2015	115	5	24.15	1.31
GANDHI NAGAR TPS	5	210	12-JUL-2015	12-AUG-2015	761.33	32	159.88	8.67
WANAKBORI TPS	2	210	03-FEB-2016	02-MAR-2016	663.62	28	139.36	7.55
WANAKBORI TPS	3	210	02-JUL-2015	02-AUG-2015	745.52	31	156.56	8.49
KUTCH LIG. TPS	3	75	13-JUL-2015	10-AUG-2015	683.13	28	51.23	7.78
KUTCH LIG. TPS	4	75	23-JUL-2015	05-OCT-2015	1758.47	73	131.89	20.02
AKRIMOTA LIG TPS	1	125	10-AUG-2015	24-AUG-2015	359.42	15	44.93	4.09
AKRIMOTA LIG TPS	2	125	18-NOV-2015	29-NOV-2015	252.42	11	31.55	2.87
SALAYA TPP	1	600	06-MAR-2016	31-MAR-2016	616.4	26	369.84	7.02

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
SALAYA TPP	2	600	27-FEB-2016	31-MAR-2016	814.5	34	488.7	9.27
SALAYA TPP	2	600	09-APR-2015	09-MAY-2015	726.25	30	435.75	8.27
SABARMATI (D-F STATIONS)	1	120	27-NOV-2015	10-DEC-2015	328.15	14	39.38	3.74
SABARMATI (D-F STATIONS)	2	121	13-DEC-2015	01-JAN-2016	456	19	56.07	5.32
SABARMATI (D-F STATIONS)	3	121	11-NOV-2015	24-NOV-2015	312	13	38.24	3.63
SURAT LIG. TPS	2	125	16-AUG-2015	08-SEP-2015	570.02	24	71.25	6.49
SURAT LIG. TPS	3	125	19-JUL-2015	07-AUG-2015	475.03	20	59.38	5.41
SURAT LIG. TPS	4	125	23-JUN-2015	16-JUL-2015	557.43	23	69.68	6.35
MUNDRA TPS	6	660	15-FEB-2016	11-MAR-2016	603.17	25	398.09	6.87
MUNDRA TPS	8	660	29-NOV-2015	01-JAN-2016	808.42	34	533.56	9.2
MUNDRA UMTTP	2	800	08-OCT-2015	01-DEC-2015	1318.22	55	1054.58	15.01
SATPURA TPS	8	210	16-JUL-2015	22-AUG-2015	895.92	37	188.14	10.2
SATPURA TPS	8	210	16-JUN-2015	15-JUL-2015	719.98	30	151.2	8.2
KORBA-II	4	50	20-NOV-2015	17-DEC-2015	634.75	26	31.74	7.23
DSPM TPS	1	250	19-DEC-2015	16-JAN-2016	671.73	28	167.93	7.65
KORBA-WEST TPS	1	210	13-NOV-2015	07-DEC-2015	578.9	24	121.57	6.59
KORBA-WEST TPS	4	210	25-MAY-2015	29-JUN-2015	841.25	35	176.66	9.58
SANJAY GANDHI TPS	2	210	23-MAY-2015	10-AUG-2015	1899.22	79	398.84	21.62
SANJAY GANDHI TPS	3	210	15-AUG-2015	13-SEP-2015	715.63	30	150.28	8.15
SANJAY GANDHI TPS	5	500	01-APR-2015	12-APR-2015	286.28	12	143.14	3.26
KORBA STPS	1	200	30-JAN-2016	01-MAR-2016	764.15	32	152.83	8.7
KORBA STPS	5	500	24-OCT-2015	28-NOV-2015	842.13	35	421.06	9.59
KORBA STPS	6	500	01-APR-2015	25-APR-2015	583.37	24	291.68	6.64
KORBA STPS	7	500	10-JUN-2015	13-JUL-2015	812.17	34	406.08	9.25
SIPAT STPS	1	660	01-APR-2015	09-MAY-2015	912.25	38	602.08	10.39
SIPAT STPS	3	660	21-SEP-2015	01-NOV-2015	989.17	41	652.85	11.26
SIPAT STPS	5	500	11-JUL-2015	14-AUG-2015	809.77	34	404.88	9.22
VINDHYACHAL STPS	1	210	17-MAY-2015	23-MAY-2015	162.58	7	34.14	1.85

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
VINDHYACHAL STPS	2	210	01-APR-2015	22-APR-2015	508.32	21	106.75	5.79
VINDHYACHAL STPS	3	210	28-MAY-2015	16-JUN-2015	474.57	20	99.66	5.4
VINDHYACHAL STPS	4	210	08-OCT-2015	20-NOV-2015	1043.62	43	219.16	11.88
VINDHYACHAL STPS	5	210	10-SEP-2015	29-SEP-2015	472.25	20	99.17	5.38
VINDHYACHAL STPS	6	210	14-JAN-2016	18-FEB-2016	841.25	35	176.66	9.58
VINDHYACHAL STPS	7	500	12-JUN-2015	05-AUG-2015	1290.03	54	645.02	14.69
VINDHYACHAL STPS	10	500	12-AUG-2015	18-SEP-2015	900.03	38	450.02	10.25
VINDHYACHAL STPS	12	500	20-NOV-2015	16-DEC-2015	623.67	26	311.84	7.1
OP JINDAL TPS	1	250	26-FEB-2016	31-MAR-2016	840	35	210	9.56
PATHADI TPP	1	300	25-AUG-2015	10-SEP-2015	406.17	17	121.85	4.62
KASAIPALLI TPP	1	135	16-MAR-2016	31-MAR-2016	384	16	51.84	4.37
KASAIPALLI TPP	2	135	11-JAN-2016	30-JAN-2016	477.47	20	64.46	5.44
BHILAI TPS	1	250	05-MAR-2016	31-MAR-2016	639.42	27	159.86	7.28
NASIK TPS	5	210	30-JUN-2015	30-JUL-2015	710.33	30	149.17	8.09
MAUDA TPS	2	500	02-OCT-2015	20-OCT-2015	424.62	18	212.31	4.83
KHAPARKHEDA TPS	2	210	01-APR-2015	24-APR-2015	565.47	24	118.75	6.44
KHAPARKHEDA TPS	4	210	19-JUN-2015	17-JUL-2015	649.62	27	136.42	7.4
KHAPARKHEDA TPS	5	500	15-MAR-2016	31-MAR-2016	406.8	17	203.4	4.63
PARAS TPS	4	250	01-APR-2015	07-APR-2015	161.67	7	40.42	1.84
BHUSAWAL TPS	5	500	29-JUL-2015	04-SEP-2015	886.32	37	443.16	10.09
PARLI TPS	4	210	13-APR-2015	05-JUL-2015	1996.55	83	419.28	22.73
CHANDRAPUR(MAHARASHTRA) STPS	4	210	29-AUG-2015	27-SEP-2015	686.45	29	144.15	7.81
DAHANU TPS	1	250	03-JAN-2016	21-JAN-2016	428.23	18	107.06	4.88
JSW RATNAGIRI TPP	1	300	14-MAY-2015	23-JUN-2015	963.1	40	288.93	10.96
TIRORA TPS	1	660	01-JUN-2015	06-JUL-2015	855.12	36	564.38	9.73
GMR WARORA TPS	2	300	10-JAN-2016	28-JAN-2016	437.85	18	131.36	4.98
BUTIBORI TPP	1	300	15-JUL-2015	13-AUG-2015	719.5	30	215.85	8.19

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
SOUTHERN REGION								
KOTHAGUEDEM TPS	1	60	07-JUL-2015	21-JUL-2015	338.88	14	20.33	3.86
KOTHAGUEDEM TPS	2	60	20-JUN-2015	04-JUL-2015	351.05	15	21.06	4
KOTHAGUEDEM TPS	3	60	28-OCT-2015	05-NOV-2015	194.13	8	11.65	2.21
KOTHAGUEDEM TPS	5	120	03-NOV-2015	23-NOV-2015	483.55	20	58.03	5.5
KOTHAGUEDEM TPS	6	120	07-JUL-2015	24-JUL-2015	427.13	18	51.26	4.86
KOTHAGUEDEM TPS	7	120	29-JAN-2016	13-FEB-2016	365.62	15	43.87	4.16
KOTHAGUEDEM TPS	8	120	20-JUN-2015	04-JUL-2015	339.6	14	40.75	3.87
KOTHAGUEDEM TPS (NEW)	1	250	10-JAN-2016	30-JAN-2016	480.5	20	120.12	5.47
KOTHAGUEDEM TPS (NEW)	2	250	29-NOV-2015	20-DEC-2015	517	22	129.25	5.89
KOTHAGUEDEM TPS (NEW)	3	500	07-JUN-2015	24-JUN-2015	407.77	17	203.88	4.64
Dr. N.TATA RAO TPS	1	210	27-AUG-2015	09-SEP-2015	317.33	13	66.64	3.61
Dr. N.TATA RAO TPS	3	210	28-OCT-2015	10-NOV-2015	321.85	13	67.59	3.66
Dr. N.TATA RAO TPS	5	210	20-JUN-2015	30-JUN-2015	262.45	11	55.11	2.99
Dr. N.TATA RAO TPS	5	210	01-JUL-2015	11-JUL-2015	248.23	10	52.13	2.83
Dr. N.TATA RAO TPS	6	210	15-SEP-2015	29-SEP-2015	331.17	14	69.55	3.77
Dr. N.TATA RAO TPS	7	500	10-NOV-2015	06-JAN-2016	1359.7	57	679.85	15.48
KAKATIYA TPS	1	500	28-DEC-2015	24-JAN-2016	638.12	27	319.06	7.26
RAYALASEEMA TPS	2	210	22-JUL-2015	05-AUG-2015	350.15	15	73.53	3.99
RAYALASEEMA TPS	3	210	20-NOV-2015	05-DEC-2015	383.57	16	80.55	4.37
RAYALASEEMA TPS	4	210	15-AUG-2015	30-AUG-2015	361.42	15	75.9	4.11
RAYALASEEMA TPS	5	210	07-AUG-2015	27-AUG-2015	463.42	19	97.32	5.28
SIMHAPURI TPS	1	150	17-FEB-2016	31-MAR-2016	1038.73	43	155.81	11.83
SIMHAPURI TPS	2	150	17-JAN-2016	31-JAN-2016	335.43	14	50.31	3.82
THAMMINAPATNAM TPS	1	150	19-DEC-2015	07-JAN-2016	465.72	19	69.86	5.3
THAMMINAPATNAM TPS	2	150	16-AUG-2015	06-OCT-2015	1239.68	52	185.95	14.11
RAMAGUNDEM STPS	1	200	12-NOV-2015	05-DEC-2015	543.02	23	108.6	6.18
RAMAGUNDEM STPS	2	200	05-JUL-2015	01-AUG-2015	655.38	27	131.08	7.46

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
RAMAGUNDEM STPS	4	500	04-SEP-2015	19-OCT-2015	1100.08	46	550.04	12.52
SIMHADRI	2	500	15-NOV-2015	30-DEC-2015	1069.43	45	534.72	12.17
SIMHADRI	3	500	28-AUG-2015	28-SEP-2015	744	31	372	8.47
RAICHUR TPS	1	210	29-JAN-2016	20-FEB-2016	530.92	22	111.49	6.04
RAICHUR TPS	2	210	02-JAN-2016	22-JAN-2016	474.58	20	99.66	5.4
RAICHUR TPS	4	210	27-JUL-2015	16-AUG-2015	471.5	20	99.02	5.37
RAICHUR TPS	6	210	28-OCT-2015	21-NOV-2015	583.57	24	122.55	6.64
RAICHUR TPS	8	250	17-FEB-2016	07-MAR-2016	462.83	19	115.71	5.27
RAICHUR TPS	8	250	18-JUN-2015	02-JUL-2015	322.02	13	80.5	3.67
TORANGALLU TPS(SBU-I)	2	130	20-JUN-2015	30-JUN-2015	243.8	10	31.69	2.78
BELLARY TPS	1	500	07-AUG-2015	13-OCT-2015	1603.72	67	801.86	18.26
BELLARY TPS	2	500	11-DEC-2015	31-DEC-2015	483.72	20	241.86	5.51
UDUPI TPP	2	600	04-OCT-2015	17-OCT-2015	313.08	13	187.85	3.56
ENNORE TPS	1	60	13-AUG-2015	29-AUG-2015	401.42	17	24.09	4.57
TUTICORIN TPS	3	210	12-SEP-2015	03-OCT-2015	486.28	20	102.12	5.54
METTUR TPS	1	210	31-MAY-2015	21-JUL-2015	1221.3	51	256.47	13.9
METTUR TPS	2	210	20-NOV-2015	06-DEC-2015	363.88	15	76.41	4.14
METTUR TPS	3	210	26-JUL-2015	17-AUG-2015	528.4	22	110.96	6.02
METTUR TPS	4	210	20-SEP-2015	07-OCT-2015	409.2	17	85.93	4.66
METTUR TPS - II	1	600	19-MAY-2015	14-JUN-2015	625.88	26	375.53	7.13
NORTH CHENNAI TPS	1	210	12-SEP-2015	30-SEP-2015	435.35	18	91.42	4.96
NORTH CHENNAI TPS	2	210	18-DEC-2015	05-JAN-2016	454.12	19	95.37	5.17
NORTH CHENNAI TPS	3	210	23-AUG-2015	09-SEP-2015	397.27	17	83.43	4.52
NORTH CHENNAI TPS	5	600	19-JUN-2015	08-SEP-2015	1933	81	1159.8	22.01
MUTHIARA TPP	1	600	09-AUG-2015	18-SEP-2015	977	41	586.2	11.12
MUTHIARA TPP	1	600	19-JUN-2015	22-JUN-2015	88.05	4	52.83	1
NEYVELI TPS- I	1	50	06-SEP-2015	26-SEP-2015	481.53	20	24.08	5.48
NEYVELI TPS- I	2	50	03-JUN-2015	24-JUN-2015	512.15	21	25.61	5.83

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
NEYVELI TPS- I	3	50	01-JUL-2015	21-JUL-2015	499.62	21	24.98	5.69
NEYVELI TPS- I	4	50	13-AUG-2015	04-SEP-2015	509.55	21	25.48	5.8
NEYVELI TPS- I	5	50	21-DEC-2015	11-JAN-2016	508.63	21	25.43	5.79
NEYVELI TPS- I	6	50	28-NOV-2015	19-DEC-2015	527.98	22	26.4	6.01
NEYVELI TPS- I	9	100	12-NOV-2015	05-DEC-2015	575.98	24	57.6	6.56
NEYVELI TPS-II	1	210	26-NOV-2015	23-DEC-2015	660.52	28	138.71	7.52
NEYVELI TPS-II	2	210	18-OCT-2015	20-NOV-2015	800.78	33	168.16	9.12
NEYVELI TPS-II	3	210	15-SEP-2015	14-OCT-2015	712.27	30	149.58	8.11
NEYVELI TPS-II	4	210	31-JUL-2015	23-AUG-2015	557.48	23	117.07	6.35
NEYVELI TPS-II	5	210	27-AUG-2015	11-OCT-2015	1091.45	45	229.2	12.43
NEYVELI TPS-II	6	210	25-OCT-2015	29-NOV-2015	829.58	35	174.21	9.44
NEYVELI TPS-II	7	210	01-JUL-2015	29-JUL-2015	684.35	29	143.71	7.79
NEYVELI (EXT) TPS	1	210	12-OCT-2015	03-NOV-2015	517.97	22	108.77	5.9
NEYVELI (EXT) TPS	2	210	05-NOV-2015	19-DEC-2015	1057.92	44	222.16	12.04
VALLUR TPP	1	500	03-OCT-2015	13-OCT-2015	241.85	10	120.92	2.75
VALLUR TPP	2	500	26-JUN-2015	09-AUG-2015	1070.57	45	535.28	12.19
NEYVELI TPS(Z)	1	250	10-OCT-2015	03-NOV-2015	581.1	24	145.28	6.62
EASTERN REGION								
KAHALGAON TPS	1	210	01-JUN-2015	26-JUN-2015	598.83	25	125.75	6.82
KAHALGAON TPS	2	210	18-JAN-2016	24-FEB-2016	908.73	38	190.83	10.35
KAHALGAON TPS	4	210	10-MAR-2016	31-MAR-2016	528	22	110.88	6.01
KAHALGAON TPS	4	210	03-APR-2015	01-MAY-2015	694.67	29	145.88	7.91
KAHALGAON TPS	6	500	08-AUG-2015	02-SEP-2015	617.1	26	308.55	7.03
MAHADEV PRASAD STPP	1	270	28-MAY-2015	06-AUG-2015	1696.57	71	458.07	19.31
MEJIA TPS	7	500	25-OCT-2015	07-DEC-2015	1051.7	44	525.85	11.97
TALCHER (OLD) TPS	1	60	26-OCT-2015	09-NOV-2015	344.48	14	20.67	3.92
TALCHER (OLD) TPS	2	60	20-AUG-2015	05-SEP-2015	362.02	15	21.72	4.12
TALCHER (OLD) TPS	2	60	20-MAR-2016	31-MAR-2016	277.82	12	16.67	3.16

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
TALCHER (OLD) TPS	3	60	23-SEP-2015	08-OCT-2015	364.67	15	21.88	4.15
TALCHER (OLD) TPS	4	60	07-SEP-2015	21-SEP-2015	337.98	14	20.28	3.85
TALCHER (OLD) TPS	5	110	29-JUL-2015	19-AUG-2015	522.67	22	57.49	5.95
TALCHER (OLD) TPS	6	110	27-NOV-2015	12-DEC-2015	379.28	16	41.72	4.32
TALCHER STPS	1	500	01-SEP-2015	08-OCT-2015	906.1	38	453.05	10.32
TALCHER STPS	3	500	01-AUG-2015	25-AUG-2015	592.63	25	296.32	6.75
TALCHER STPS	4	500	06-JUN-2015	01-JUL-2015	616.15	26	308.08	7.01
STERLITE TPP	1	600	01-APR-2015	29-JUN-2015	2141.53	89	1284.92	24.38
STERLITE TPP	4	600	26-JUN-2015	10-SEP-2015	1818.07	76	1090.84	20.7
DERANG TPP	1	600	21-NOV-2015	30-NOV-2015	219.07	9	131.44	2.49
KOLAGHAT TPS	3	210	03-JUL-2015	26-JUL-2015	559.58	23	117.51	6.37
BAKRESWAR TPS	1	210	28-OCT-2015	27-NOV-2015	736.95	31	154.76	8.39
SOUTHERN REPL. TPS	1	67.5	11-NOV-2015	01-DEC-2015	470.8	20	31.78	5.36
BUDGE BUDGE TPS	1	250	31-DEC-2015	30-JAN-2016	719.78	30	179.94	8.19
BUDGE BUDGE TPS	2	250	07-DEC-2015	14-DEC-2015	168.3	7	42.08	1.92
FARAKKA STPS	4	500	07-SEP-2015	03-NOV-2015	1377.67	57	688.84	15.68
FARAKKA STPS	6	500	06-APR-2015	07-MAY-2015	763.65	32	381.82	8.69
Sub Total	226	60824.5			159930.21	6673	44373.61	8.31
BOILER INSPECTION/RE-CERTIFICATION								
NORTHERN REGION								
JALIPA KAPURDI TPP	4	135	22-FEB-2016	01-MAR-2016	188.6	8	25.46	2.15
JALIPA KAPURDI TPP	5	135	01-JAN-2016	11-JAN-2016	233.55	10	31.53	2.66
JALIPA KAPURDI TPP	7	135	12-FEB-2016	19-FEB-2016	176.17	7	23.78	2.01
WESTERN REGION								
KUTCH LIG. TPS	3	75	13-APR-2015	15-APR-2015	29.97	1	2.25	0.34
MUNDRA UMTTP	2	800	23-MAY-2015	30-MAY-2015	179.98	7	143.98	2.05
MUNDRA UMTTP	5	800	01-APR-2015	24-APR-2015	562.8	23	450.24	6.41
KORBA-WEST TPS	2	210	01-AUG-2015	07-AUG-2015	125.03	5	26.26	1.42

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
NIGRI TPP	2	660	21-DEC-2015	22-DEC-2015	25.08	1	16.55	0.29
RATIJA TPS	1	50	21-JAN-2016	24-JAN-2016	64.68	3	3.23	0.74
BARADARHA TPS	1	600	07-SEP-2015	13-SEP-2015	150	6	90	1.71
NASIK TPS	4	210	19-NOV-2015	21-NOV-2015	56.63	2	11.89	0.64
KORADI TPS	7	210	08-SEP-2015	11-SEP-2015	64.68	3	13.58	0.74
KHAPARKHEDA TPS	5	500	22-DEC-2015	25-DEC-2015	63.85	3	31.92	0.73
PARLI TPS	7	250	20-MAY-2015	23-MAY-2015	63.67	3	15.92	0.72
TROMBAY TPS	5	500	26-JAN-2016	06-FEB-2016	255.25	11	127.62	2.91
TROMBAY TPS	8	250	07-FEB-2016	02-MAR-2016	579.28	24	144.82	6.59
BUTIBORI TPP	2	300	09-DEC-2015	14-DEC-2015	118.48	5	35.54	1.35
SOUTHERN REGION								
DAMODARAM SANJEEVAIAH TPS	2	800	03-OCT-2015	19-OCT-2015	366.02	15	292.82	7.16
THAMMINAPATNAM TPS	1	150	12-APR-2015	19-APR-2015	179.12	7	26.87	2.04
RAICHUR TPS	6	210	08-SEP-2015	10-SEP-2015	28.57	1	6	0.33
TUTICORIN (P) TPP	2	150	09-OCT-2015	24-OCT-2015	337.45	14	50.62	3.84
NEYVELI TPS- I	7	100	29-JUL-2015	03-AUG-2015	123.6	5	12.36	1.41
TUTICORIN (JV) TPP	2	500	22-SEP-2015	23-SEP-2015	21.1	1	10.55	0.41
EASTERN REGION								
DURGAPUR TPS	4	210	20-OCT-2015	07-NOV-2015	429.67	18	90.23	4.89
MAITHON RB TPP	1	525	06-SEP-2015	07-OCT-2015	750.28	31	393.9	8.54
FARAKKA STPS	2	200	05-AUG-2015	11-AUG-2015	154.08	6	30.82	1.75
Sub Total	26	8665			5327.59	220	2108.75	2.96
CAPITAL MAINTENANCE								
NORTHERN REGION								
GH TPS (LEH.MOH.)	3	250	01-APR-2015	22-APR-2015	517.22	22	129.3	5.89
SURATGARH TPS	4	250	24-JUN-2015	20-AUG-2015	1354.78	56	338.7	15.42
JALIPA KAPURDI TPP	2	135	06-APR-2015	07-MAY-2015	759.97	32	102.6	8.65

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
JALIPA KAPURDI TPP	4	135	14-OCT-2015	05-NOV-2015	546.08	23	73.72	6.22
OBRA TPS	9	200	13-OCT-2015	17-OCT-2015	101.72	4	20.34	1.16
KUNDARKI TPS	1	45	14-NOV-2015	30-MAR-2016	3291.63	137	148.12	37.47
WESTERN REGION								
KUTCH LIG. TPS	1	70	16-MAY-2015	19-JUN-2015	825.1	34	57.76	9.39
KUTCH LIG. TPS	2	70	15-APR-2015	24-MAY-2015	949.22	40	66.45	10.81
MUNDRA TPS	1	330	01-MAY-2015	05-JUN-2015	844.45	35	278.67	9.61
BHILAI TPS	2	250	21-AUG-2015	23-SEP-2015	792.65	33	198.16	9.02
CHANDRAPUR(MAHARASHTRA) STPS	5	500	27-DEC-2015	30-JAN-2016	799.27	33	399.64	9.1
CHANDRAPUR(MAHARASHTRA) STPS	6	500	09-JUN-2015	22-JUL-2015	1011.22	42	505.61	11.51
SOUTHERN REGION								
KOTHAGUDEM TPS	4	60	07-NOV-2015	17-DEC-2015	968.1	40	58.09	11.02
TORANGALLU TPS(SBU-II)	3	300	30-JUN-2015	12-AUG-2015	1029.57	43	308.87	11.72
TUTICORIN TPS	5	210	17-AUG-2015	29-SEP-2015	1018.92	42	213.97	11.6
EASTERN REGION								
DURGAPUR TPS	3	130	27-JUL-2015	29-AUG-2015	772.37	32	100.41	8.79
MEJIA TPS	5	250	01-JUN-2015	17-JUL-2015	1102.3	46	275.58	12.55
MEJIA TPS	6	250	26-SEP-2015	18-OCT-2015	540.48	23	135.12	6.15
IB VALLEY TPS	1	210	16-JAN-2016	17-FEB-2016	763.27	32	160.29	8.69
BANDEL TPS	2	60	01-DEC-2015	17-FEB-2016	1886.72	79	113.2	21.48
SANTALDIH TPS	5	250	20-AUG-2015	11-SEP-2015	527.68	22	131.92	6.01
BAKRESWAR TPS	5	210	30-NOV-2015	08-JAN-2016	954.98	40	200.55	10.87
Sub Total	22	4665			21357.7	890	4017.05	9.8
OTHER PLANNED MAINTENANCE INCLUDING PG TEST OF NEW UNITS AND RLA STUDIES ETC.								
NORTHERN REGION								
JALIPA KAPURDI TPP	3	135	01-APR-2015	06-APR-2015	125.28	5	16.91	1.43
WESTERN REGION								

Annexure-3.1

UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
NIGRI TPP	2	660	21-FEB-2016	08-MAR-2016	385.67	16	254.54	4.39
SIPAT STPS	3	660	20-FEB-2016	22-FEB-2016	24.7	1	16.3	0.28
SOUTHERN REGION								
METTUR TPS - II	1	600	08-JUL-2015	08-JUL-2015	1.92	0	1.15	0.02
METTUR TPS - II	1	600	04-JUL-2015	08-JUL-2015	109.35	5	65.61	1.24
EASTERN REGION								
RAGHUNATHPUR TPP	2	600	31-MAR-2016	31-MAR-2016	24	1	0	0
Sub Total	6	3255			670.92	28	354.52	1.52
OTHER PLANNED MAINTENANCE WORKS								
NORTHERN REGION								
GIRAL TPS	1	125	01-APR-2015	31-MAR-2016	8784	366	1098	100
GIRAL TPS	2	125	27-JAN-2016	31-MAR-2016	1544.55	64	193.07	17.58
JALIPA KAPURDI TPP	1	135	06-SEP-2015	13-SEP-2015	169.7	7	22.91	1.93
TANDA TPS	1	110	23-AUG-2015	26-SEP-2015	826.58	34	90.92	9.41
WESTERN REGION								
WANAKBORI TPS	2	210	13-JUL-2015	13-JUL-2015	9.48	0	1.99	0.11
WANAKBORI TPS	3	210	02-AUG-2015	02-AUG-2015	19.38	1	4.07	0.22
SURAT LIG. TPS	4	125	21-JUN-2015	22-JUN-2015	31.23	1	3.9	0.36
SOUTHERN REGION								
KAKATIYA TPS	1	500	05-APR-2015	06-APR-2015	17.83	1	8.92	0.2
EASTERN REGION								
DURGAPUR TPS	4	210	10-SEP-2015	19-SEP-2015	228.47	10	47.98	2.6
TALCHER (OLD) TPS	1	60	19-JAN-2016	19-JAN-2016	5.62	0	0.34	0.06
KOLAGHAT TPS	6	210	20-NOV-2015	01-DEC-2015	253.85	11	53.31	2.89
D.P.L. TPS	8	250	21-OCT-2015	31-OCT-2015	258.77	11	64.69	2.95
TITAGARH TPS	2	60	20-MAY-2015	20-MAY-2015	0.85	0	0.05	0.01
BUDGE BUDGE TPS	3	250	31-JAN-2016	05-FEB-2016	117.68	5	29.42	1.34
HALDIA TPP	1	300	30-DEC-2015	31-DEC-2015	8.48	0	2.54	0.1

Annexure-3.1

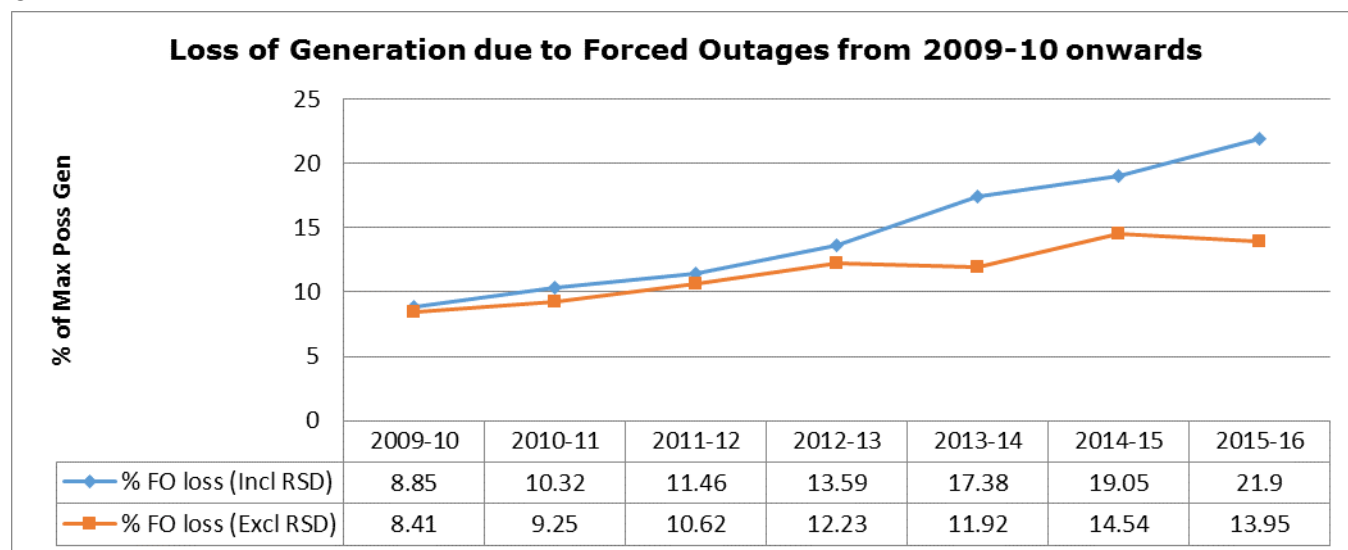
UNIT-WISE PLANNED MAINTENANCE DURING THE YEAR 2015 - 16								
Name Of Station	Unit No.	Cap (in MW)	Date Of Outage	Date Of Return	Outage hours	Outage days	MU Loss	Energy loss as % of Pos. Gen.
HALDIA TPP	1	300	05-MAR-2016	07-MAR-2016	31.28	1	9.38	0.36
HALDIA TPP	2	300	26-MAR-2016	28-MAR-2016	32.13	1	9.64	0.37
FARAKKA STPS	1	200	01-AUG-2015	01-AUG-2015	4.17	0	0.83	0.05
Sub Total	18	3680			12344.05	513	1641.97	5.08
R AND M WORKS								
NORTHERN REGION								
OBRA TPS	7	94	01-APR-2015	31-MAR-2016	8784	366	825.7	100
OBRA TPS	10	200	01-APR-2015	31-MAR-2016	8784	366	1756.8	100
OBRA TPS	11	200	01-APR-2015	31-MAR-2016	8784	366	1756.8	100
HARDUAGANJ TPS	7	105	01-APR-2015	30-APR-2015	696.48	29	73.13	7.93
WESTERN REGION								
KORBA STPS	2	200	18-JUL-2015	26-AUG-2015	943.38	39	188.68	10.74
KORADI TPS	6	210	09-JUL-2015	31-MAR-2016	6408	267	1345.68	72.95
EASTERN REGION								
BARAUNI TPS	6	105	01-APR-2015	31-MAR-2016	8784	366	922.32	100
BARAUNI TPS	7	105	01-APR-2015	31-MAR-2016	8784	366	922.32	100
TALCHER (OLD) TPS	5	110	06-MAR-2016	12-MAR-2016	147.12	6	16.18	1.67
BANDEL TPS	5	210	01-APR-2015	25-AUG-2015	3517.95	147	738.77	40.05
Sub Total	10	1539			55632.93	2318	8546.38	63.22
Total	308	82628.5			259827.58	10832	61042.28	4.28

SECTION-4 FORCED OUTAGES

4.1 Based on the analysis carried out for 617 thermal power generating units, it is seen that forced outages of generating units were due to various problems in generating equipment, auxiliary systems and also due to external reasons viz., shortage of fuel, system constraints, lower demand/ schedules etc.

During the financial year 2015-16, the loss of generation on account of forced outages of units increased **to 312.42 BU** from 240.5 BU in 2014-15. Forced outages loss increased to 21.90% from 19.05% during 2015-16. The All India energy loss due to forced outage of units considered in the review as the percentage of their maximum possible generation⁵ calculated on the basis of rated capacity of the units from year 2009-10 onwards are depicted below:

As may be seen from the



art, the losses on account of RSD (Reserve Shutdown - when units remain out of operation due to lack of schedule/dispatch) have increased constantly and significantly. The FO loss due to RSD was less than 1 % in 2011-12 and increased to around **8 %** in 2015-16.

4.2 Forced outages losses due to the main equipment faults accounted for 23.45 % of the total forced outages losses as per details given in the table below:

⁵ calculated on the basis of rated capacity of the units

Sl. No.	Cause of Outage	Percentage of total forced outage losses including losses due to reserve shut down				
		11-12	12-13	13-14	2014-15	2015-16
I.	Main Equipment					
a)	Boiler	29.87	29.04	19.91	19.68	14.96
b)	Turbine	15.84	12.49	10.33	6.9	4.33
c)	Generator	8.65	4.38	5.33	9.99	4.17
	Sub Total	54.37	45.91	35.57	36.57	23.45
II.	Auxiliaries					
a)	Boiler Aux.	5.57	10.84	5.83	4.86	3.09
b)	Turbine Aux.	2.49	3.53	1.27	2.11	1.65
	Sub-Total	8.06	14.37	7.1	6.97	4.74
III.	Boiler & Boiler Aux.	35.44	39.88	25.75	24.54	18.04
IV.	Turbine & Turbine Aux.	18.33	16.01	11.6	9.01	5.98
V.	Generator	8.65	4.38	5.33	9.99	4.17
VI.	Others	37.58	39.72	57.33	56.46	71.81
VII.	Generation loss due to Reserve Shut Down (RSD) – included in Others	7.04	9.97	30.63	23.52	36.31

4.3 EQUIPMENT OUTAGES:

A. Boiler

The generation loss due to Boiler outages decreased from 3.75% of maximum possible generation during 2014-15 to 3.28% during 2015-16. Tube leakages and air preheater problems were main causes of boiler forced outages. A comparison of area/causes of outages in boiler during 2014-15 and 2015-16 is given below:

Sl. No.	Area/ cause of outages	No. of outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1	Water wall tube leakage	1120	838	26537.29	19873.85	2.1	1.39
2	Super heater tube leakage	115	146	3320.09	3246.10	0.26	0.23
3	Re-heater tube leakage	74	144	2344.08	2418.12	0.19	0.17
4	Economizer tube leakage	236	258	3302.18	5620.78	0.26	0.39

5	Air pre-heater problems	74	112	1620.14	5096.97	0.13	0.36
6	Furnace trouble	12	10	379.2	211.26	0.03	0.01
7	Boiler operational problems						
	(a) Furnace fire out/ flame failure	489	386	2904.98	1446.81	0.23	0.10
	(b) Furnace draft abnormal	281	272	1568.07	1049.34	0.12	0.07
	(c) Drum level high/ low	155	161	1636.56	676.82	0.13	0.05
	(d) Miscellaneous	3	2	400.09	304.06	0.03	0.02
8	Others boiler misc. Problem	126	291	3331.71	6785.94	0.26	0.48
TOTAL BOILER		2685	2620	47344.38	46730.05	3.75	3.28

B. Turbine

The generation loss due to Turbine problems decreased from 1.32% of maximum possible generation during 2014-15 to 0.95% during 2015-16. Turbine bearings and eccentricity problems, governing oil systems and condenser tube leakages were major causes for turbine forced outages. A comparison of area/causes of outages in turbine during 2014-15 and 2015-16 is given below:

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1	Turbine Bearing problems	17	37	1112.29	2119.55	0.09	0.15
2	Governing /Oil System Failures	32	64	286.96	1217.02	0.02	0.09
3	Turbine differential expansion problem	12	17	43.74	32.23	0	0
4	Axial shift/thrust pad problem	24	11	1304.25	690.04	0.1	0.05
5	Turbine eccentricity / high vibrations	101	90	4673.74	2602.85	0.37	0.18
6	Turbine rotor failure/ damaged	0	4	0	67.78	0	0
7	Turbine control valve problem	16	20	1012.07	258.14	0.08	0.02
8	Condenser tube leakage/ cleaning	71	63	1882.5	2044.91	0.15	0.14
9	Main Steam line problem	50	46	911.88	835.02	0.07	0.06
10	Emergency Stop Valve (ESV) closure	6	6	458.34	113.40	0.04	0.01
11	Condenser low vacuum	109	134	631.61	716.91	0.05	0.05

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
12	H.P.&L.P bypass system	12	19	409.07	679.41	0.03	0.05
13	Other Misc. Problems	111	123	3880.46	2144.30	0.31	0.15
Total Turbine		561	634	16606.91	13521.58	1.32	0.95

C. Generator

The generation loss due to Generator problems decreased from 1.9% during 2014-15 to 0.91% during 2015-16 of maximum possible generation. Earth fault, excitation system and generator protection/relay operation were the main causes of generator outages. A comparison of areas/causes of outages in generator during 2014-15 and 2015-16 is given below:

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1.	Stator/ Stator Earth fault	44	77	2494.05	2720.50	0.2	0.19
2.	Rotor/ Rotor Earth Fault	11	36	349.27	1014.17	0.03	0.07
3	Gen. Transformer Tripping/ Damaged	29	25	3155.66	2658.88	0.25	0.19
4.	Excitation Problem	51	47	125.66	1423.77	0.01	0.10
5.	Gen. Cooling System Failure	1	14	2.25	324.11	0	0.02
6.	Seal Oil System Problem	10	3	57.66	46.93	0	0
7.	Generator Bearing Problem	7	5	975.93	878.40	0.08	0.06
8.	Fire In Turbo Gen. Bushing/ Bushing Failure	5	8	3752.88	215.23	0.3	0.02
9.	A.V.R. Problem	17	22	644.92	367.33	0.05	0.03
10.	Generator Protection/ Relay Operation Problem	241	158	7473	3027.68	0.59	0.21
11.	Hydrogen Pressure Problem	23	10	4030.84	131.32	0.32	0.01
12.	Generator Miscellaneous Maintenance	36	41	957.13	218.31	0.08	0.02
Total Generator		475	446	24019.25	13026.62	1.9	0.91

D. OTHER ELECTRICAL PROBLEMS

Details of loss of generation during 2014-15 and 2015-16 due to various electrical problems including switchyard area and other instruments etc. are as under:

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1.	Unit Aux. Transformer problem / Station Transformer	66	56	376.62	922.22	0.03	0.06
2.	Generator Transformer problem	67	80	1091.91	4283.51	0.09	0.30
3.	H.T./L.T. supply problem	27	32	98.19	128.60	0.01	0.01
4.	DC supply problem	39	46	149.01	973.08	0.01	0.07
5.	Switchyard/ Bus Bar problems	58	164	739.26	1159.39	0.06	0.08
6.	Breaker/isolator	19	18	799.81	290.88	0.06	0.02
7.	Misc. fire hazards / fire in cable gallery	7	6	158.38	634.74	0.01	0.04
8.	Instrument fault	3	3	20.43	2738.2	0	0.19
9.	Mal-operation of relays	7	0	19.63	0	0	0
10.	Air supply problem	—	12	—	32.98	—	0
11.	Other electrical problems	497	401	3521.84	3158.82	0.28	0.22
Total		790	818	6975.08	14322.5	0.55	1.00

E. FUEL SUPPLY AND OTHER MISC. PROBLEMS:

The generation loss on account of shutdown of thermal units due to Coal and Lignite shortage decreased to 1639.26MU in 2015-16 from 3495.22MU in the previous year. Coal and ash handling systems accounted for major losses of around 22000 MU. Withdrawal of units from operation due to being uneconomical or vintage units also contributed significantly to losses- over 24000 MU.

Sl. No.	Area/ cause of outages	No. of outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1	Coal Shortage	76	24	3495.2	1623.25	0.28	0.11
2	Coal Feeding Problem	192	93	21468	14511.45	1.7	1.02
3	Wet/ Poor Quality Coal/Lignite	19	21	237.38	287.93	0.05	0.02

Sl. No.	Area/ cause of outages	No. of outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
4	Fuel Supply & Other Misc. Problem	-	72	-	9238.42	-	0.65
5	Fuel Oil Problem	29	26	60.84	201.31	0	0.01
6	Ash Handling System Problem	43	69	6564.1	7460.51	0.52	0.52
7	Raw Water Problem	11	17	3009.9	4151.54	0.24	0.29
8	D.M. Water Problem	4	0	190.06	0	0.02	0
9	Cooling Tower Problem	3	3	39.8	182.75	0	0.01
10	E.S.P. Problem	13	31	2226.8	3280.74	0.18	0.23
11	Non-Readiness Of Residual Work Of New Unit	6	7	875.72	1124.35	0.07	0.08
12	Vintage Unit Withdrawn And Closed For Operation	5	27	3686.9	19166.71	0.29	1.34
13	Uneconomical Operation	-	6	-	5344.99	0.54	0.37
14	Other Misc. Problems	79	36	15606	5609.26	0.73	0.39
	TOTAL MISCELLANEOUS	480	432	57461	72183.21	4.62	5.06

F. GRID SYSTEM AND LOW SYSTEM DEMAND

Almost half of total Forced outage losses occurred on account of low system demand and transmission/grid related constraints. Energy loss due to Reserve shutdown increased from 56,573.77MU in 2014-15 to 113,413.88 MU during 2015-16 and the generation loss due to transmission constraints decreased from 13,339 MU to 8,814.94MU.

Details of generation losses due to transmission constraints/ grid system problems and reserve shut down during 2014-15 and 2015-16 are given below: -

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
1.	Transmission constraints/grid system problems	194	261	13,339	8,814.94	1.06	0.62
2.	Reserve Shut Down	676	934	56,573.77	113,413.88	4.48	7.95
3.	NO Power purchase agreement	—	16	—	15,602.30	—	1.09
	Total	870	1211	69,912.77	137,831.12	5.54	9.66

4.2 OUTAGE & ENERGY LOSS DUE TO PROBLEMS IN AUXILIARY SYSTEMS

4.4.1 Details of losses due to problems in boiler & turbine auxiliaries systems during the years 2014-15 and 2015-16 are given below:-

Sl. No.	Area/ cause of outages	No. of Outages		Loss (MU)		% age of Max. possible gen.	
		2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
I. Boiler Aux.							
	a) I.D. Fans	100	96	3602.77	2161.50	0.29	0.15
	b) F.D. Fans	31	37	91.2	254.84	0.01	0.02
	c) P.A. Fans	151	127	1489.4	2026.35	0.12	0.14
	d) Milling System / RC feeder problems	40	106	2733.55	1590.23	0.22	0.11
	e) Pipe and valves	69	76	444.55	775.15	0.04	0.05
	f) Boiler Aux. Misc. Problems	63	61	3332.39	2835.30	0.26	0.20
	Total Boiler Aux.	454	503	11693.86	9643.38	0.93	0.68
II. Turbine Aux.							
	a) Boiler feed pump problems	67	105	625.8	961.68	0.05	0.07
	b) Condensate pump problems	6	8	7.03	31.40	0	0
	c) C.W. pump problems	29	51	462.07	1160.77	0.04	0.08
	d) Regenerative System problem	3	9	880.58	1178.01	0.07	0.08
	e) Pipe and valve	11	4	174.22	68.57	0.01	0
	f) De-aerator Problem	0	3	0	27.54	0	0
	g)Turbine Misc.	89	97	2914.81	1731.99	0.23	0.12
	Total Turbine Aux.	205	277	5064.5	5159.95	0.4	0.36
Total Boiler & Turbine Aux.		659	780	16758.36	14803.33	1.33	1.04

4.5 FREQUENCY OF OUTAGES AND ENERGY LOSS

4.5.1 Region-wise frequency of outages/ tripping of equipment and related energy loss during 2014-15 and 2015-16 are shown in the **Annexure 4.1**.

4.5.2 Details of Average loss per outage (in MU) due to failure of equipment and auxiliaries from the years 2011-12 to 2015-16 is shown below: -

Sl. No.	Outages	Average Loss/Outage (MU)
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		2011-12	2012-13	2013-14	2014-15	2015-16
I.	Equipment					
	1. Boiler	9.02	11.85	13	17.63	17.84
	2. Turbine	21.52	19.17	26.59	29.6	21.33
	3. Generator	21.5	10.79	24.19	50.57	29.21
	4. Total Equipment	12.22	13.09	16.62	23.64	19.80
II.	Auxiliaries					
	1. Boiler Aux.	12.83	24.87	21.41	25.76	19.17
	2. Turbine Aux.	11.29	14.21	7.61	24.7	18.63
	3. Total Aux.	12.31	21	16.18	25.43	18.98
III	Boiler & Aux.	9.46	13.82	14.27	18.81	18.05
IV.	Turbine & Aux.	19.16	17.8	20.89	28.29	20.51
V.	Generator	21.5	10.79	24.19	50.57	29.21
VI.	Other Misc. Problems	14.83	17.76	42.84	63.08	89.02
	Total (Excl. RSD)	13.36	14.82	19.67	31.41	32.77
VII.	Reserve Shut Down	10.4	28.29	78.23	83.69	122.24
	Total (Incl. RSD)	13.09	15.56	25.53	36.82	44.63

The Average losses per Outage increased from 36.82 MU during 2014-15 to 44.63 MU during 2015-16. This was mainly due to considerable increase in RSD loss in 2015-16.

4.6 DURATION PATTERN OF FORCED OUTAGES

4.6.1 There were a total of about 7000 forced outages / tripping with aggregate duration of 1822149 outage hours during the year 2015-16. The duration of individual outage varied from few hours to the maximum of full year. The duration pattern of forced outages of thermal units during the year 2015-16 in the country is given at **Annexure-4.2**.

4.7 LONG DURATION FORCED OUTAGES

4.7.1 Energy loss (in MUs) due to forced outages of more than 25 days during the year 2015-16 contributed to **64.94% of total forced outage losses**. Details of units which under forced outages for more than 25 days are given in **Annexure 4.3**. Western Region has maximum loss (104843.14 MU) due to long forced outage and North Eastern Region had minimum MU loss (527.04 MU).

4.8 DURATION PATTERN OF BOILER TUBE LEAKAGE

4.8.1 WATER WALL TUBE LEAKAGE

Duration pattern of forced outages due to water wall tube leakage during last three years is shown below: -

Period in days	2013-14 (539 units)			2014-15 (571 units)			2015-16 (617 units)		
	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)
Upto-2 days	253	553	4089.06	255	562	4158.7	208	379	3000.04
>2 & up to 3	150	249	3690.5	147	247	3873.04	123	179	2805.39
>3 & up to 4	84	110	2150.2	88	113	2478.49	74	100	2626.75
>4 & up to 5	49	53	1381.69	47	57	1620.36	50	61	1872.31
>5 & up to 6	40	43	1309.11	28	29	1294.67	20	23	624.21
>6 & up to 7	13	15	586.27	18	20	810.23	18	18	793.86
>7 & up to 14	45	51	3310.8	44	56	2850.84	34	41	2676.47
>14 & up to 21	17	19	1335.51	15	15	1774.75	10	14	768.28
>21 & up to 28	5	5	827.68	5	5	1038.73	2	2	546.24
>28 & up to 30	3	3	299.95	0	0		1	1	141.16
> 30 days	9	9	3544.41	14	16	6637.47	12	20	4019.15
Total	353	1110	22,525.17	374	1120	26,537.29	324	838	19,873.85

As may be seen, the number of Water wall tube leakages and consequent losses have come down significantly over the years and the outages in 2015-16 were lower despite higher number of units reviewed. Also most of the WW leakages involved outages of less than 4 days and almost half of the outages have been for less than 2 days' duration.

4.8.2 SUPERHEATER TUBE LEAKAGE

Duration pattern of forced outages due to super heater tube leakage problems during last three years is shown below.

Period in days	2013-14 (539 units)			2014-15 (571 units)			2015-16 (617 Units)		
	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)
Upto-2 days	50	94	463.91	31	51	211.07	45	78	464.36
>2 & up to 3	13	20	134.04	19	20	238.57	29	30	430.32
>3 & up to 4	15	17	409.85	16	20	351.08	9	10	164.65

Period in days	2013-14 (539 units)			2014-15 (571 units)			2015-16 (617 Units)		
	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)
>4 & up to 5	8	8	207.45	9	9	265.24	7	7	232.66
>5 & up to 6	3	3	41.58	3	3	48.78	3	4	57.10
>6 & up to 7	4	4	78.34	2	2	117.69	4	4	207.61
>7 & up to 14	10	10	795.19	3	3	52.31	7	8	388.50
>14 & up to 21	4	4	588.23	4	4	442.94	1	1	52.13
>21 & up to 28	0	0		0	0		1	1	110.34
>28 & up to 30	1	1	88.05	0	0		1	1	453.60
> 30 days	2	2	308.53	3	3	1592.41	2	2	684.81
Total	92	164	3127.73	69	115	3320.09	87	146	3246.10

4.8.3 REHEATER TUBE LEAKAGE

Duration pattern of forced outages due to Re-heater tube leakage problems during last three years is shown below.

Period in days	2013-14 (539 units)			2014-15 (571 units)			2015-16 (Units 617)		
	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)
Upto-2 days	38	68	348.81	33	40	218.78	56	89	811.87
>2 & up to 3	11	16	193.33	13	16	235.15	20	26	531.61
>3 & up to 4	5	5	134.34	4	4	86.19	12	12	342.87
>4 & up to 5	4	4	126.92	2	2	78.66	4	4	77.94
>5 & up to 6	0	0	0	3	3	123.39	5	5	158.23
>6 & up to 7	0	0	0	3	3	151.31	0	0	0
>7 & up to 14	3	3	248.46	3	3	142.42	3	3	216.76
>14 & up to 21	3	3	305.63	1	1	129.68	0	0	0
>21 & up to 28	0	0	0	0	0	0	2	2	214.92
>28 & up to 30	0	0	0	0	0	0	0	0	0
> 30 days	1	1	581.7	2	2	1178.52	2	2	29.59
Total	59	100	1939.21	52	74	2344.08	86	144	2418.12

4.8.4 ECONOMISER TUBE LEAKAGE

Duration pattern of forced outages due to Economizer tube leakage problems during the last three years is shown below:

Period in days	2013-14(539 units)			2014-15(571 units)			2015-16(617 Units)		
	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)	No. of Units	No. of Outage	Loss (MU)
Upto-2 days	98	198	973.69	83	140	666.87	91	164	948.96
>2 & up to 3	32	37	413.83	37	41	654.91	36	44	626.94
>3 & up to 4	15	16	303.94	19	23	447.39	14	17	230.15
>4 & up to 5	5	5	128.44	9	9	242.05	5	5	137.67
>5 & up to 6	8	8	206.78	4	4	205.36	6	8	137.62
>6 & up to 7	4	4	107.29	4	4	118.34	2	2	40.25
>7 & up to 14	11	14	767.2	6	6	201.07	4	4	228.10
>14 & up to 21	2	3	206.67	2	3	157.8	8	8	759.48
>21 & up to 28	0	0		0	0		1	1	28.76
>28 & up to 30	0	0		0	0		1	1	34.74
> 30 days	0	0		2	2	415.43	3	3	2413.15
Total	142	286	3116.08	129	236	3302.18	131	258	5620.78

4.9 BOILER TUBE LEAKAGE DURATION PATTERN (CAPACITY GROUPWISE)

Capacity group-wise details of boiler tube leakage problems during the year 2015-16 are given below:

Capacity (MW)	No. of Units Reviewed	Water Wall		Super heater		Re-heater		Economizer		Total	
		No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages
660-800	45	14	37	4	4	3	5	0	0	18	46
490-600	118	71	172	16	21	28	52	24	35	85	280
300-360	37	14	29	4	5	1	1	0	0	16	35
250-270	64	38	87	7	9	9	14	16	25	43	135
210-210	143	98	237	20	37	25	46	45	97	116	417
195-200	25	16	35	6	6	6	8	5	7	21	56
100-150	102	41	131	14	36	9	13	20	37	50	217

Capacity (MW)	No. of Units Reviewed	Water Wall		Super heater		Re-heater		Economizer		Total	
		No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages	No. of Units involved	No. of Outages
25-99	83	32	110	16	28	5	5	21	57	41	200
Total	617	324	838	87	146	86	144	131	258	390	1386

It is seen that the incidences of tube failures have been significantly lower in the supercritical units (660-800 MW group) amongst all capacity groups.

4.10 FORCED OUTAGE – UTILITY WISE

The forced outages of thermal generating units under various Central Sector Utilities, Private Sector and State Electricity Boards- /-Power Generating Corporations, is given below:

Sl. No.	Organization/ Utility	No. of Units under Review	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Loss as % of Max. Possible generation of review capacity
CENTRAL SECTOR								
1	NTPC Ltd.	100	34385	98	34175	97323.1	21384.1	7.4
2	DVC	24	7400	23	6800	74548.6	20396.4	37.45
3	NLC	22	3240	22	3240	27077.65	4061.79	14.65
4	APCPL	3	1500	3	1500	7945.28	3972.64	30.15
5	NTECL	3	1500	3	1500	5028.55	2514.28	19.08
6	NTPL	2	1000	2	1000	4230.24	2115.12	36.12
7	PVUNL	10	770	10	770	78825	5809.73	85.9
8	NSPCL	2	500	0	0	0	0	0
9	K.B.U.N.L	2	220	2	220	9967.92	1096.47	56.74
CENTRAL SECTOR TOTAL		168	50515	163	49205	404732	61350	14.74
STATE SECTOR								
NORTHERN REGION								
1	HPGCL	12	3160	12	3160	58978	13006.2	48.54
2	IPGPCL	2	135	2	135	16688.7	1126.49	94.99

Sl. No.	Organization/ Utility	No. of Units under Review	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Loss as % of Max. Possible generation of review capacity
3	PSPCL	14	2620	14	2620	75526	13672	59.41
4	RRVUNL	21	5190	20	5065	93683.1	12424.3	28.35
5	UPRVUNL	26	4923	23	4429	50308.3	5896.45	13.64
WESTERN REGION								
6	CSPGCL	14	2780	13	2280	16985	1654.92	7.09
7	GMDCL	2	250	2	250	1498.08	187.26	8.53
8	GSECL	26	4720	26	4720	99139.9	16666.3	42.85
9	MAHAGENCO	34	9060	34	9060	106404	20839.7	27.7
10	MPPGCL	14	4080	14	4080	38566.5	11415.3	31.85
SOUTHERN REGION								
11	APGENCO	12	2810	12	2810	2192.9	566.92	2.3
12	APPDCL	2	1600	2	1600	5173.15	4138.52	37.23
13	KPCL	10	2720	10	2720	10766.7	2703.83	11.32
14	TNGDCL	20	4770	20	4770	42509.4	5882.85	14.04
15	TSGENCO	14	2882.5	14	2882.5	4865.18	775.07	3.87
EASTERN REGION								
16	DPL	6	880	6	880	43378.2	5139.08	66.48
17	OPGC	2	420	2	420	701.6	147.34	3.99
18	TVNL	2	420	2	420	2198.87	461.76	12.52
19	WBPDC	24	4340	24	4340	75334.8	11347.2	29.77
NORTH EASTERN REGION								
20	APGPCL	2	60	2	60	17568	527.04	100
STATE SECTOR TOTAL		259	57820.5	254	56702	762466	128579	26.3
PVT SECTOR								
WESTERN REGION								
1	RIL (DAHANU)	2	500	2	500	853.55	213.39	4.86
2	TATA PCL	4	1400	4	1400	17397.3	5607.07	45.59
3	TOR. POW. (UNOSUGEN)	5	422	5	422	6028.23	513.34	13.91

Sl. No.	Organization/ Utility	No. of Units under Review	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Loss as % of Max. Possible generation of review capacity
EASTERN REGION								
4	CESC	13	1285	13	1285	35483.2	1442.3	12.78
PVT TOTAL		24	3607	24	3607	140855	7776.1	24.56
IPPs								
NORTHERN REGION								
1	APL	2	1320	2	1320	902.16	595.43	5.14
2	BEPL	10	450	10	450	31777.1	1429.97	36.18
3	JhPL(HR)	2	1320	2	1320	6833.43	4510.06	38.9
4	LAPPL	2	1200	2	1200	1396.71	838.03	7.95
5	LPGCL	1	660	1	660	3466.1	867.15	85.0
6	NPL	2	1400	2	1400	1848.59	1294.01	10.52
7	PPGCL (Jaypee)	1	660	1	660	581.48	383.78	93.36
8	RPSCL	4	1200	4	1200	8168.09	2450.43	23.25
9	RWPL (JSW)	8	1080	8	1080	7680.03	1036.8	10.93
10	TSPL	3	1980	2	1320	20397.5	3129.72	40.49
WESTERN REGION								
11	ACB	3	300	3	300	2346.47	254.76	9.67
12	AMNEPL	4	246	4	246	35136	2160.86	100
12	APL	14	7920	14	7920	10543.3	6302.25	9.06
13	BALCO	2	600	2	600	973.13	291.94	14.74
14	BLAPPL	1	45	1	45	4072.76	183.27	46.37
15	CGPL	5	4000	5	4000	5746.12	4596.9	13.08
16	DBPCL	2	1200	2	1200	3202.91	1835.35	34.82
17	DIPL	2	600	2	600	15011.4	4503.42	85.45
18	EPGL	2	1200	2	1200	3254.3	1952.58	18.52
19	ESSARPMPL	1	600	1	600	8784	5270.4	100
20	GCEL	1	685	1	685	5832.71	3995.41	79.68
21	GEPL	2	120	2	120	17568	1054.08	100

Sl. No.	Organization/ Utility	No. of Units under Review	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Loss as % of Max. Possible generation of review capacity
22	GIPCL	4	500	4	500	5029.1	628.64	14.31
23	GMR ENERG	2	600	2	600	482.15	144.64	2.74
24	IEPL	1	270	1	270	8784	2371.68	100
25	JPL	7	2800	7	2800	27643.8	12835	52.18
26	JPPVL	4	1820	4	1820	15597.7	6058.29	37.9
27	JSWEL	4	1200	4	1200	2053.37	616.01	5.84
28	KWPCL	1	600	1	600	6748.45	4049.07	76.83
29	LANCO	2	600	2	600	6141.79	1842.54	34.96
30	MBPMPL	1	600	1	600	2371.62	1422.97	32.4
31	MCCPL	1	300	1	300	1431.70	429.51	24.45
32	RKMPPPL	2	720	1	360	3024	0	0
33	Rattan India	5	1350	5	1350	16023.1	4326.23	36.48
34	SCPL	1	50	1	50	2649.99	132.5	30.17
35	SPL	6	3960	6	3960	3444.86	2273.61	6.54
36	STPL	1	270	1	270	8784	2371.68	100
37	SVPPPL	1	63	1	63	7385.16	465.27	84.08
38	VESPL	1	35	1	35	8784	307.44	100
39	VIP	2	600	2	600	401.82	120.55	2.29
40	VVL	1	135	1	135	8784	1185.84	100
41	WPCL	6	1740	6	1740	21911.5	5130.55	33.57
SOUTHERN REGION								
42	CEPL	2	1200	2	1200	6493.23	2063.54	31.36
43	HNPC	1	520	1	520	1155.94	601.09	52.93
44	IBPIL	2	300	2	300	9353.62	1403.04	53.24
45	ITPCL	1	600	1	600	681.75	409.05	18.69
45	JSWEL	4	860	4	860	615.62	93.05	1.23
46	MEL	2	300	2	300	1671.09	250.66	9.51
47	SEIL	2	1320	2	1320	12863.9	1314.03	14.33

Sl. No.	Organization/ Utility	No. of Units under Review	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Loss as % of Max. Possible generation of review capacity
48	SEPL	4	600	4	600	3953.01	592.95	11.25
49	ST-CMSECP	1	250	1	250	576.02	144	6.56
50	UPCL	2	1200	2	1200	2140.69	1284.41	12.19
EASTERN REGION								
51	ADHUNIK	2	540	2	540	3203.06	864.83	18.23
51	GMR ENERG	3	1050	3	1050	2322.46	812.86	8.81
52	HEL	2	600	2	600	1934.34	580.3	11.01
53	JITPL	2	1200	2	1200	3570.45	2142.27	20.32
54	MPL	2	1050	2	1050	931.59	489.08	5.3
55	SEL	4	2400	4	2400	10035.7	6021.4	28.56
56	TATA PCL	3	360	3	360	22.96	2.76	0.09
IPPs TOTAL		166	61349	164	60329	514095	114718	23.43
ALL INDIA		617	173292	605	169843	1822149.24	312423.01	21.9

4.11 REGION WISE PERFORMACNE

The performance of thermal units installed in the Southern Region was best as the non-availability due to forced outages was least (12.14%) & the worst was Western region where it is 24.46%.The region wise summary of forced outages of thermal generating units is given below:

Sl. No.	REGION	No. of Units	Capacity (MW)	FORCED OUTAGE				
				No. of Units	Capacity (MW)	Duration (Hrs.)	Energy Loss(MU)	Energy Loss as % of Max. Possible generation OF Regional capacity
1	NORTHERN	148	38063	143	36784	436232	75664.87	24.3
2	WESTERN	222	70781	218	69421	778415	145547.01	24.46
3	SOUTHERN	115	32022.5	115	32022.5	239457	31150.01	12.14
4	EASTERN	130	32365	127	31555	350477	59534.08	22.62
5	NORTH EASTERN	2	60	2	60	17568	527.04	100

	ALL INDIA	617	173291.5	605	169843	1822149.24	312423.01	21.9
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Annexure 4.1

**REGION-WISE FREQUENCY OF OUTAGES/ TRIPPING OF EQUIPMENT AND RELATED ENERGY LOSS
DURING 2014-15 AND 2015-16**

Particulars of outages	Northern Region		Western Region		Southern Region		Eastern Region		North- Eastern Region		All India	
	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16
I. Boiler												
1. No. of outages	746	703	854	746	577	570	508	601	0	0	2685	2620
2. MU Loss	9517.49	11997.72	17272.7	15785.6 4	6746.42	8817.56	13807.76	10129.12	0	0	47344.38	46730.05
3. % age of total F.O	18.07	15.86	15.25	10.85	33.8	28.31	25.51	17.01	0	0	19.68	14.96
II. Turbine												
1. No. of outages	158	143	194	205	126	189	83	97	0	0	561	634
2. MU Loss	3731.05	1494.73	7598.87	5161.24	2570.78	3276.38	2706.2	3589.23	0	0	16606.91	13521.58
3. % age of total F.O	7.09	1.98	6.71	3.55	12.88	10.52	5	6.03	0	0	6.9	4.33
III. Generator												
1. No. of outages	146	122	134	107	118	127	77	90	0	0	475	446
2. MU Loss	3980.58	3913.94	5503.38	3510.4	4989.52	2076.12	9545.78	3526.16	0	0	24019.25	13026.62

[illegible]

Particulars of outages	Northern Region		Western Region		Southern Region		Eastern Region		North- Eastern Region		All India	
	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16
1. No. of outages	1828	1703	1840	1752	1153	1367	1034	1248	2	2	5857	6072
2. MU Loss	27213.32	30103.38	88485.73	93198.44	19473.29	27456.07	48279.25	47724.23	525.6	527.04	183977.18	199009.16
3. FO Loss as % of Max. Possible Gen.	9.55	10.21	18.16	17.35	9.47	11.52	20.08	18.28	100	100	14.56	13.91
VIII. Reserve Shutdown												
1. No. of outages	354	403	228	301	14	102	82	128	0	0	676	934
2. MU Loss	25445.15	45561.52	24797.16	52348.57	488.61	3693.94	6218.88	11809.83	0	0	56573.77	113,413.88
3. % age of total F.O	48.32	60.21	21.89	35.97	2.45	11.86	11.49	19.84	0	0.00	23.67	36.31
IX. Total including RSD												
1. No. of outages	2182	2106	2068	2053	1167	1469	1114	1376	2	2	6533	7006
2. MU Loss	52658.47	75664.9	113282.89	145547.01	19961.9	31150.01	54122.09	59534.06	525.6	527.04	240550.95	312423.04
3. FO Loss as % of Max. Possible Gen.	17.88	24.3	22.32	24.46	9.5	12.14	21.64	22.62	100	100	19.05	21.9

Annexure-4.2**DURATION PATTERN OF FORCED OUTAGES****All India:-**

Number of units considered	:	617
Number of units involved	:	605
All India possible generation	:	1426614.58 MU
All India energy loss on account of forced outage	:	312423.04 MU

DURATION	No. of units	No. of Outages	MU loses	% OF All India F.O. Loss	% All India Poss. gen
Upto 3 Hrs	376	1423	601.71	0.19	0.04
>3 & up to 6 Hrs	349	894	1075.53	0.34	0.07
>6 & up to 12 Hrs	267	540	1283.37	0.41	0.08
>12 & up to 18 Hrs	183	275	1085.86	0.35	0.07
>18 & up to 24 Hrs	182	284	1389.56	0.44	0.09
>1 & up to 2 Days	369	998	8858.98	2.84	0.68
>2 & up to 3 Days	316	602	9326.45	2.99	0.61
>3 & up to 4 Days	229	362	8737.89	2.80	0.58
>4 & up to 5 Days	160	225	7893.12	2.53	0.52
>5 & up to 6 Days	115	150	6198.95	1.98	0.41
>6 & up to 7 Days	109	132	5732.16	1.83	0.48
>7 & up to 8 Days	70	87	4204.85	1.35	0.28
>8 & up to 9 Days	72	84	4451.72	1.42	0.29
>9 & up to 10 Days	71	84	5428.6	1.74	0.46
>10 & up to 11 Days	47	50	3567.94	1.14	0.24
>11 & up to 12 Days	46	48	4042.6	1.29	0.29
>12 & up to 13 Days	39	41	3250.6	1.04	0.21
>13 & up to 14 Days	43	45	3209.05	1.03	0.21
>14 & up to 15 Days	32	33	3102.47	0.99	0.20

DURATION	No. of units	No. of Outages	MU loses	% OF All India F.O. Loss	% All India Poss. gen
>15 & up to 16 Days	28	30	3020.38	0.97	0.20
>16 & up to 17 Days	25	29	3298.98	1.06	0.23
>17 & up to 18 Days	18	19	1862.13	0.60	0.12
>18 & up to 19 Days	19	21	3021.8	0.97	0.20
>19 & up to 20 Days	38	38	3163.33	1.01	0.21
>20 & up to 21 Days	21	22	2420.93	0.77	0.16
>21 & up to 22 Days	18	18	2599.75	0.83	0.19
>22 & up to 23 Days	16	16	2453.6	0.95	0.21
>23 & up to 24 Days	12	13	2079.87	0.67	0.15
>24 & up to 25 Days	12	13	2168.8	0.66	0.16
Over 25 Days	271	422	202892.06	64.94	14.22
Total	605	7006	312423.04	100	21.90

Annexure-4.2

Northern Region

Number of units in the Region : 148

Number of units involved : 143

Regional possible generation : 311352.43 MU

Regional energy loss on account of forced : 75664.87 MU

Duration	No of units	No of outages	Loss(MU)	% age of Regional F.O. loss	% age of Regional possible generation	% of All India F.O. loss	% of possible All India generation
Upto 3 Hrs	106	536	156.42	0.2	0.05	0.05	0.01
>3 & up to 6 Hrs	88	276	253.48	0.34	0.08	0.08	0.02
>6 & up to 12 Hrs	75	174	331.24	0.44	0.11	0.11	0.02
>12 & up to 18 Hrs	49	66	265.88	0.35	0.09	0.09	0.02
>18 & up to 24 Hrs	44	57	262.94	0.35	0.08	0.08	0.02
>1 & up to 2 Days	95	240	2234.75	2.95	0.72	0.72	0.16
>2 & up to 3 Days	80	162	2183.29	2.89	0.7	0.7	0.15

>3 & up to 4 Days	62	100	2273.16	3	0.73	0.73	0.16
>4 & up to 5 Days	41	50	1552.67	2.05	0.5	0.5	0.11
>5 & up to 6 Days	33	40	2036.97	2.69	0.65	0.65	0.14
>6 & up to 7 Days	19	20	807.54	1.07	0.26	0.26	0.06
>7 & up to 8 Days	25	29	1228.46	1.62	0.39	0.39	0.09
>8 & up to 9 Days	27	32	1248.47	1.65	0.4	0.4	0.09
>9 & up to 10 Days	27	34	1815.53	2.4	0.58	0.58	0.13
>10 & up to 11 Days	10	11	798.54	1.06	0.26	0.26	0.06
>11 & up to 12 Days	15	16	1143.92	1.51	0.37	0.37	0.08
>12 & up to 13 Days	14	15	1384.92	1.83	0.44	0.44	0.1
>13 & up to 14 Days	13	14	791.78	1.05	0.25	0.25	0.06
>14 & up to 15 Days	15	16	1557.58	2.06	0.5	0.5	0.11
>15 & up to 16 Days	11	11	610.37	0.81	0.2	0.2	0.04
>16 & up to 17 Days	7	8	657.42	0.87	0.21	0.21	0.05
>17 & up to 18 Days	2	2	80.87	0.11	0.03	0.03	0.01
>18 & up to 19 Days	5	6	618.65	0.82	0.2	0.2	0.04
>19 & up to 20 Days	14	14	762.97	1.01	0.25	0.24	0.05
>20 & up to 21 Days	7	7	730.7	0.97	0.23	0.23	0.05
>21 & up to 22 Days	9	9	865.73	1.14	0.28	0.28	0.06
>22 & up to 23 Days	3	3	574.32	0.76	0.18	0.18	0.04
>23 & up to 24 Days	6	7	1270.87	1.68	0.41	0.41	0.09
>24 & up to 25 Days	3	3	651.26	0.86	0.21	0.21	0.05
Over 25 Days	78	148	46517.17	61.48	14.94	14.89	3.26
Total	143	2106	75664.87	100	24.30	24.22	5.33

Annexure-4.2**Western Region**

Number of units in the Region : 222

Number of units involved : 218

Regional possible generation : 595068.02 MU

Regional energy loss on account of forced : 145547.01 MU

Duration	No of units	No of outages	Loss(MU)	% age of Regional F.O. loss	% age of Regional possible generation	% of All India F.O. loss	% of possible All India generation
Upto 3 Hrs	120	343	197.88	0.14	0.03	0.06	0.01
>3 & up to 6 Hrs	116	245	364.99	0.24	0.06	0.11	0.02
>6 & up to 12 Hrs	83	137	391.72	0.26	0.06	0.12	0.03
>12 & up to 18 Hrs	53	72	290.35	0.2	0.05	0.09	0.02
>18 & up to 24 Hrs	44	74	419.78	0.28	0.07	0.13	0.03
>1 & up to 2 Days	108	303	2541.54	1.75	0.43	0.81	0.18
>2 & up to 3 Days	98	184	2800.6	1.92	0.47	0.9	0.2
>3 & up to 4 Days	81	127	3216.99	2.21	0.54	1.03	0.23
>4 & up to 5 Days	53	72	2876.08	1.92	0.47	0.89	0.2
>5 & up to 6 Days	37	41	1785.89	1.2	0.29	0.56	0.12
>6 & up to 7 Days	28	33	1628.19	1.02	0.25	0.48	0.1
>7 & up to 8 Days	24	32	2108.39	1.37	0.34	0.64	0.14
>8 & up to 9 Days	21	23	1800.38	1.24	0.3	0.58	0.13
>9 & up to 10 Days	23	25	1654.53	1.14	0.28	0.53	0.12
>10 & up to 11 Days	15	15	1068.38	0.73	0.18	0.34	0.07
>11 & up to 12 Days	11	12	1140.71	0.78	0.19	0.36	0.08
>12 & up to 13 Days	14	15	1521.07	1.05	0.26	0.49	0.11
>13 & up to 14 Days	16	17	1717.32	1.18	0.29	0.55	0.12
>14 & up to 15 Days	7	7	792.18	0.54	0.13	0.25	0.06
>15 & up to 16 Days	7	7	617.24	0.42	0.1	0.2	0.04

>16 & up to 17 Days	9	11	1739.15	1.11	0.27	0.52	0.11
>17 & up to 18 Days	10	10	1207.57	0.83	0.2	0.39	0.08
>18 & up to 19 Days	8	9	1440.14	0.99	0.24	0.46	0.1
>19 & up to 20 Days	11	11	1267.19	0.87	0.21	0.41	0.09
>20 & up to 21 Days	7	7	1184.88	0.81	0.2	0.38	0.08
>21 & up to 22 Days	4	4	1264.21	0.87	0.21	0.4	0.09
>22 & up to 23 Days	9	9	1959.86	1.35	0.33	0.63	0.14
>23 & up to 24 Days	5	5	690.63	0.47	0.12	0.22	0.05
>24 & up to 25 Days	5	5	576.02	0.4	0.1	0.18	0.04
Over 25 Days	109	198	105283.15	72.71	17.78	33.87	7.42
Total	218	2053	145547.01	100	24.46	46.59	10.21

Annexure-4.2

Southern Region

Number of units in the Region	:	115
Number of units involved	:	115
Regional possible generation	:	256526.52 MU
Regional energy loss on account of forced	:	31150.01 MU

Duration	No of units	No of outages	Loss(MU)	% age of Regional F.O. loss	% age of Regional possible generation	% of All India F.O. loss	% of possible All India generation
Upto 3 Hrs	76	256	109.39	0.35	0.04	0.04	0.01
>3 & up to 6 Hrs	67	169	204.03	0.65	0.08	0.07	0.01
>6 & up to 12 Hrs	56	121	270.43	0.87	0.11	0.09	0.02
>12 & up to 18 Hrs	50	91	311.64	1	0.12	0.1	0.02
>18 & up to 24 Hrs	54	105	398.27	1.28	0.16	0.13	0.03
>1 & up to 2 Days	85	270	2307.3	7.41	0.9	0.74	0.16
>2 & up to 3 Days	73	144	2432.51	7.81	0.95	0.78	0.17
>3 & up to 4 Days	48	74	1876.84	6.03	0.73	0.6	0.13
>4 & up to 5 Days	34	48	1641.39	5.27	0.64	0.53	0.12

>5 & up to 6 Days	21	31	1141.77	3.67	0.45	0.37	0.08
>6 & up to 7 Days	20	23	754.59	2.42	0.29	0.24	0.05
>7 & up to 8 Days	17	21	1146.75	3.68	0.45	0.37	0.08
>8 & up to 9 Days	16	19	1026	3.29	0.4	0.33	0.07
>9 & up to 10 Days	9	11	787.16	2.53	0.31	0.25	0.06
>10 & up to 11 Days	12	13	972.93	3.12	0.38	0.31	0.07
>11 & up to 12 Days	11	11	704.96	2.26	0.27	0.23	0.05
>12 & up to 13 Days	5	5	283.78	0.91	0.11	0.09	0.02
>13 & up to 14 Days	5	5	379.66	1.22	0.15	0.12	0.03
>14 & up to 15 Days	5	5	432.12	1.39	0.17	0.14	0.03
>15 & up to 16 Days	3	3	713.26	2.29	0.28	0.23	0.05
>16 & up to 17 Days	1	1	195.66	0.63	0.08	0.06	0.01
>17 & up to 18 Days	3	3	180.35	0.58	0.07	0.06	0.01
>18 & up to 19 Days	2	2	584.26	1.88	0.23	0.19	0.04
>19 & up to 20 Days	5	5	645.91	2.07	0.25	0.21	0.05
>20 & up to 21 Days	1	1	121.61	0.39	0.05	0.04	0.01
>21 & up to 22 Days	1	1	314.54				
>22 & up to 23 Days	0	0					
>23 & up to 24 Days	0	0					
>24 & up to 25 Days	0	0					
Over 25 Days	14	31	11527.46	37.01	4.49	3.69	0.81
Total	115	1469	31150.01	100	12.14	9.97	2.18

Annexure-4.2**Eastern Region**

Number of units in the Region	:	130
Number of units involved	:	127
Regional possible generation	:	263140.56 MU
Regional energy loss on account of forced	:	59534.08 MU

Duration	No of units	No of outages	Loss(MU)	% age of Regional F.O. loss	% age of Regional possible generation	% of All India F.O. loss	% of possible All India generation
Upto 3 Hrs	75	287	131.86	0.22	0.05	0.04	0.01
>3 & up to 6 Hrs	79	206	231.19	0.39	0.09	0.07	0.02
>6 & up to 12 Hrs	53	107	241.07	0.4	0.09	0.08	0.02
>12 & up to 18 Hrs	31	46	187.18	0.31	0.07	0.06	0.01
>18 & up to 24 Hrs	39	47	255.16	0.43	0.1	0.08	0.02
>1 & up to 2 Days	76	168	1666.98	2.8	0.63	0.53	0.12
>2 & up to 3 Days	62	109	1801.58	3.03	0.68	0.58	0.13
>3 & up to 4 Days	36	61	1239.62	2.08	0.47	0.4	0.09
>4 & up to 5 Days	29	52	1636.32	2.75	0.62	0.52	0.11
>5 & up to 6 Days	23	37	1254.31	2.11	0.48	0.4	0.09
>6 & up to 7 Days	15	17	670.8	1.13	0.25	0.21	0.05
>7 & up to 8 Days	24	38	1148.94	1.93	0.44	0.37	0.08
>8 & up to 9 Days	8	10	355.28	0.6	0.14	0.11	0.02
>9 & up to 10 Days	11	12	864	1.45	0.33	0.28	0.06
>10 & up to 11 Days	10	11	828.08	1.39	0.31	0.27	0.06
>11 & up to 12 Days	8	8	779.3	1.31	0.3	0.25	0.05
>12 & up to 13 Days	6	6	460.83	0.77	0.18	0.15	0.03
>13 & up to 14 Days	9	9	820.29	1.38	0.31	0.26	0.06
>14 & up to 15 Days	6	6	720.59	1.21	0.27	0.23	0.05
>15 & up to 16 Days	7	9	1179.51	1.98	0.45	0.38	0.08

>16 & up to 17 Days	7	7	585.5	0.98	0.22	0.19	0.04
>17 & up to 18 Days	3	4	393.34	0.66	0.15	0.13	0.03
>18 & up to 19 Days	4	4	579.75	0.97	0.22	0.19	0.04
>19 & up to 20 Days	8	8	686.46	1.15	0.26	0.22	0.05
>20 & up to 21 Days	6	7	583.73	0.98	0.22	0.19	0.04
>21 & up to 22 Days	4	4	355.26	0.6	0.14	0.11	0.02
>22 & up to 23 Days	4	4	420.12	0.71	0.16	0.13	0.03
>23 & up to 24 Days	1	1	118.38	0.2	0.04	0.04	0.01
>24 & up to 25 Days	4	5	841.38	1.41	0.32	0.27	0.06
Over 25 Days	60	86	38497.25	64.66	14.63	12.32	2.7
Total	127	1376	59534.06	100	22.62	19.06	4.17

North Eastern Region

Number of units in the Region	:	2
Number of units involved	:	2
Regional possible generation	:	527.04 MU
Regional energy loss on account of forced	:	527.04 MU

Duration	No of units	No of outages	Loss(MU)	% age of Regional F.O. loss	% age of Regional possible generation	% of All India F.O. loss	% of possible All India generation
Over 25 Days	2	2	27.04	100	100	0.17	0.04
Total	2	2	527.04	100	100	0.17	0.04

Annexure-4.3**DETAILS OF LONG DURATION FORCED OUTAGES (25 DAYS & ABOVE) DURING 2015-16**

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
NORTHERN REGION									
BADARPUR TPS	4	210	10-Oct-15	2-Dec-15	53	1271.63	RSD/LOW SCHEDULE	267.04	14.48
BADARPUR TPS	4	210	12-Dec-15	31-Mar-16	110	2650.75	RSD/LOW SCHEDULE	556.66	30.18
BADARPUR TPS	5	210	1-Apr-15	10-May-15	40	957.07	RSD/LOW SCHEDULE	200.98	10.9
BADARPUR TPS	1	95	1-Apr-15	31-Mar-16	366	8784	POLLUTION PROBLEM	834.48	100
BADARPUR TPS	2	95	11-May-15	23-Sep-15	135	3230.73	RSD/LOW SCHEDULE	306.92	36.78
BADARPUR TPS	2	95	24-Sep-15	31-Mar-16	189	4540.13	POLLUTION PROBLEM	431.31	51.69
BADARPUR TPS	3	95	3-Aug-15	20-Sep-15	47	1133.17	RSD/LOW SCHEDULE	107.65	12.9
BADARPUR TPS	3	95	9-Oct-15	31-Mar-16	174	4180.13	POLLUTION PROBLEM	397.11	47.59
BARKHERA TPS	1	45	14-Nov-15	9-Feb-16	88	2101.13	RSD/LOW SCHEDULE	94.55	23.92
BARKHERA TPS	2	45	14-Nov-15	5-Feb-16	83	2002	RSD/LOW SCHEDULE	90.09	22.79
CHHABRA TPP	1	250	18-Aug-15	10-Mar-16	204	4905.52	GEN. TRANSFORMER TRIPPING/ DAMAGED	1226.38	55.85
CHHABRA TPP	3	250	5-May-15	3-Jun-15	29	705.25	MILLING SYSTEM /RC FEEDER PROBLEM	176.31	8.03

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
DADRI (NCTPP)	6	490	22-Nov-15	14-Jan-16	53	1281.48	RSD/LOW SCHEDULE	627.93	14.59
DADRI (NCTPP)	1	210	4-Mar-16	31-Mar-16	28	671.8	RSD/LOW SCHEDULE	141.08	7.65
DADRI (NCTPP)	1	210	22-Oct-15	4-Dec-15	42	1016.72	RSD/LOW SCHEDULE	213.51	11.57
DADRI (NCTPP)	1	210	30-Jul-15	26-Aug-15	26	633.23	RSD/LOW SCHEDULE	132.98	7.21
DADRI (NCTPP)	2	210	18-Oct-15	15-Jan-16	89	2143.42	RSD/LOW SCHEDULE	450.12	24.4
DADRI (NCTPP)	2	210	25-Feb-16	28-Mar-16	32	774.93	RSD/LOW SCHEDULE	162.74	8.82
DADRI (NCTPP)	3	210	22-Sep-15	14-Dec-15	83	2000.67	RSD/LOW SCHEDULE	420.14	22.78
GH TPS (LEH.MOH.)	3	250	7-Nov-15	22-Dec-15	45	1075.77	RSD/LOW SCHEDULE	268.94	12.25
GH TPS (LEH.MOH.)	3	250	29-Jan-16	31-Mar-16	61	1475.65	RSD/LOW SCHEDULE	368.91	16.8
GH TPS (LEH.MOH.)	4	250	1-Aug-15	28-Aug-15	27	646.07	RSD/LOW SCHEDULE	161.52	7.36
GH TPS (LEH.MOH.)	4	250	1-Feb-16	28-Mar-16	57	1356.55	RSD/LOW SCHEDULE	339.14	15.44
GH TPS (LEH.MOH.)	4	250	12-May-15	17-Jun-15	36	857.47	RSD/LOW SCHEDULE	214.37	9.76
GH TPS (LEH.MOH.)	1	210	3-Feb-16	28-Mar-16	54	1290.35	RSD/LOW SCHEDULE	270.97	14.69
GH TPS (LEH.MOH.)	1	210	12-Oct-15	19-Dec-15	67	1616.17	RSD/LOW SCHEDULE	339.4	18.4
GH TPS (LEH.MOH.)	1	210	16-Apr-15	4-Jun-15	49	1177.78	UNIT AUX. TRANSFORMER PROBLEM	247.33	13.41
GH TPS (LEH.MOH.)	1	210	22-Dec-15	19-Jan-16	28	678.47	RSD/LOW SCHEDULE	142.48	7.72
GH TPS (LEH.MOH.)	2	210	5-Mar-16	31-Mar-16	27	637.53	RSD/LOW SCHEDULE	133.88	7.26
GH TPS (LEH.MOH.)	2	210	14-Oct-15	17-Dec-15	64	1531.8	RSD/LOW SCHEDULE	321.68	17.44
GH TPS (LEH.MOH.)	2	210	23-Dec-15	4-Mar-16	72	1737.75	RSD/LOW SCHEDULE	364.93	19.78

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
GIRAL TPS	2	125	8-Nov-15	15-Dec-15	37	877.03	WATER WALL TUBE LEAKAGE	109.63	9.98
GND TPS(BHATINDA)	1	110	3-Nov-15	31-Mar-16	150	3588.92	RSD/LOW SCHEDULE	394.78	40.86
GND TPS(BHATINDA)	1	110	19-Sep-15	29-Oct-15	40	951.25	RSD/LOW SCHEDULE	104.64	10.83
GND TPS(BHATINDA)	1	110	29-Apr-15	31-May-15	32	772.08	ASH HANDLING SYSTEM PROBLEM	84.93	8.79
GND TPS(BHATINDA)	2	110	1-Feb-16	31-Mar-16	60	1433.48	RSD/LOW SCHEDULE	157.68	16.32
GND TPS(BHATINDA)	2	110	2-Dec-15	22-Jan-16	51	1220.72	RSD/LOW SCHEDULE	134.28	13.9
GND TPS(BHATINDA)	2	110	6-Apr-15	18-Jun-15	72	1738.05	RSD/LOW SCHEDULE	191.19	19.79
GND TPS(BHATINDA)	2	110	16-Sep-15	30-Oct-15	44	1046.82	RSD/LOW SCHEDULE	115.15	11.92
GND TPS(BHATINDA)	2	110	25-Jul-15	28-Aug-15	34	811.53	RSD/LOW SCHEDULE	89.27	9.24
GND TPS(BHATINDA)	3	110	1-Feb-16	31-Mar-16	59	1421.45	RSD/LOW SCHEDULE	156.36	16.18
GND TPS(BHATINDA)	3	110	6-Jul-15	29-Aug-15	53	1283.93	RSD/LOW SCHEDULE	141.23	14.62
GND TPS(BHATINDA)	3	110	28-Oct-15	6-Jan-16	70	1670.17	RSD/LOW SCHEDULE	183.72	19.01
GND TPS(BHATINDA)	4	110	10-Dec-15	13-Jan-16	34	820.23	RSD/LOW SCHEDULE	90.23	9.34
GND TPS(BHATINDA)	4	110	22-Jan-16	31-Mar-16	69	1646.25	RSD/LOW SCHEDULE	181.09	18.74
GND TPS(BHATINDA)	4	110	24-Apr-15	15-Jun-15	52	1245.03	WATER WALL TUBE LEAKAGE	136.95	14.17
GND TPS(BHATINDA)	4	110	30-Oct-15	28-Nov-15	29	702.62	RSD/LOW SCHEDULE	77.29	8
HARDUAGANJ TPS	7	105	30-Nov-15	7-Jan-16	38	905.65	RSD/LOW SCHEDULE	95.09	10.31
HARDUAGANJ TPS	5	60	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR	527.04	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
							OPERATION		
INDIRA GANDHI STPP	1	500	27-Aug-15	23-Oct-15	58	1381.07	RSD/LOW SCHEDULE	690.54	15.72
INDIRA GANDHI STPP	1	500	28-Oct-15	15-Jan-16	79	1904.67	RSD/LOW SCHEDULE	952.34	21.68
INDIRA GANDHI STPP	2	500	1-Apr-15	18-May-15	47	1138.83	RSD/LOW SCHEDULE	569.42	12.96
INDIRA GANDHI STPP	2	500	2-Mar-16	31-Mar-16	30	719.98	RSD/LOW SCHEDULE	359.99	8.2
INDIRA GANDHI STPP	2	500	30-Jul-15	27-Aug-15	28	660.17	RSD/LOW SCHEDULE	330.09	7.52
INDIRA GANDHI STPP	3	500	18-May-15	2-Jul-15	45	1069.22	RSD/LOW SCHEDULE	534.61	12.17
KALISINDH TPS	1	600	26-Jul-15	30-Aug-15	35	843.23	FUEL SUPPLY & OTHER MISC. PROBLEMS	505.94	9.6
KALISINDH TPS	2	600	12-Nov-15	31-Mar-16	140	3360	RSD/LOW SCHEDULE	490.23	13.95
KHAMBARKHERA TPS	1	45	14-Nov-15	20-Feb-16	99	2365.23	RSD/LOW SCHEDULE	106.44	26.93
KHAMBARKHERA TPS	2	45	14-Nov-15	5-Feb-16	83	2001	RSD/LOW SCHEDULE	90.05	22.78
KOTA TPS	5	210	25-Jun-15	4-Aug-15	41	976.22	RSD/LOW SCHEDULE	205.01	11.11
KOTA TPS	1	110	6-Mar-16	31-Mar-16	26	622.92	RSD/LOW SCHEDULE	68.52	7.09
KOTA TPS	2	110	6-Mar-16	31-Mar-16	26	615.3	RSD/LOW SCHEDULE	67.68	7
KOTA TPS	2	110	17-Dec-15	16-Jan-16	30	724.37	RSD/LOW SCHEDULE	79.68	8.25
KOTA TPS	2	110	30-May-15	8-Jul-15	39	930.68	CONDENSER LOW VACCUM	102.37	10.59
KUNDARKI TPS	2	45	2-Dec-15	25-Feb-16	86	2053.13	RSD/LOW SCHEDULE	92.39	23.37
LALITPUR TPS	1	660	14-Nov-15	31-Mar-16	139	3336	RSD/LOW SCHEDULE	433.57	88.3
MAHATMA GANDHI TPS	1	660	7-Aug-15	9-Sep-15	34	811.03	RSD/LOW SCHEDULE	535.28	9.23

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
MAHATMA GANDHI TPS	1	660	19-Feb-16	17-Mar-16	27	638.07	RSD/LOW SCHEDULE	421.13	7.26
MAHATMA GANDHI TPS	2	660	5-Mar-16	31-Mar-16	26	628.23	RSD/LOW SCHEDULE	414.63	7.15
MAQSOODPUR TPS	1	45	14-Nov-15	30-Mar-16	137	3291.93	RSD/LOW SCHEDULE	148.14	37.48
MAQSOODPUR TPS	2	45	14-Nov-15	25-Feb-16	103	2477.75	RSD/LOW SCHEDULE	111.5	28.21
OBRA TPS	8	94	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	825.7	100
OBRA TPS	1	40	13-Nov-15	23-Dec-15	41	975.67	MILLING SYSTEM /RC FEEDER PROBLEM	39.03	11.11
PANIPAT TPS	7	250	1-Apr-15	6-May-15	35	841.3	RSD/LOW SCHEDULE	210.33	9.58
PANIPAT TPS	7	250	19-May-15	19-Jun-15	31	749.63	RSD/LOW SCHEDULE	187.41	8.53
PANIPAT TPS	7	250	28-Oct-15	28-Jan-16	91	2189.9	RSD/LOW SCHEDULE	547.48	24.93
PANIPAT TPS	8	250	3-Mar-16	29-Mar-16	26	612.58	RSD/LOW SCHEDULE	153.15	6.97
PANIPAT TPS	8	250	5-Dec-15	7-Jan-16	33	796.33	RSD/LOW SCHEDULE	199.08	9.07
PANIPAT TPS	8	250	8-Apr-15	5-May-15	28	666.83	RSD/LOW SCHEDULE	166.71	7.59
PANIPAT TPS	8	250	19-May-15	4-Jul-15	46	1094.98	RSD/LOW SCHEDULE	273.75	12.47
PANIPAT TPS	8	250	30-Oct-15	1-Dec-15	32	774.13	RSD/LOW SCHEDULE	193.53	8.81
PANIPAT TPS	5	210	1-Apr-15	6-May-15	36	857.28	RSD/LOW SCHEDULE	180.03	9.76
PANIPAT TPS	5	210	7-May-15	9-Sep-15	126	3019.78	WATER WALL TUBE LEAKAGE	634.15	34.38
PANIPAT TPS	5	210	21-Feb-16	31-Mar-16	40	959.67	RSD/LOW SCHEDULE	201.53	10.93
PANIPAT TPS	5	210	22-Oct-15	5-Feb-16	106	2545.55	RSD/LOW SCHEDULE	534.57	28.98

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
PANIPAT TPS	6	210	1-Apr-15	6-May-15	35	847.65	RSD/LOW SCHEDULE	178.01	9.65
PANIPAT TPS	6	210	12-Sep-15	23-Nov-15	71	1715.38	RSD/LOW SCHEDULE	360.23	19.53
PANIPAT TPS	6	210	15-May-15	4-Jul-15	50	1195.77	RSD/LOW SCHEDULE	251.11	13.61
PANIPAT TPS	6	210	21-Feb-16	31-Mar-16	40	959.72	RSD/LOW SCHEDULE	201.54	10.93
PANIPAT TPS	6	210	24-Nov-15	5-Feb-16	73	1744.25	RSD/LOW SCHEDULE	366.29	19.86
PANIPAT TPS	6	210	27-Jul-15	10-Sep-15	45	1076.13	RSD/LOW SCHEDULE	225.99	12.25
PANIPAT TPS	1	110	1-Apr-15	16-May-15	46	1103.42	RSD/LOW SCHEDULE	121.38	16.72
PANIPAT TPS	1	110	16-May-15	9-Dec-15	207	4968.02	RSD/LOW SCHEDULE	546.48	75.27
PANIPAT TPS	2	110	1-Apr-15	11-May-15	40	960.08	RSD/LOW SCHEDULE	105.61	14.55
PANIPAT TPS	2	110	13-May-15	9-Dec-15	210	5048.17	RSD/LOW SCHEDULE	555.3	76.49
PANIPAT TPS	3	110	1-Apr-15	11-May-15	40	971.67	RSD/LOW SCHEDULE	106.88	14.72
PANIPAT TPS	3	110	13-May-15	9-Dec-15	210	5048.42	RSD/LOW SCHEDULE	555.33	76.49
PANIPAT TPS	4	110	1-Apr-15	10-May-15	40	956.83	RSD/LOW SCHEDULE	105.25	14.5
PANIPAT TPS	4	110	11-May-15	9-Dec-15	212	5090.33	RSD/LOW SCHEDULE	559.94	77.13
PANKI TPS	3	105	26-Nov-15	1-Mar-16	96	2296.83	RSD/LOW SCHEDULE	241.17	26.15
PANKI TPS	4	105	28-Oct-15	31-Mar-16	156	3742.92	STATOR/ STATOR EARTH FAULT	393.01	42.61
PARICHHA TPS	6	250	8-Sep-15	20-Dec-15	104	2491.37	GENERATOR PROTECTION RELAY OPERATION PROBLEM	622.84	28.36
PARICHHA TPS	2	110	1-Apr-15	9-Nov-15	223	5345.5	FIRE IN CABLE GALLERY.	588.01	60.86

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
RAJGHAT TPS	1	67.5	4-Apr-15	6-May-15	32	777.45	RSD/LOW SCHEDULE	52.48	8.85
RAJGHAT TPS	1	67.5	8-May-15	31-Mar-16	328	7882.33	RSD/LOW SCHEDULE	532.06	89.74
RAJGHAT TPS	2	67.5	21-May-15	31-Mar-16	316	7573.67	RSD/LOW SCHEDULE	511.22	86.22
RAJIV GANDHI TPS	1	600	1-Apr-15	1-May-15	30	731.67	GRID FREQ. HIGH/LOW	439	8.33
RAJIV GANDHI TPS	1	600	1-Jul-15	24-Aug-15	54	1296.37	BOILER MISC. PROBLEM	777.82	14.76
RAJIV GANDHI TPS	2	600	1-Apr-15	4-May-15	34	808.9	SUPER HEATER TUBE LEAKAGE	485.34	9.21
RIHAND STPS	6	500	4-Aug-15	31-Oct-15	88	2104.27	EXCITATION PROBLEM	1052.14	23.96
ROPAR TPS	1	210	10-May-15	9-Jun-15	30	730.5	WATER WALL TUBE LEAKAGE	153.41	8.32
ROPAR TPS	1	210	17-Oct-15	29-Dec-15	73	1743.92	RSD/LOW SCHEDULE	366.22	19.85
ROPAR TPS	1	210	29-Jan-16	31-Mar-16	63	1500.17	RSD/LOW SCHEDULE	315.04	17.08
ROPAR TPS	2	210	24-Oct-15	27-Dec-15	64	1530.58	RSD/LOW SCHEDULE	321.42	17.42
ROPAR TPS	2	210	28-Feb-16	31-Mar-16	32	770	RESERVE SHUT DOWN / STANDBY UNIT	161.7	8.77
ROPAR TPS	3	210	13-May-15	12-Jun-15	30	725.5	CONSERVATION OF MAIN FUEL/RSD	152.36	8.26
ROPAR TPS	3	210	29-Dec-15	31-Mar-16	94	2244.58	RSD/LOW SCHEDULE	471.36	25.55
ROPAR TPS	4	210	1-Feb-16	31-Mar-16	59	1421.75	RSD/LOW SCHEDULE	298.57	16.19
ROPAR TPS	4	210	14-Oct-15	18-Jan-16	96	2296.25	RSD/LOW SCHEDULE	482.21	26.14

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
ROPAR TPS	5	210	12-May-15	10-Jun-15	29	689.5	RSD/LOW SCHEDULE	144.8	7.85
ROPAR TPS	5	210	16-Oct-15	29-Feb-16	136	3257.25	RSD/LOW SCHEDULE	684.02	37.08
ROPAR TPS	6	210	3-May-15	6-Jun-15	35	828.75	TURBINE VIBRATIONS HIGH	174.04	9.43
ROPAR TPS	6	210	4-Dec-15	31-Mar-16	118	2838.25	RSD/LOW SCHEDULE	596.03	32.31
ROPAR TPS	6	210	16-Oct-15	2-Dec-15	47	1118.25	CONSERVATION OF MAIN FUEL/RSD	234.83	12.73
ROSA TPP Ph-I	2	300	11-Dec-15	16-Feb-16	67	1607	SWITCH YARD/TRIPPING OF TRANSMISSION LINES/BUS BAR PROBLEM	482.1	18.29
ROSA TPP Ph-I	2	300	18-Jun-15	25-Jul-15	37	877.05	TURBINE BEARING FAILURE.	263.12	9.98
ROSA TPP Ph-I	3	300	14-Nov-15	13-Feb-16	91	2193.3	RSD/LOW SCHEDULE	657.99	24.97
ROSA TPP Ph-I	4	300	14-Nov-15	10-Dec-15	26	612.78	RSD/LOW SCHEDULE	183.83	6.98
ROSA TPP Ph-I	4	300	20-Jul-15	17-Aug-15	28	662.72	TURBINE BEARING PROBLEM	198.82	7.54
SURATGARH TPS	1	250	1-Apr-15	2-Jun-15	62	1489.48	RSD/LOW SCHEDULE	372.37	16.96
SURATGARH TPS	1	250	20-Jun-15	17-Jul-15	28	666.12	RSD/LOW SCHEDULE	166.53	7.58
SURATGARH TPS	2	250	4-Apr-15	7-May-15	34	810.38	RSD/LOW SCHEDULE	202.6	9.23
SURATGARH TPS	2	250	23-Sep-15	18-Dec-15	86	2070.32	GEN. TRANSFORMER PROTECTION RELAY OPERATION PROBLEM	517.58	23.57
SURATGARH TPS	3	250	28-Oct-15	16-Dec-15	49	1170.27	RSD/LOW SCHEDULE	292.57	13.32

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
SURATGARH TPS	4	250	28-Oct-15	16-Jan-16	80	1923.78	RSD/LOW SCHEDULE	480.95	21.9
SURATGARH TPS	5	250	3-Jun-15	7-Jul-15	33	803.97	RSD/LOW SCHEDULE	200.99	9.15
SURATGARH TPS	5	250	17-Dec-15	15-Jan-16	29	706.62	RSD/LOW SCHEDULE	176.66	8.04
SURATGARH TPS	6	250	2-May-15	5-Jun-15	35	835.82	RSD/LOW SCHEDULE	208.96	9.52
SURATGARH TPS	6	250	29-Oct-15	11-Dec-15	42	1016.82	RSD/LOW SCHEDULE	254.21	11.58
SURATGARH TPS	6	250	30-Jan-16	31-Mar-16	62	1479.4	GRID MISCELLANEOUS	369.85	16.84
TALWANDI SABO TPP	2	660	6-Feb-16	3-Mar-16	26	627.22	RESERVE SHUT DOWN / STANDBY UNIT	413.97	7.14
TALWANDI SABO TPP	2	660	18-Apr-15	23-May-15	34	826.73	WATER WALL TUBE LEAKAGE	545.64	9.41
TALWANDI SABO TPP	3	660	4-Mar-16	31-Mar-16	28	664	RESERVE SHUT DOWN / STANDBY UNIT	421.23	21.8
UTRAULA TPS	1	45	14-Nov-15	5-Feb-16	84	2005.48	RSD/LOW SCHEDULE	90.25	22.83
UTRAULA TPS	2	45	2-Dec-15	20-Feb-16	81	1941.7	RSD/LOW SCHEDULE	87.38	22.11
SUB TOTAL	145	33266.5			10871	260824.32		45716.3	
WESTERN REGION									
AKALTARA TPS	3	600	21-Aug-15	29-Sep-15	39	927.23	TURBINE MISC. PROBLEM	556.34	10.56
AKALTARA TPS	4	600	9-Apr-15	2-Aug-15	115	2752.9	TRANSMISSION CONSTRAINTS	1651.74	31.34
AMARAVATI TPS	1	270	1-Apr-15	29-May-15	59	1413.58	RSD/LOW SCHEDULE	381.67	16.09

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
AMARAVATI TPS	2	270	16-Feb-16	15-Mar-16	28	677.5	RSD/LOW SCHEDULE	182.93	7.71
AMARAVATI TPS	2	270	30-May-15	30-Jun-15	31	750.12	OTHER FUEL FEEDING PROBLEM	202.53	8.54
AMARAVATI TPS	3	270	5-Apr-15	27-Jun-15	83	1989.27	OTHER FUEL FEEDING PROBLEM	537.1	22.65
AMARAVATI TPS	3	270	16-Feb-16	15-Mar-16	28	678.75	RSD/LOW SCHEDULE	183.26	7.73
AMARAVATI TPS	4	270	3-Apr-15	18-Jun-15	76	1835.22	GRID DISTURBANCE	495.51	20.89
AMARAVATI TPS	5	270	3-Apr-15	9-Nov-15	220	5276.32	FUEL SUPPLY & OTHER MISC. PROBLEMS	1424.61	60.07
ANUPPUR TPP	1	600	19-Jul-15	22-Aug-15	34	827.17	RSD/LOW SCHEDULE	496.3	11.3
ANUPPUR TPP	1	600	26-May-15	22-Jun-15	28	669.93	FUEL SUPPLY & OTHER MISC. PROBLEMS	401.96	9.15
AVANTHA BHANDAR	1	600	1-Apr-15	2-Jan-16	277	6647.65	TRANSMISSION CONSTRAINTS	3988.59	75.68
BANDAKHAR TPP	1	300	28-Oct-15	31-Mar-16	155	3727.27	BOILER MISC. PROBLEM	48.19	2.74
BANDAKHAR TPP	1	300	31-Jul-15	31-Mar-16	244	5856	I.D. FANS PROBLEM	121.26	6.9
BARADARHA TPS	1	600	6-Apr-15	1-Aug-15	116	2793.95	RSD/LOW SCHEDULE	1676.37	31.81
BELA TPS	1	270	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	2371.68	100
BHUSAWAL TPS	4	500	14-Feb-16	13-Mar-16	28	670.63	RSD/LOW SCHEDULE	335.32	7.63
BHUSAWAL TPS	2	210	1-Apr-15	31-Oct-15	213	5117.78	UNECONOMICAL OPERATION	1074.73	58.26

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
BHUSAWAL TPS	3	210	20-Apr-15	12-Jun-15	54	1290.43	RSD/LOW SCHEDULE	270.99	14.69
BINA TPS	1	250	14-Apr-15	27-Aug-15	135	3233.92	RSD/LOW SCHEDULE	808.48	36.82
BINA TPS	1	250	29-Feb-16	31-Mar-16	31	744.08	RSD/LOW SCHEDULE	186.02	8.47
BINA TPS	2	250	2-Mar-16	31-Mar-16	30	719.85	RSD/LOW SCHEDULE	179.96	8.19
BINA TPS	2	250	28-Apr-15	2-Sep-15	127	3037.58	RSD/LOW SCHEDULE	759.4	34.58
CHANDRAPUR(MAHARASHTRA) STPS	6	500	5-Mar-16	31-Mar-16	27	637.75	TURBINE VIBRATIONS HIGH	318.88	7.26
CHANDRAPUR(MAHARASHTRA) STPS	1	210	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	1844.64	100
CHANDRAPUR(MAHARASHTRA) STPS	2	210	12-Jan-16	31-Mar-16	80	1915.22	RSD/LOW SCHEDULE	402.2	21.8
DHARIWAL TPP	1	300	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	2635.2	100
DHARIWAL TPP	2	300	1-Apr-15	31-Oct-15	214	5131.57	RSD/LOW SCHEDULE	1539.47	58.42
DHARIWAL TPP	2	300	3-Nov-15	16-Dec-15	44	1044.22	RSD/LOW SCHEDULE	313.27	11.89
GANDHI NAGAR TPS	3	210	11-Dec-15	31-Mar-16	112	2679.5	RSD/LOW SCHEDULE	562.7	30.5
GANDHI NAGAR TPS	3	210	22-Jul-15	31-Aug-15	40	959.42	RSD/LOW SCHEDULE	201.48	10.92
GANDHI NAGAR TPS	4	210	11-Nov-15	9-Dec-15	28	666.08	RSD/LOW SCHEDULE	139.88	7.58
GANDHI NAGAR TPS	4	210	12-Dec-15	9-Feb-16	58	1400.43	RSD/LOW SCHEDULE	294.09	15.94
GANDHI NAGAR TPS	4	210	15-Sep-15	24-Oct-15	39	927.67	RSD/LOW SCHEDULE	194.81	10.56
GANDHI NAGAR TPS	4	210	31-May-15	12-Jul-15	41	987	RSD/LOW SCHEDULE	207.27	11.24
GANDHI NAGAR TPS	1	120	1-Apr-15	31-Mar-16	366	8784	RSD/LOW SCHEDULE	1054.08	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
GANDHI NAGAR TPS	2	120	1-Apr-15	31-Mar-16	366	8784	RSD/LOW SCHEDULE	1054.08	100
GEPL TPP Ph-I	1	60	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	527.04	100
GEPL TPP Ph-I	2	60	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	527.04	100
JSW RATNAGIRI TPP	1	300	29-Jun-15	28-Jul-15	29	702.52	TURBINE BEARING PROBLEM	210.76	8
KATGHORA TPP	1	35	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	307.44	100
KHAPARKHEDA TPS	3	210	4-Apr-15	1-May-15	26	628	TURBINE MISC.	131.88	7.15
KORADI TPS	6	210	1-Apr-15	8-Jul-15	99	2375.98	UNECONOMICAL OPERATION	498.96	27.05
KORADI TPS	7	210	1-Mar-16	31-Mar-16	30	720.08	RSD/LOW SCHEDULE	151.22	8.2
KORADI TPS	5	200	18-Feb-16	31-Mar-16	43	1020.65	RSD/LOW SCHEDULE	204.13	11.62
KORADI TPS	1	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	922.32	100
KORADI TPS	2	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	922.32	100
KORADI TPS	3	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	922.32	100
KORADI TPS	4	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR	922.32	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
							OPERATION		
KORBA-II	1	50	1-Jan-16	11-Mar-16	71	1697.35	GENERATOR BEARING PROBLEM	84.87	19.32
KORBA-II	1	50	13-Sep-15	19-Oct-15	37	877.45	BOILER MISC. PROBLEM	43.87	9.99
KORBA-II	2	50	1-Apr-15	27-Apr-15	26	634.27	ELECTRICAL MISCELLANEOUS PROBLEMS	31.71	7.22
KORBA-II	2	50	14-Oct-15	12-Nov-15	29	694.88	ECONOMISER TUBE LEAKAGE	34.74	7.91
KORBA-II	4	50	21-Dec-15	16-Jan-16	26	616.43	BOILER MISC. PROBLEM	30.82	7.02
KORBA-II	4	50	26-Jul-15	15-Sep-15	51	1216.77	MILLING SYSTEM /RC FEEDER PROBLEM	60.84	13.85
MAHAN TPP	1	600	1-Apr-15	31-Mar-16	366	8784	COAL FEEDING PROBLEM IN PLANT	5270.4	100
MAUDA TPS	1	500	1-Dec-15	13-Mar-16	102	2457.58	RSD/LOW SCHEDULE	1228.79	27.98
MAUDA TPS	1	500	1-Jun-15	12-Jul-15	41	983.47	RSD/LOW SCHEDULE	491.74	11.2
MAUDA TPS	1	500	20-Jul-15	19-Aug-15	29	705.75	RSD/LOW SCHEDULE	352.88	8.03
MAUDA TPS	2	500	5-Jun-15	13-Jul-15	38	911.57	RSD/LOW SCHEDULE	455.79	10.38
MAUDA TPS	2	500	9-Nov-15	9-Feb-16	91	2194.08	RSD/LOW SCHEDULE	1097.04	24.98
MAUDA TPS	2	500	24-Feb-16	31-Mar-16	37	886.35	RSD/LOW SCHEDULE	443.18	10.09
MIHAN TPS	1	61.5	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	540.22	100
MIHAN TPS	2	61.5	1-Apr-15	31-Mar-16	366	8784	NO Power purchase	540.22	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
							agreement		
MIHAN TPS	3	61.5	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	540.22	100
MIHAN TPS	4	61.5	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	540.22	100
MUNDRA UMTTP	1	800	12-Jul-15	15-Sep-15	66	1576.57	AIR PREHEATERS PROBLEM	1261.26	17.95
MUNDRA UMTTP	4	800	25-Apr-15	22-May-15	28	666.07	UNIT AUX. TRANSFORMER PROBLEM	532.86	7.58
NASIK (P) TPS	1	270	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	2371.68	100
NIGRI TPP	1	660	1-Apr-15	8-Jun-15	68	1635.67	WATER WALL TUBE LEAKAGE	1079.54	18.62
NIGRI TPP	2	660	15-Aug-15	30-Sep-15	46	1115.7	RSD/LOW SCHEDULE	736.36	12.7
NIGRI TPP	2	660	18-Jun-15	29-Jul-15	41	988.07	RSD/LOW SCHEDULE	652.13	11.25
NIWARI TPP	1	45	12-Jun-15	10-Sep-15	90	2166.18	RSD/LOW SCHEDULE	97.48	24.66
OP JINDAL TPS	1	250	1-Apr-15	3-Aug-15	125	2997.47	RSD/LOW SCHEDULE	749.37	34.12
OP JINDAL TPS	2	250	10-Jul-15	7-Sep-15	59	1404.52	RSD/LOW SCHEDULE	351.13	15.99
OP JINDAL TPS	2	250	22-Oct-15	27-Nov-15	36	870.82	RSD/LOW SCHEDULE	217.71	9.91
OP JINDAL TPS	4	250	1-Apr-15	10-Jul-15	101	2416.27	GRID MISCELLANEOUS	604.07	27.51
OP JINDAL TPS	4	250	13-Jan-16	27-Feb-16	44	1062.23	RSD/LOW SCHEDULE	265.56	12.09
PARLI TPS	6	250	25-Jun-15	31-Mar-16	280	6728.95	BOILER AUX. MISC. PROMLEMS	1682.24	76.6

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
PARLI TPS	7	250	8-Jul-15	31-Mar-16	267	6419.87	RAW WATER SHORTAGE	1604.97	73.09
PARLI TPS	3	210	14-Jun-15	31-Mar-16	291	6995.03	RAW WATER NOT AVAILABLE/LOW INTAKE CANAL LEVEL	1468.96	79.63
PARLI TPS	4	210	5-Jul-15	31-Mar-16	270	6485.23	RSD/LOW SCHEDULE	1361.9	73.83
PARLI TPS	5	210	6-Jul-15	31-Mar-16	268	6441.08	RSD/LOW SCHEDULE	1352.63	73.33
PATHADI TPP	2	300	1-Apr-15	5-Dec-15	249	5969.45	LIGNITE FEEDING PROBLEM IN PLANT	1790.84	67.96
RAIKHEDA TPP	1	685	1-Jun-15	1-Nov-15	153	3673.75	NO Power purchase agreement	2516.52	50.19
RAIKHEDA TPP	1	685	4-Feb-16	4-Mar-16	29	689.18	RSD/LOW SCHEDULE	472.09	9.42
RAIKHEDA TPP	1	685	7-Nov-15	6-Dec-15	30	710.82	RSD/LOW SCHEDULE	486.91	9.71
RATIJA TPS	1	50	25-May-15	19-Jul-15	55	1329.75	TURBINE VIBRATIONS HIGH	66.49	15.14
SABARMATI (C STATION)	15	30	1-Jun-15	5-Sep-15	96	2308.15	RSD/LOW SCHEDULE	69.24	26.28
SABARMATI (C STATION)	15	30	6-Sep-15	31-Mar-16	208	4992	RSD/LOW SCHEDULE	149.76	56.83
SABARMATI (C STATION)	16	30	1-Jun-15	5-Sep-15	96	2308.15	RSD/LOW SCHEDULE	69.24	26.28
SABARMATI (C STATION)	16	30	6-Sep-15	31-Mar-16	208	4992	RSD/LOW SCHEDULE	149.76	56.83
SALORA TPP	1	135	1-Apr-15	31-Mar-16	366	8784	NO Power purchase agreement	1185.84	100
SANJAY GANDHI TPS	1	210	31-May-15	23-Jul-15	53	1275.83	RSD/LOW SCHEDULE	267.92	14.52
SANJAY GANDHI TPS	3	210	18-Jan-16	23-Feb-16	35	848.53	RSD/LOW SCHEDULE	178.19	9.66
SANJAY GANDHI TPS	3	210	23-May-15	14-Aug-15	84	2004.48	RSD/LOW SCHEDULE	420.94	22.82

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
SANJAY GANDHI TPS	4	210	23-May-15	21-Jul-15	59	1425.78	RSD/LOW SCHEDULE	299.41	16.23
SATPURA TPS	10	250	27-Jul-15	27-Aug-15	32	759.33	FURNACE FIRE OUT /FLAME FAILURE	189.83	8.64
SATPURA TPS	11	250	25-Jul-15	11-Mar-16	231	5534.75	GEN. TRANSFORMER PROTECTION RELAY OPERATION PROBLEM	1383.69	63.01
SATPURA TPS	7	210	23-Jun-15	19-Jul-15	26	618.83	RSD/LOW SCHEDULE	129.95	7.04
SATPURA TPS	8	210	30-Nov-15	23-Jan-16	54	1285.58	TURBINE VIBRATIONS HIGH	269.97	14.64
SATPURA TPS	9	210	23-May-15	30-Nov-15	191	4579.67	GEN. TRANSFORMER PROTECTION RELAY OPERATION PROBLEM	961.73	52.14
SATPURA TPS	6	200	1-Apr-15	2-May-15	32	757.03	WATER WALL TUBE LEAKAGE	151.41	8.62
SATPURA TPS	6	200	22-Jun-15	20-Jul-15	28	681.33	RSD/LOW SCHEDULE	136.27	7.76
SHREE SINGAJI TPP	1	600	23-Apr-15	23-May-15	30	711.6	RSD/LOW SCHEDULE	426.96	8.1
SHREE SINGAJI TPP	1	600	28-Feb-16	31-Mar-16	33	791.97	RESERVE SHUT DOWN / STANDBY UNIT	475.18	9.02
SHREE SINGAJI TPP	2	600	2-Aug-15	4-Sep-15	33	793.55	RESERVE SHUT DOWN / STANDBY UNIT	476.13	9.03
SHREE SINGAJI TPP	2	600	16-Apr-15	24-May-15	39	924.67	RSD/LOW SCHEDULE	554.8	10.53
SIKKA REP. TPS	4	250	22-Feb-16	31-Mar-16	39	936	MINOR MAINTENANCE WORKS	234	42.86
SIKKA REP. TPS	1	120	15-May-15	11-Aug-15	87	2097.9	RSD/LOW SCHEDULE	251.75	23.88

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
SIKKA REP. TPS	1	120	19-Sep-15	31-Mar-16	195	4669	RESERVE SHUT DOWN / STANDBY UNIT	560.28	53.15
SIKKA REP. TPS	2	120	25-Jul-15	13-Oct-15	80	1909.42	RSD/LOW SCHEDULE	229.13	21.74
SIKKA REP. TPS	2	120	28-Feb-16	31-Mar-16	33	783.92	RSD/LOW SCHEDULE	94.07	8.92
SIKKA REP. TPS	2	120	31-Oct-15	22-Feb-16	114	2726.75	RSD/LOW SCHEDULE	327.21	31.04
SIPAT STPS	1	660	12-May-15	9-Jun-15	28	667.05	TURB. AXIAL SHIFT/ THRUST PAD	440.25	7.59
SURAT LIG. TPS	3	125	17-Aug-15	1-Dec-15	105	2527.85	GEN. TRANSFORMER TRIPPING/ DAMAGED	315.98	28.78
SVPL TPP	1	63	1-Apr-15	7-Dec-15	250	6000.9	FUEL SUPPLY & OTHER MISC. PROBLEMS	378.06	68.32
SVPL TPP	1	63	1-Mar-16	31-Mar-16	30	725.83	GENERATOR BEARING PROBLEM	45.73	8.26
TAMNAR TPP	1	600	3-Dec-15	31-Mar-16	119	2860.07	COAL FEEDING SYSTEM FAILURE.	1716.04	32.56
TAMNAR TPP	1	600	6-Jun-15	2-Jul-15	27	639.88	RSD/LOW SCHEDULE	383.93	7.28
TAMNAR TPP	2	600	1-Apr-15	5-May-15	35	834.78	RSD/LOW SCHEDULE	500.87	9.5
TAMNAR TPP	2	600	5-Oct-15	7-Dec-15	62	1497.93	GENERATOR PROTECTION RELAY OPERATION PROBLEM	898.76	17.05
TAMNAR TPP	2	600	31-Jul-15	9-Sep-15	39	942.17	RSD/LOW SCHEDULE	565.3	10.73
TAMNAR TPP	3	600	1-Apr-15	15-Sep-15	167	4009.13	RSD/LOW SCHEDULE	2405.48	45.64
TAMNAR TPP	3	600	11-Oct-15	31-Mar-16	173	4151.3	RSD/LOW SCHEDULE	2490.78	47.26

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
TIRORA TPS	2	660	4-Aug-15	3-Sep-15	30	723.55	I.D. FANS PROBLEM	477.54	8.24
TIRORA TPS	3	660	4-Jul-15	2-Aug-15	29	687.28	SUPER HEATER TUBE LEAKAGE	453.6	7.82
TIRORA TPS	4	660	11-Sep-15	28-Oct-15	46	1112.92	GENERATOR BEARING PROBLEM	734.53	12.67
TIRORA TPS	4	660	14-Dec-15	24-Jan-16	42	996.03	AIR PREHEATERS PROBLEM	657.38	11.34
TROMBAY TPS	6	500	5-Jun-15	13-Jul-15	38	917.85	RSD/LOW SCHEDULE	458.93	10.45
TROMBAY TPS	6	500	6-Apr-15	1-Jun-15	56	1338.17	ECONOMISER TUBE LEAKAGE	669.09	15.23
TROMBAY TPS	6	500	15-Jul-15	31-Mar-16	260	6246.87	NO Power purchase agreement	3123.44	71.12
TROMBAY TPS	4	150	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	1317.6	100
UCHPINDA TPP	1	360	27-Nov-15	31-Mar-16	126	3024	NO Power purchase agreement	0	0
UKAI TPS	6	500	26-Jul-15	3-Sep-15	39	935.43	RSD/LOW SCHEDULE	467.72	10.65
UKAI TPS	4	200	19-Nov-15	4-Feb-16	76	1830.33	RSD/LOW SCHEDULE	366.07	20.84
UKAI TPS	1	120	20-Sep-15	31-Mar-16	194	4648.5	RSD/LOW SCHEDULE	557.82	52.92
UKAI TPS	1	120	24-Apr-15	16-Jul-15	82	1971.77	RSD/LOW SCHEDULE	236.61	22.45
UKAI TPS	1	120	27-Jul-15	12-Sep-15	47	1129.93	RSD/LOW SCHEDULE	135.59	12.86
UKAI TPS	2	120	1-Apr-15	31-Mar-16	366	8784	RSD/LOW SCHEDULE	1054.08	100
WANAKBORI TPS	2	210	29-Dec-15	23-Jan-16	25	603.57	RSD/LOW SCHEDULE	126.75	6.87
WANAKBORI TPS	4	210	1-Jun-15	13-Jul-15	42	1006.35	RSD/LOW SCHEDULE	211.33	11.46

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
WANAKBORI TPS	4	210	5-Dec-15	29-Jan-16	54	1303.98	RSD/LOW SCHEDULE	273.84	14.85
WANAKBORI TPS	4	210	7-Nov-15	4-Dec-15	27	641.52	RSD/LOW SCHEDULE	134.72	7.3
WANAKBORI TPS	4	210	22-Feb-16	31-Mar-16	39	924.53	RSD/LOW SCHEDULE	194.15	10.53
WANAKBORI TPS	5	210	1-Jun-15	13-Jul-15	42	1006.58	RSD/LOW SCHEDULE	211.38	11.46
WANAKBORI TPS	5	210	23-Jul-15	31-Aug-15	39	931.82	RSD/LOW SCHEDULE	195.68	10.61
WANAKBORI TPS	5	210	29-Oct-15	7-Mar-16	130	3111.58	RSD/LOW SCHEDULE	653.43	35.42
WANAKBORI TPS	6	210	1-Apr-15	16-Jun-15	77	1838.88	RSD/LOW SCHEDULE	386.16	20.93
WANAKBORI TPS	6	210	17-Feb-16	29-Mar-16	41	973.82	RSD/LOW SCHEDULE	204.5	11.09
WANAKBORI TPS	6	210	18-Sep-15	4-Feb-16	139	3331.95	RESERVE SHUT DOWN / STANDBY UNIT	699.71	37.93
WANAKBORI TPS	6	210	23-Jul-15	31-Aug-15	39	931.75	RSD/LOW SCHEDULE	195.67	10.61
WANAKBORI TPS	7	210	8-Nov-15	25-Dec-15	47	1129.25	DRUM LEVEL HIGH/ low	237.14	12.86
WANAKBORI TPS	7	210	26-Jul-15	25-Aug-15	30	713.42	RSD/LOW SCHEDULE	149.82	8.12
WARDHA WARORA TPP	1	135	7-Jan-16	10-Feb-16	35	833.32	E.S.P.MISCELLANEOUS	112.5	9.49
WARDHA WARORA TPP	1	135	16-Feb-16	31-Mar-16	44	1062.68	NO Power purchase agreement	143.46	12.1
WARDHA WARORA TPP	1	135	16-Jun-15	11-Jul-15	25	610.9	MISC. SHORT DURATION MAINTENANCE WORKS	82.47	6.95
WARDHA WARORA TPP	1	135	23-Oct-15	29-Dec-15	66	1592.75	MISC. SHORT DURATION MAINTENANCE	215.02	18.13

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
WARDHA WARORA TPP	1	135	25-Aug-15	10-Oct-15	45	1085.93	ESP PROBLEM	146.6	12.36
WARDHA WARORA TPP	2	135	16-Jun-15	23-Feb-16	253	6068.47	MISC. SHORT DURATION MAINTENANCE WORKS	819.24	69.09
WARDHA WARORA TPP	2	135	29-Feb-16	31-Mar-16	31	746.23	NO Power purchase agreement	100.74	8.5
SUB TOTAL	161	46832			19407	465700.87		104843	
SOUTHERN REGION									
DAMODARAM SANJEEVAIAH TPS	1	800	1-Apr-15	20-May-15	50	1194.53	OTHER FUEL FEEDING PROBLEM	955.62	13.6
DAMODARAM SANJEEVAIAH TPS	2	800	23-Nov-15	28-Dec-15	35	831.12	NON-READINESS OF RESIDUAL WORKS OF NEW UNIT	664.9	16.26
ENNORE TPS	3	110	9-Jun-15	28-Dec-15	201	4829.05	TURBINE BEARING FAILURE.	531.2	54.98
ENNORE TPS	4	110	12-Jan-16	12-Feb-16	31	740.95	BOILER FEED PUMP/MOTOR PROBLEM	81.5	8.43
ENNORE TPS	5	110	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	966.24	100
ENNORE TPS	1	60	13-Nov-15	31-Mar-16	139	3341.18	NON AVAILABILITY OF MAN POWER	200.47	38.04
ENNORE TPS	2	60	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	527.04	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
MUTHIARA TPP	1	600	5-Jan-16	1-Feb-16	26	635.77	VARIOUS STEAM LEAKAGES	381.46	7.24
NEYVELI TPS- I	7	100	5-Oct-15	14-Dec-15	71	1692.33	LIGNITE FEEDING MISC.	169.23	19.27
NEYVELI TPS- I	8	100	26-Jul-15	8-Sep-15	44	1057.45	DC SUPPLY PROBLEM	105.75	12.04
NEYVELI TPS- I	9	100	2-Jan-16	13-Feb-16	42	1018.48	TURBINE BEARING PROBLEM	101.85	11.59
NEYVELI TPS- I	5	50	17-Feb-16	20-Mar-16	32	760.15	GEN. TRANSFORMER TRIPPING/ DAMAGED	38.01	8.65
NEYVELI TPS-II EXP	1	250	9-Feb-16	31-Mar-16	51	1229.03	FURNACE DRAFT ABNORMAL	307.26	18.62
NEYVELI TPS-II EXP	1	250	15-Sep-15	3-Nov-15	49	1172.33	WATER WALL TUBE LEAKAGE	293.08	17.76
NEYVELI TPS-II EXP	2	250	15-May-15	15-Jul-15	60	1441.42	BOILER MISC. PROBLEM	360.36	17.88
NEYVELI TPS-II EXP	2	250	25-Nov-15	5-Jan-16	41	974.17	GENERATOR PROTECTION RELAY OPERATION PROBLEM	243.54	12.08
RAICHUR TPS	3	210	23-May-15	6-Nov-15	167	4009.7	GEN. TRANSFORMER PROTECTION RELAY OPERATION PROBLEM	842.04	45.65
RAICHUR TPS	4	210	28-Feb-16	31-Mar-16	33	791.08	GEN. TRANSFORMER TRIPPING/ DAMAGED	166.13	9.01
RAICHUR TPS	5	210	20-Jun-15	16-Jul-15	26	629.65	RSD/LOW SCHEDULE	132.23	7.17
RAICHUR TPS	7	210	21-Nov-15	17-Dec-15	26	621.85	WATER WALL TUBE LEAKAGE	130.59	7.08
RAMAGUNDEM - B TPS	1	62.5	1-Apr-15	30-Apr-15	29	703.33	TURBINE MISC.	43.96	8.01

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
SIMHAPURI TPS	1	150	11-Aug-15	6-Sep-15	26	634.45	BOILER MISC. PROBLEM	95.17	7.22
TUTICORIN (P) TPP	1	150	31-Oct-15	7-Mar-16	128	3079.38	RSD/LOW SCHEDULE	461.91	35.06
TUTICORIN (P) TPP	2	150	26-Feb-16	25-Mar-16	28	662.72	RSD/LOW SCHEDULE	99.41	7.54
TUTICORIN (P) TPP	2	150	30-Oct-15	22-Jan-16	83	2002	RSD/LOW SCHEDULE	300.3	22.79
TUTICORIN TPS	2	210	4-Mar-16	31-Mar-16	27	652.05	GEN. TRANSFORMER TRIPPING/ DAMAGED	136.93	7.42
UDUPI TPP	1	600	10-Aug-15	10-Sep-15	31	738.35	RAW WATER SUPPLY MISC.	443.01	8.41
VALLUR TPP	3	500	30-Nov-15	27-Dec-15	27	641.92	GENERATOR PROTECTION RELAY OPERATION PROBLEM	320.96	7.31
VIZAG TPP	1	520	29-Feb-16	31-Mar-16	31	744.22	OTHER FUEL FEEDING PROBLEM	386.99	34.08
SUB TOTAL	29	7332.5			2266	54396.66		9487.1	
EASTERN REGION									
BAKRESWAR TPS	1	210	14-Jan-16	11-Feb-16	28	677.95	RSD/LOW SCHEDULE	142.37	7.72
BAKRESWAR TPS	4	210	30-Jun-15	17-Aug-15	48	1160.43	RSD/LOW SCHEDULE	243.69	13.21
BANDEL TPS	5	210	25-Aug-15	21-Sep-15	27	647.65	TURBINE MISC. PROBLEMS	136.01	7.37
BANDEL TPS	1	60	9-Jun-15	11-Jul-15	32	774.07	MILLING SYSTEM /RC FEEDER PROBLEM	46.44	8.81
BANDEL TPS	2	60	8-Sep-15	13-Oct-15	35	833.15	BOILER FEED PUMP/MOTOR PROBLEM	49.99	9.49

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
BANDEL TPS	4	60	11-Jul-15	5-Aug-15	25	607.23	MILLING SYSTEM /RC FEEDER PROBLEM	36.43	6.91
BOKARO `B` TPS	1	210	1-Apr-15	10-May-15	40	953.58	I.D. FANS PROBLEM	200.25	10.86
BOKARO `B` TPS	1	210	15-Feb-16	22-Mar-16	37	887.98	ESP PROBLEM	186.48	10.11
BOKARO `B` TPS	1	210	27-Oct-15	26-Nov-15	30	721	FUEL SUPPLY & OTHER MISC. PROBLEMS	151.41	8.21
BOKARO `B` TPS	2	210	4-Mar-16	31-Mar-16	28	660.25	RESERVE SHUT DOWN / STANDBY UNIT	138.65	7.52
BOKARO `B` TPS	3	210	26-Apr-15	9-Aug-15	105	2531.1	CONDENSER TUBE LEAKAGE/ CLEANING	531.53	28.81
CHANDRAPURA(DVC) TPS	7	250	6-Nov-15	6-Jan-16	61	1462.48	ROTOR/ ROTOR EARTH FAULT	365.62	16.65
CHANDRAPURA(DVC) TPS	7	250	7-Jan-16	7-Mar-16	60	1438.92	ROTOR/ ROTOR EARTH FAULT	359.73	16.38
CHANDRAPURA(DVC) TPS	8	250	1-Apr-15	9-May-15	39	933.88	STATOR/ STATOR EARTH FAULT	233.47	10.63
CHANDRAPURA(DVC) TPS	1	130	29-Apr-15	1-Jun-15	34	807.65	RSD/LOW SCHEDULE	104.99	9.19
D.P.L. TPS	7	300	5-Mar-16	31-Mar-16	26	617.6	HRH LINE LEAKAGE	185.28	7.03
D.P.L. TPS	8	250	1-Apr-15	24-May-15	53	1281.5	E.S.P.MISCELLANEOUS	320.38	14.59
D.P.L. TPS	8	250	1-Jul-15	30-Jul-15	29	707.27	BOILER AUX. MISC. PROMLEMS	176.82	8.05
D.P.L. TPS	6	110	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR	966.24	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
							OPERATION		
D.P.L. TPS	4	75	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	658.8	100
D.P.L. TPS	5	75	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	658.8	100
D.P.L. TPS	3	70	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	614.88	100
DERANG TPP	2	600	20-Jul-15	18-Aug-15	29	692	TURBINE BEARING PROBLEM	415.2	7.88
DURGAPUR STEEL TPS	1	500	29-Feb-16	29-Mar-16	29	691.48	RSD/LOW SCHEDULE	345.74	7.87
DURGAPUR STEEL TPS	2	500	1-Apr-15	28-Apr-15	28	662.93	RSD/LOW SCHEDULE	331.47	7.55
DURGAPUR STEEL TPS	2	500	1-Dec-15	1-Mar-16	91	2172.73	ASH HANDLING SYSTEM PROBLEM	1086.37	24.74
DURGAPUR STEEL TPS	2	500	1-Oct-15	1-Nov-15	31	743.98	COAL SHORTAGE	371.99	8.47
DURGAPUR TPS	4	210	1-Apr-15	16-May-15	46	1100.37	RSD/LOW SCHEDULE	231.08	12.53
DURGAPUR TPS	4	210	5-Jan-16	13-Feb-16	39	941.05	WATER WALL TUBE LEAKAGE	197.62	10.71
DURGAPUR TPS	4	210	12-Aug-15	10-Sep-15	28	672.17	WATER WALL TUBE LEAKAGE	141.16	7.65
DURGAPUR TPS	4	210	18-Jun-15	23-Jul-15	35	834.33	RESERVE SHUT DOWN / STANDBY UNIT	175.21	9.5

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
DURGAPUR TPS	3	130	24-Oct-15	31-Mar-16	159	3821.25	RESERVE SHUT DOWN / STANDBY UNIT	496.76	43.5
HALDIA TPP	2	300	20-Apr-15	14-Jun-15	56	1337.53	TURBINE MISC. PROBLEMS	401.26	15.23
KAMALANGA TPS	1	350	27-Apr-15	22-May-15	26	615.83	ESP PROBLEM	215.54	7.01
KODARMA TPP	1	500	1-Apr-15	31-Mar-16	366	8784	ASH HANDLING SYSTEM PROBLEM	4392	100
KOLAGHAT TPS	1	210	2-Sep-15	6-Nov-15	66	1573.1	LIGNITE FEEDING PROBLEM IN PLANT	330.35	17.91
KOLAGHAT TPS	2	210	8-Dec-15	28-Jan-16	51	1234.63	TURBINE MISC.	259.27	14.06
KOLAGHAT TPS	3	210	8-Nov-15	17-Dec-15	40	949.87	SUPER HEATER TUBE LEAKAGE	199.47	10.81
KOLAGHAT TPS	4	210	24-Jan-16	12-Mar-16	48	1154.67	GEN. TRANSFORMER TRIPPING/ DAMAGED	242.48	13.15
KOLAGHAT TPS	6	210	18-Feb-16	31-Mar-16	42	1013.6	STATOR/ STATOR EARTH FAULT	212.86	11.54
MAHADEV PRASAD STPP	2	270	1-Apr-15	29-May-15	59	1407.13	COAL FEEDING SYSTEM FAILURE.	379.93	16.02
MAHADEV PRASAD STPP	2	270	12-Aug-15	7-Oct-15	56	1335.68	STATOR/ STATOR EARTH FAULT	360.63	15.21
MEJIA TPS	5	250	9-Aug-15	16-Sep-15	37	899.87	LIGNITE FEEDING PROBLEM IN PLANT	224.97	10.24
MEJIA TPS	1	210	12-Feb-16	31-Mar-16	48	1154.38	RSD/LOW SCHEDULE	242.42	13.14
MEJIA TPS	1	210	15-May-15	10-Jun-15	26	631.38	RSD/LOW SCHEDULE	132.59	7.19
MEJIA TPS	1	210	16-Sep-15	5-Dec-15	80	1914.97	STATOR/ STATOR	402.14	21.8

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
							EARTH FAULT		
MEJIA TPS	2	210	1-Apr-15	14-May-15	43	1043.03	UNECONOMICAL OPERATION	219.04	11.87
MEJIA TPS	2	210	5-Dec-15	16-Mar-16	102	2455.78	STATOR/ STATOR EARTH FAULT	515.71	27.96
MEJIA TPS	2	210	10-Aug-15	19-Sep-15	40	957.8	LIGNITE FEEDING PROBLEM IN PLANT	201.14	10.9
MEJIA TPS	2	210	26-Sep-15	1-Nov-15	36	864.12	TURBINE BEARING PROBLEM	181.47	9.84
MEJIA TPS	3	210	14-Jul-15	26-Sep-15	73	1760.58	RSD/LOW SCHEDULE	369.72	20.04
MEJIA TPS	3	210	31-Oct-15	12-Feb-16	103	2482.58	RSD/LOW SCHEDULE	521.34	28.26
MEJIA TPS	4	210	1-Apr-15	1-May-15	30	731.47	RSD/LOW SCHEDULE	153.61	8.33
MEJIA TPS	4	210	10-Dec-15	15-Feb-16	67	1608.52	RSD/LOW SCHEDULE	337.79	18.31
MEJIA TPS	4	210	10-May-15	24-Oct-15	168	4030.42	RSD/LOW SCHEDULE	846.39	45.88
MUZAFFARPUR TPS	1	110	1-Mar-16	31-Mar-16	31	739.65	TURBINE VIBRATIONS HIGH	81.36	8.42
MUZAFFARPUR TPS	1	110	12-Sep-15	12-Nov-15	61	1471.23	TURBINE VIBRATIONS HIGH	161.84	16.75
MUZAFFARPUR TPS	1	110	15-Jun-15	13-Jul-15	28	661.72	RSD/LOW SCHEDULE	72.79	7.53
MUZAFFARPUR TPS	2	110	12-Jul-15	25-Sep-15	75	1796.35	TURBINE VIBRATIONS HIGH	197.6	20.45
MUZAFFARPUR TPS	2	110	19-Oct-15	7-Dec-15	49	1167.7	STATOR/ STATOR EARTH FAULT	128.45	13.29
NEW COSSIPORE TPS	3	50	1-Apr-15	31-Mar-16	366	8784	RSD/LOW SCHEDULE	439.2	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
NEW COSSIPORE TPS	4	50	1-Apr-15	31-Mar-16	366	8784	RSD/LOW SCHEDULE	439.2	100
NEW COSSIPORE TPS	1	30	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	263.52	100
NEW COSSIPORE TPS	2	30	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	263.52	100
PATRATU TPS	9	110	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	966.24	100
PATRATU TPS	7	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	922.32	100
PATRATU TPS	8	105	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	922.32	100
PATRATU TPS	5	90	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	790.56	100
PATRATU TPS	6	90	11-Aug-15	31-Mar-16	233	5599.58	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	503.96	63.75
PATRATU TPS	6	90	20-Jun-15	25-Jul-15	35	847.63	TURBINE MISC.	76.29	9.65
PATRATU TPS	1	40	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	351.36	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
PATRATU TPS	2	40	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	351.36	100
PATRATU TPS	3	40	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	351.36	100
PATRATU TPS	4	40	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	351.36	100
SAGARDIGHI TPS	1	300	14-Jul-15	13-Aug-15	30	709.48	CONDENSER LOW VACCUM	212.84	8.08
SAGARDIGHI TPS	1	300	24-Nov-15	30-Dec-15	35	851.23	DC SUPPLY PROBLEM	255.37	9.69
SAGARDIGHI TPS	2	300	8-Oct-15	9-Nov-15	33	780.47	DC SUPPLY PROBLEM	234.14	8.89
SAGARDIGHI TPS	2	300	17-Aug-15	20-Sep-15	34	815.63	RSD/LOW SCHEDULE	244.69	9.29
SAGARDIGHI TPS	2	300	23-Apr-15	23-May-15	30	719.73	RSD/LOW SCHEDULE	215.92	8.19
SANTALDIH TPS	1	120	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	1054.08	100
SANTALDIH TPS	2	120	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	1054.08	100
SANTALDIH TPS	3	120	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	1054.08	100

Station	Unit	Capacity	Date Of Outage	Date of Return	Outage Days	Outage Hours	Reason	MU Loss	% of Unit Max Possible gen
SANTALDIH TPS	4	120	1-Apr-15	31-Mar-16	366	8784	VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	1054.08	100
STERLITE TPP	1	600	17-Sep-15	10-Jan-16	115	2757.92	ECONOMISER TUBE LEAKAGE	1654.75	31.4
STERLITE TPP	3	600	15-Jan-16	31-Mar-16	76	1830.7	RSD/LOW SCHEDULE	1098.42	20.84
STERLITE TPP	3	600	29-Jun-15	12-Sep-15	76	1812.05	RSD/LOW SCHEDULE	1087.23	20.63
SUB TOTAL	86	18190			11176	268217.99		38497.27	
NORTH EASTERN REGION									
CHANDRAPUR(ASSAM) TPS	1	30	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	263.52	100
CHANDRAPUR(ASSAM) TPS	2	30	1-Apr-15	31-Mar-16	366	8784	UNECONOMICAL OPERATION	263.52	100
SUB TOTAL	2	60			732	17568		527.04	
GRAND TOTAL	422	105681.0			44452	1066707.8		199070.7	

SECTION-5 OPERATING AVAILABILITY

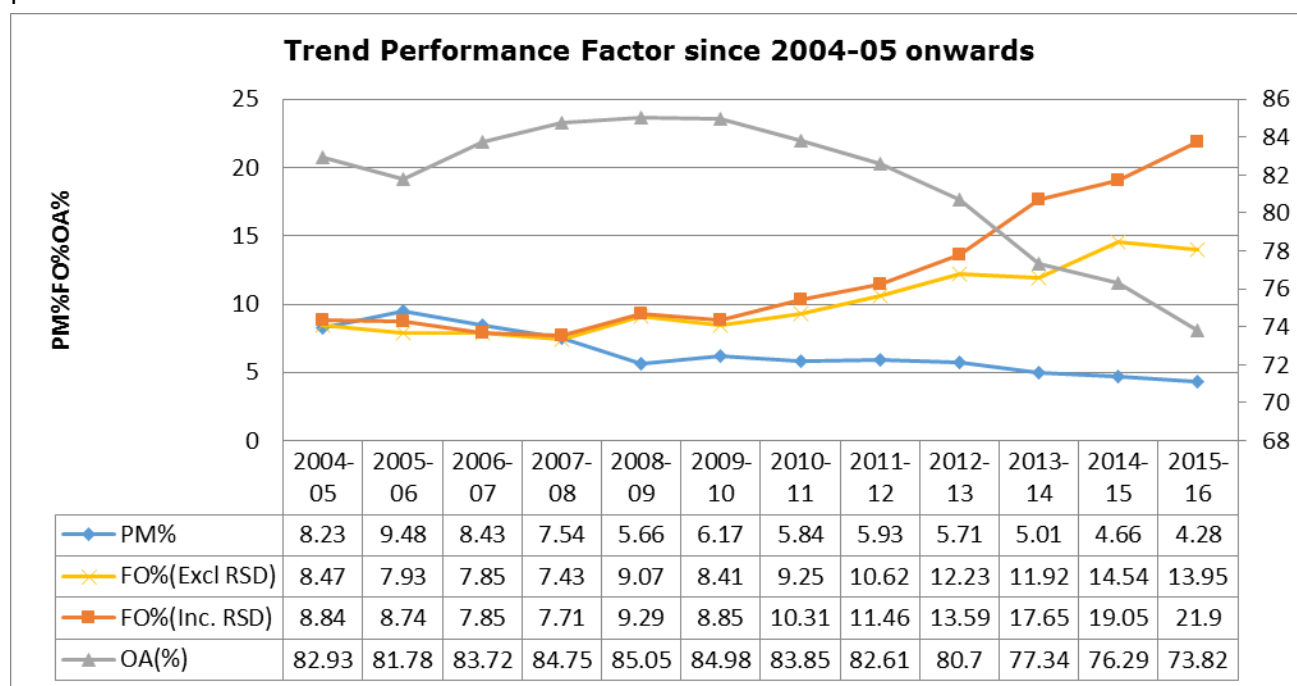
5.1 Based on the Planned Maintenance undertaken and Forced Outages occurred as brought out in Section 3 and 4 respectively, the Operating Availability for the 617 Thermal Generating Units aggregating to 173291.5 MW, covered in the Review, has been computed in this section.

5.2 During the year 2015-16, the overall Operating Availability of 73.82% has been achieved by the generating units under review. It was lower than the overall Operating Availability of 76.29% achieved during last year. Main reasons for lower Operating Availability vis-à-vis 2014-15 is the sharp increase in losses due to Reserve Shut Down – which increased from 4.5 % in 2014-15 to about 8 % in 2015-16. Thus, while the FO losses (excluding RSD) were lower in 2015-16 compare to 2014-15, the overall Forced Outage loss in 2015-16 has been higher due to higher RSD loss. Details of various components of Forced outage/shutdown and losses have been detailed in Section 4.

Forced and planned shutdown and corresponding operating availability of units reviewed from 2002-03 onwards are shown below:

OPERATING AVAILABILITY				
Year	Unavailability (%)			Operating Availability (%)
	Planned	Forced	Total	
2002-03	8.3	9.87	18.17	81.83
2003-04	8.59	9.46	18.07	81.93
2004-05	8.23	8.84	17.07	82.93
2005-06	9.48	8.74	18.22	81.78
2006-07	8.43	7.85	16.28	83.72
2007-08	7.54	7.71	15.23	83.72
2008-09	5.66	9.29	14.95	85.05
2009-10	6.17	8.25	14.42	85.58
2010-11	5.84	10.31	16.15	83.85
2011-12	5.93	11.46	17.39	82.61
2012-13	5.71	13.6	19.31	80.70
2013-14	5.01	17.65	22.66	77.34
2014-15	4.66	19.05	23.71	76.29
2015-16	4.28	21.90	26.18	73.82

As may be seen from the
f



figure, losses on account of Planned Maintenance have been coming down over the last five to six years and Forced Outages loss (excluding RSD) has also come down from last year but there is a rise in overall FO loss mainly due to RSD loss.

5.3 UNITWISE/ STATIONWISE OPERATING AVAILABILITY

The details of some of the stations/units showing highest Operating Availability during the year 2015-16 are highlighted below.

- Thirty-five Thermal Power stations achieved Operating Availability between 99% to 90%.
- 17 generating units achieved Operating Availability of more than 99 %. Some units achieved Operating Availability of 100% but these were mostly units commissioned towards the end of the year with short operating period.
- The details of these Thermal stations/generating units are as follows: -

Thermal Stations achieving the Operating Availability of 99 % to 90%

Stations with Operating Availability (%) more than 90% during 2015-16					
SL. NO.	STATION NAME	ORGANISATION NAME	STATE NAME	CAPACITY	OP. AV. (%)
1	AMARKANTAK EXT TPS	MPPGCL	MADHYA PRADESH	210	98.47

Stations with Operating Availability (%) more than 90% during 2015-16					
SL. NO.	STATION NAME	ORGANISATION NAME	STATE NAME	CAPACITY	OP. AV. (%)
2	SOUTHERN REPL. TPS	CESC	WEST BENGAL	135	97.1
3	BUDGE BUDGE TPS	CESC	WEST BENGAL	750	95.87
4	PARAS TPS	MAHAGENCO	MAHARASHTRA	500	95.58
5	TORANGALLU TPS(SBU-I)	JSWEL	KARNATAKA	260	95.54
6	SINGRAULI STPS	NTPC Ltd.	UTTAR PRADESH	2000	95.12
7	GMR WARORA TPS	GMR ENERG	MAHARASHTRA	600	94.77
8	SIMHADRI	NTPC Ltd.	ANDHRA PRADESH	2000	94.44
9	RAYALASEEMA TPS	APGENCO	ANDHRA PRADESH	1050	94.15
10	RAMAGUNDEM STPS	NTPC Ltd.	TELANGANA	2600	94.13
11	KAHALGAON TPS	NTPC Ltd.	BIHAR	2340	94.07
12	SABARMATI (D-F STATIONS)	TOR. POW. (UNOSUGEN)	GUJARAT	362	94.05
13	UNCHAHAAR TPS	NTPC Ltd.	UTTAR PRADESH	1050	93.95
14	TORANGALLU TPS(SBU-II)	JSWEL	KARNATAKA	600	93.7
15	SASAN UMTTP	SPL	MADHYA PRADESH	3960	93.46
16	MUNDRA TPS	APL	GUJARAT	4620	93.39
17	CHAKABURA TPP	ACB	CHHATTISGARH	30	93.28
18	DSPM TPS	CSPGCL	CHHATTISGARH	500	93.22
19	ANPARA TPS	UPRVUNL	UTTAR PRADESH	1630	93.13
20	TALCHER STPS	NTPC Ltd.	ORISSA	3000	93.01
21	BUTIBORI TPP	VIP	MAHARASHTRA	600	92.94
22	KORBA-III	CSPGCL	CHHATTISGARH	240	92.73
23	DAHANU TPS	RIL (DAHANU)	MAHARASHTRA	500	92.7
24	TALCHER (OLD) TPS	NTPC Ltd.	ORISSA	460	92.13
25	KOTHAGUDEM TPS	TSGENCO	TELANGANA	720	91.94
26	BHILAI TPS	NSPCL	CHHATTISGARH	500	91.85
27	KORBA STPS	NTPC Ltd.	CHHATTISGARH	2600	91.77
28	IB VALLEY TPS	OPGC	ORISSA	420	91.67
29	KOTHAGUDEM TPS (NEW)	TSGENCO	TELANGANA	1000	91.58
30	JSW RATNAGIRI TPP	JSWEL	MAHARASHTRA	1200	91.42

Stations with Operating Availability (%) more than 90% during 2015-16					
SL. NO.	STATION NAME	ORGANISATION NAME	STATE NAME	CAPACITY	OP. AV. (%)
31	Dr. N.TATA RAO TPS	APGENCO	ANDHRA PRADESH	1760	91.29
32	KAMALANGA TPS	GMR ENERG	ORISSA	1050	91.19
33	KORBA-WEST TPS	CSPGCL	CHHATTISGARH	1340	90.97
34	MAITHON RB TPP	MPL	JHARKHAND	1050	90.43
35	NEYVELI (EXT) TPS	NLC	TAMIL NADU	420	90.4

Thermal Units achieving the Operating Availability of greater than 99%

Units with Operating Availability (%) more than 99% during 2015-16						
SL. No.	Station Name	Unit No.	Organization name	State name	Capacity	OP. AV. (%)
1	TITAGARH TPS	1	CESC	WEST BENGAL	60	99.93
2	JOJOBERA TPS	3	TATA PCL	JHARKHAND	120	99.89
3	JOJOBERA TPS	4	TATA PCL	JHARKHAND	120	99.88
4	SIMHADRI	1	NTPC Ltd.	ANDHRA PRADESH	500	99.8
5	TITAGARH TPS	3	CESC	WEST BENGAL	60	99.77
6	KAHALGAON TPS	3	NTPC Ltd.	BIHAR	210	99.69
7	RAMAGUNDEM STPS	3	NTPC Ltd.	TELANGANA	200	99.66
8	SOUTHERN REPL. TPS	2	CESC	WEST BENGAL	68	99.62
9	TITAGARH TPS	2	CESC	WEST BENGAL	60	99.6
10	UNCHAHAH TPS	2	NTPC Ltd.	UTTAR PRADESH	210	99.52
11	SINGRAULI STPS	5	NTPC Ltd.	UTTAR PRADESH	200	99.44
12	Dr. N.TATA RAO TPS	4	APGENCO	ANDHRA PRADESH	210	99.4
13	SIMHADRI	4	NTPC Ltd.	ANDHRA PRADESH	500	99.37
14	MUNDRA TPS	2	APL	GUJARAT	330	99.29
15	TORANGALLU TPS(SBU-II)	4	JSWEL	KARNATAKA	300	99.25
16	UNCHAHAH TPS	3	NTPC Ltd.	UTTAR PRADESH	210	99.21
17	SINGRAULI STPS	1	NTPC Ltd.	UTTAR PRADESH	200	99.19

5.3 SECTORWISE OPERATING AVAILABILITY

5.3.1 Among different Sectors, the Central Sector achieved highest overall Operating Availability of 80.55 % during 2015-16; though this was lower than the last year Operating Availability of 83.39 %. The Operating Availability of Private sector increased to 73.57% during the year 2015-16 from 72.03% during 2014-15. The Operating Availability of State sector was 68.36 % in the year 2015-16 vis-à-vis 73.54 % in 2014-15. The Sector Wise Planned Maintenance, forced outages and Operating Availability of generating units for the last three years were as under: -

SECTOR	Planned Maintenance (%)			Forced Outage (%)			Operating Availability (%) (100-PM%-FO %)		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
1. Central	4.01	4.31	4.71	10.45	12.3	14.74	85.54	83.39	80.55
2. State	6.92	6.18	5.34	19.99	20.28	26.30	73.09	73.54	68.36
3. Private	2.94	3.20	3.55	20.81	24.77	23.50	76.25	72.03	73.57

5.4 CAPACITY GROUP WISE OPERATING AVAILABILITY

5.4.1 The capacity group wise Planned Maintenance, Forced Outages and Operating availability for 2015-16 and previous two years is given in the Table below. The operating availability of capacity group 25-99 MW has decreased significantly – the main causes are Reserve Shut Down, vintage units closed for operation and commercial reasons in some units. The Operating Availability of 250 MW capacity group has also dropped sharply due to significantly higher RSD losses.

Capacity Group (MW)	Planned Maintenance (%)			Forced Outage (%)			Operating Availability (%)		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
660-800	1.53	2.73	2.72	16.58	15.85	16.66	81.89	81.42	80.62
490-600	4.03	4.13	4.16	16.06	18.66	18.26	79.91	77.21	77.58
300-360	2.05	3	1.99	18.72	17.65	17.45	79.23	79.35	80.56
250-250	4.6	2.85	4.31	13.93	19.12	29.79	81.47	78.03	65.90
210-210	5.45	5.06	4.74	14.34	15.01	22.02	80.21	79.93	73.24
195-200	12.7	11.05	11.81	6.77	9.75	7.53	80.53	79.20	80.66

Capacity Group (MW)	Planned Maintenance (%)			Forced Outage (%)			Operating Availability (%)		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
100-150	10.44	9.43	5.39	33.88	32.54	38.48	55.68	58.03	56.13
25-99	4.89	4.85	5.56	34.22	38.72	50.62	60.89	56.43	43.82
ALL INDIA	5.01	4.66	4.28	17.65	19.05	21.90	77.34	76.29	73.82

5.5 REGIONWISE OPERATING AVAILABILITY

Southern Region had the highest overall Operating Availability of 82.79 %. All other regions had Operating Availability of around 72 %. NE region had only one Stations which remained under Forced outage for the whole year thus leading to Forced outage of 100 %. The Region-wise Planned Maintenance, forced outages and Operating Availability of generating units for the year 2015-16 were as under: -

Region	Planned Maintenance (%)	Forced Outage(%)	Operating Availability (%)
NORTHERN	5.31	24.30	70.39
WESTERN	3.33	24.46	72.21
SOUTHERN	5.07	12.14	82.79
EASTERN	4.44	22.62	72.94
NORTH EASTERN	0.00	100.00	0.00
ALL INDIA TOTAL	4.28	21.90	73.82

5.6 MAKEWISE OPERATING AVAILABILITY:

The Operating Availability of 77.36% achieved by CHINA/CHINA make units was the highest among the units of different makes. The Planned maintenance (%), Forced outage (%) and Operating Availability (%) of units of different make during 2015-16 and previous two years were as under:

Make of Units TG / BOILER	Planned Maintenance (%)			Forced Outage(%)			Operating Availability (%)		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
BHEL/BHEL	6.08	5.38	4.88	14.3	16.88	23.12	79.62	77.74	72.00
BHEL/ABL	8.26	7.69	3.89	32.74	34.18	47.21	59	58.13	48.9
CHINA/CHINA	2.57	4.12	2.77	23.66	20.09	19.87	73.77	85.79	77.36
RUSSIA/RUSSIA	4.19	3.67	5.34	12.86	14.93	17.99	82.95	81.40	76.67

OTHER	3.62	3.03	4.38	20.94	22.71	19.86	75.44	74.26	75.76
ALL MAKE	5.01	4.66	4.28	17.65	19.0	22.20	77.34	76.29	73.82

As may be seen, the Operating Availability of all the makes has reduced substantially from the last year mainly due to higher RSD outages during the current year. The China/China make shows the highest Operating Availability. However, there is a remarkable difference between BHEL/BHEL and China/China make units in the losses/outages due to factors not attributable to unit performance – like Reserve Shut Down, Coal shortages, long outages for Renovation & Modernization, and unit closure due uneconomical operation/ old vintage units under permanent shutdown awaiting closure. BHEL/BHEL make units have considerably higher outages due to these reasons. Accounting for the above factors, the BHEL/BHEL make shows much higher Operating Availability than the China/China make.

The BHEL/ABL, RUSSIA/RUSSIA and OTHER make groups are small groups with total capacity of around 3000 MW in each group.

5.7 OPERATING AVAILABILITY OF SYSTEMS

The Operating Availability of different systems / areas during the years 2014-15 and 2015-16 are shown in the Table below. It may be seen that equipment availability in 2015-16 has been marginally higher in all areas, and the lower overall Operating Availability in 2015-16 is due to higher unavailability due to "Other" reasons.

Systems / Areas	OPERATING AVAILABILITY	
	(%)	
	2014-15	15-16
BOILER & AUXILIARIES	95.32	96.05
TURBINE & AUXILIARIES	98.28	98.69
GENERATOR	98.1	99.09
OTHERS	84.57	80.0
Over All	76.29	73.82

5.8 MONTHWISE OPERATING AVAILABILITY

During the year 2015-16, the highest Operating Availability of 78.06% was achieved during Oct, 2015 and lowest Operating Availability of 70.16% during Aug'15. Month wise Planned Maintenance (%), Forced outage (%) and Operating Availability (%) during 2014-15 and 2015-16 are shown below:

Month	Unavailability (%)				Operating Availability (%)	
	Planned (%)		Forced (%)			
	2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
April	3.27	4.60	17.96	22.51	78.77	72.89
May	4.28	2.93	15.97	19.33	79.75	77.74
June	5.26	5.58	16.64	19.70	78.1	74.72
July	5.67	5.88	17.4	20.09	76.93	74.03
August	7.72	5.71	19.07	24.13	73.21	70.16
September	6.09	5.39	21.39	19.53	72.52	75.08
October	3.85	4.66	17.84	17.28	78.31	78.06
November	3.57	4.30	17.82	22.43	78.61	73.27
December	4.98	3.75	17.87	21.87	77.15	74.38
January	4.18	3.09	18.18	20.60	77.64	76.31
February	3.37	3.77	16.45	18.53	80.18	77.70
March	3.41	4.46	21	21.06	75.59	74.48
April – March	4.66	4.28	19.05	21.90	76.29	73.82

5.9 OPERATING AVAILABILITY – ORGANISATION WISE

Organization wise operating availability in respect of Central Sector, State Sector and Pvt. Utilities during 2015-16 is given below:

Sl. No.	Organization/ Utility	No of units Reviewed	Capacity (mw)	PM (%)	FO (%)	OP. Av. (%)
CENTRAL SECTOR						
1	NTPC Ltd.	100	34385	5.22	7.4	87.38
2	APCPL	3	1500	3.73	30.15	66.12
3	DVC	24	7400	2.16	37.45	60.39
4	K.B.U.N.L	2	220	0	56.74	43.26
5	NLC	22	3240	6.66	14.65	78.69
6	NSPCL	2	500	8.15	0	91.85
7	NTECL	3	1500	4.98	19.08	75.94
8	NTPL	2	1000	0.18	36.12	63.7
9	PVUNL	10	770	0	85.9	14.1
	CENTRAL SECTOR	168	50515	4.71	14.74	80.55
STATE SECTOR						
NORTHERN REGION						
1	HPGCL	12	3160	1.26	48.54	50.2
2	IPGCL	2	135	0	94.99	5.01

Sl. No.	Organization/ Utility	No of units Reviewed	Capacity (mw)	PM (%)	FO (%)	OP. Av. (%)
3	PSPCL	14	2620	1.56	59.41	39.03
4	RRVUNL	21	5190	8.57	28.35	63.08
5	UPRVUNL	26	4923	13.29	13.64	73.07
WESTERN REGION						
6	CSPGCL	14	2780	2.25	7.09	90.66
7	GMDCL	2	250	3.48	8.53	87.99
8	GSECL	26	4720	3.7	42.85	53.45
9	MAHAGENCO	34	9060	5.29	27.7	67.01
10	MPPGCL	14	4080	2.91	31.85	65.24
SOUTHERN REGION						
11	APGENCO	12	2810	5.34	2.3	92.36
12	APPDCL	2	1600	2.63	37.23	60.14
13	KPCL	10	2720	7.03	11.32	81.65
14	TNGDCL	20	4770	6.54	14.04	79.42
15	TSGENCO	14	2882.5	5.42	3.87	90.71
EASTERN REGION						
16	DPL	6	880	0.84	66.48	32.68
17	OPGC	2	420	4.34	3.99	91.67
18	TVNL	2	420	0	12.52	87.48
19	WBPDC	24	4340	3.96	29.77	66.27
NORTH EASTERN REGION						
20	APGPCL	2	60	0	100	0
	STATE SECTOR	259	57820.5	5.34	26.3	68.36
PRIVATE UTILITY						
WESTERN REGION						
1	RIL (DAHANU)	2	500	2.44	4.86	92.7
2	TATA PCL	4	1400	2.22	45.59	52.19
3	TOR. POW. (UNOSUGEN)	5	422	3.62	13.91	82.47
EASTERN						
4	CESC	13	1285	2.51	12.78	84.71
	PRIVATE UTILITY	24	3607	2.52	24.56	72.93
PRIVATE IPPs						
NORTHERN REGION						
1	APL	2	1320	6.04	5.14	88.82
2	BEPL	10	450	15.01	36.18	48.81
3	JhPL(HR)	2	1320	0	38.9	61.1
4	LAPPL	2	1200	2.94	7.95	89.11
5	LPGCL	1	660	0	85.00	15.00
6	NPL	2	1400	4.36	10.52	85.12
7	PPGCL (Jaypee)	1	660	0	93.36	21.84
8	RPSCCL	4	1200	4.05	23.25	72.7
9	RWPL (JSW)	8	1080	3.13	10.93	85.94

Sl. No.	Organization/ Utility	No of units Reviewed	Capacity (mw)	PM (%)	FO (%)	OP. Av. (%)
10	TSPL	3	1980	0	40.49	59.51
WESTERN REGION						
11	ACB	3	300	4.41	9.67	85.92
12	AMNEPL	4	246	0	100	0
13	APL	14	7920	2.55	9.06	88.39
14	BALCO	2	600	0	14.74	85.26
15	BLAPPL	1	45	0	46.37	53.63
16	CGPL	5	4000	4.69	13.08	82.23
17	DBPCL	2	1200	1.71	34.82	63.47
18	DIPL	2	600	0	85.45	14.55
19	EPGL	2	1200	12.28	18.52	69.2
20	ESSARPMPL	1	600	0	100	0
21	GCEL	1	685	0	79.68	20.32
22	GEPL	2	120	0	100	0
23	GIPCL	4	500	4.65	14.31	81.04
24	GMR ENERG	2	600	2.49	2.74	94.77
25	IEPL	1	270	0	100	0
26	JPL	7	2800	0.85	52.18	46.97
27	JPPVL	4	1820	1.7	37.9	60.4
28	JSWEL	4	1200	2.74	5.84	91.42
29	KWPCL	1	600	0	76.83	23.17
30	LANCO	2	600	2.31	34.96	62.73
31	MBPMPL	1	600	0	32.4	67.6
32	MCCPL	1	300	0	24.45	75.55
33	RKMPL	2	720	0	0	100
34	Rattan India	5	1350	0	36.48	63.52
35	SCPL	1	50	0.74	30.17	69.09
36	SPL	6	3960	0	6.54	93.46
37	STPL	1	270	0	100	0
38	SVPL	1	63	0	84.08	15.92
39	VESPL	1	35	0	100	0
40	VIP	2	600	4.77	2.29	92.94
41	VVL	1	135	0	100	0
42	WPCL	6	1740	0	33.57	66.43
SOUTHERN REGION						
43	CEPL	2	1200	9.71	31.36	58.93
44	HNPC	1	520	0	52.93	47.07
45	IBPIL	2	300	1.92	53.24	44.84
46	ITPCL	1	600	0	18.69	81.31
47	JSWEL	4	860	4.51	1.23	94.26
48	MEL	2	300	10.73	9.51	79.76
49	SEIL	2	1320	0	14.33	85.67

Sl. No.	Organization/ Utility	No of units Reviewed	Capacity (mw)	PM (%)	FO (%)	OP. Av. (%)
50	SEPL	4	600	3.91	11.25	84.84
51	ST-CMSECP	1	250	6.62	6.56	86.82
52	UPCL	2	1200	1.78	12.19	86.03
EASTERN REGION						
53	ADHUNIK	2	540	9.66	18.23	72.11
54	GMR ENERG	3	1050	0	8.81	91.19
55	HEL	2	600	0.41	11.01	88.58
56	JITPL	2	1200	1.25	20.32	78.43
57	MPL	2	1050	4.27	5.3	90.43
58	SEL	4	2400	11.27	28.56	60.17
59	TATA PCL	3	360	0	0.09	99.91
	PRIVATE IPP	166	61349	2.96	23.43	73.61
	ALL INDIA	617	173291.5	4.28	21.9	73.82

SECTION-6 CAPACITY GROUPWISE PERFORMANCE

6.1 This section covers the performance analysis of various capacity groups of thermal units during last three years. As on 31st March 2016, capacity group-wise

Capacity Group Wise Disposition of thermal units												
	BHEL/BHEL		ABL/BHEL		RUSSIA/RUSSIA		CHINA/CHINA		OTHER/OTHER		TOTAL	
Capacity	NO.	CAP. (MW)	NO.	CAP. (MW)	NO.	CAP. (MW)	NO.	CAP. (MW)	NO.	CAP. (MW)	NO.	CAP. (MW)
25-99	15	1108	0	0	18	930	7	429	43	2237.5	83	4704.5
100-150	55	6347	6	710	3	300	18	2475	20	2530	102	12362
195-200	22	4390	0	0	0	0	0	0	3	600	25	4990
210-210	117	24570	11	2310	10	2100	0	0	5	1050	143	30030
250-270	59	14910	0	0	0	0	0	0	5	1270	64	16180
300-360	0	0	0	0	0	0	37	11490	0	0	37	11490
490-600	86	44350	0	0	0	0	24	14,400	8	4000	118	62,750
660-800	4	2640	0	0	0	0	25	1650	16	11645	45	30,785
Total	358	98315	17	3020	31	3330	111	45294	100	23332.50	617	173,292

disposition of 617 units considered in the review is as shown below:

6.2 CAPACITY GROUPWISE PERFORMANCE

Capacity group wise performance of these 617 thermal units is discussed in the subsequent paragraphs.

6.2.1 660-800 MW CAPACITY GROUP (SUPERCRITICAL UNITS)

6.2.1.1 At the end of year 2015-16, 51 super critical units were operational in the grid, out of these, 45 units which had been reckoned for PLF calculation have been considered in the Review. The Plant load factor of the group was 69.36%. Performance of 660-800 MW capacity group units during the years 2014-15 and 2015-16 are given below: -

Sl. No.	PARTTICULARS	2014-15	2015-16
1	UNITS COMMISSIONED BY HE END OF THE YEAR		

	(a) Number	40	51
	(b) Capacity (MW)	27,485	34,950
2	UNITS REVIEWED		
	(a) Number	27	45
	(b) Capacity (MW)	18,560	30,785
	(c) Generation (MU)	109,484.59	164,079.75
3	Planned Maintenance (%)	2.73	2.72
4	Forced outage (%)	15.85	16.66
5	Operating Availability (%)	81.42	80.62
6	Plant Load Factor (%)	68.23	69.36

As may be seen, this Capacity Group showed much higher Operating Availability than the overall Operating Availability of the units considered in the review.

- 6.2.1.2** During the year 2015-16, energy losses due to forced outage in respect of 660-800 MW capacity group unit was **38108.78** MU. The maximum energy loss of 13059.23 MU was due to Boiler & Boiler Aux. problem. These accounted for over 1/3rd of the total forced outage losses of the group. Details of Forced outages and energy loss of 660-800 MW capacity group units and areas of outages for the years 2014-15 and 2015-16 are shown below:

Area/ cause of Outage of 660-800 MW capacity group	No. of Outages		MU Loss		% of Group Forced outage losses	
	2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
I. EQUIPMENT						
1. Boiler	93	108	8,262.63	10,736.94	33.15	28.17
2. Turbine	38	36	2,880.95	2,745.22	11.56	7.2
3. Generator	24	26	2,067.02	1,460.55	8.29	3.83
Total	155	170	13,210.6	14,942.71	53	39.21
II. AUXILIARIES						
1. Boiler	16	40	672.59	2,322.29	2.7	6.09
2. Turbine	22	22	1,699.99	2,208.71	6.82	5.8
Total	38	62	2,372.57	4,531	9.52	11.89
III. Boiler & Boiler Aux.	109	148	8,935.21	13,059.23	35.85	34.27
IV. Turbine & Turbine Aux.	60	58	4,580.94	4,953.93	18.38	13
V. Generator	24	26	2,067.02	1,460.55	8.29	3.83
VI. Misc. (Elect. /Mech.)	74	82	7,456.97	8,490.54	29.92	22.28

VII. Total excluding RSD of the Group	267	314	23,040.15	27,964.25	92.44	73.38
VIII. RSD	12	49	1,883.66	10,144.52	7.56	26.62
Total	279	363	24,923.81	38,108.78	100	100

6.2.1.3 The details of the area/causes of forced outages and energy loss of this capacity group unit during the years 2014-15 and 2015-16 are given below.

Area/ cause of outage (660-800 MW Capacity group)	No. of Outages		MU Loss		% of Group F.O. Loss	
	14-15	15-16	14-15	15-16	14-15	15-16
I. Equipment						
A. Boiler						
1. Water Wall Tube Leakage	54	37	4189.13	4338.7	16.81	11.39
2. Super Heater Tube Leakage	1	4	6.82	599.35	0.03	1.57
3. Reheater Tube Leakage	3	5	1082.5	159.05	4.34	0.42
4. Economizer Tube Leakage	6	0	217.01	0	0.87	0
5. Air Preheaters Problem	7	24	533.95	3586.66	2.14	9.41
6. Furnace Trouble	1	0	152.74	0	0.61	0
7. Boiler Operational Problems						
(A) FURNACE FIRE OUT/FLAME FAILURE	4	7	101.92	115.53	0.41	0.3
(B) FURNACE DRAFT ABNORMAL	4	4	193.35	63.2	0.78	0.17
8. Others	13	26	1785.21	1872.87	7.16	4.91
Total Boiler	93	108	8262.63	10736.94	33.15	28.17
B. Turbine						
1.Turbine Bearing Problem	3	1	312.1	3.07	1.25	0.01
2.Governing / Oil System Problem	2	3	7.38	370.8	0.03	0.97
3.Turbine Differential Expansion Problem	0	0	0	0	0	0
4.Turbine Axial Shift/ Thrust Pad Problem	2	3	164.14	587.98	0.66	1.54
5.Turbine Eccentricity/ High Vibration	-	0	0	0	0	0
6.Turbine Rotor Failure/Damaged	4	0	865.51	0	3.47	0
7.Turbine Control Valve Problem	6	1	665.13	1.6	2.67	0
8.Condenser Tube Leakage	7	7	522.73	642.48	2.1	1.69
9.Main Steam Line Problem	0	8	0	484.86	0	1.27
10.Emergency Safety Valve Closure	5	0	30.32	0	0.12	0

Area/ cause of outage (660-800 MW Capacity group)	No. of Outages		MU Loss		% of Group F.O. Loss	
	14-15	15-16	14-15	15-16	14-15	15-16
11. Condenser Low Vacuum	2	4	45.1	40.88	0.18	0.11
12. H.P. & L.P. Bypass System	7	2	268.54	381.75	1.08	1
13. Turbine Misc. Problems	0	7	0	231.81	0	0.61
Total Turbine	38	36	2880.95	2745.22	11.56	7.20
C. Generator						
1. Stator/ Stator Earth Fault	1	0	59.06	0	0.24	0
2. Rotor/ Rotor Earth Fault	1	0	28.1	0	0.11	0
2. Gen. Transformer Tripping/ Damaged	3	3	94.89	294.54	0.38	0.77
3. Excitation Problem	3	3	11.4	245.96	0.05	0.65
4. Gen. Cooling System Failure	1	2	2.25	70.58	0.01	0.19
5. Seal Oil System Problem	0	1	0	12.74	0	0.03
6. Fire In Gen. Bushing/ Bushing Failure	1	0	480.16	0	1.93	0
6. Generator Bearing Problem	2	2	425.44	746.18	1.71	1.96
7. A.V.R. Problem	0	0	0	0	0	0
8. Generator Protection/ Relay Operation Problem	8	12	198.84	79.8	0.8	0.21
9. Hydrogen Pressure Problem	4	0	766.87	0	3.08	0
10. Generator Miscellaneous Maintenance	0	3	0	10.75	0	0.03
Total Generator	24	26	2067.02	1460.55	8.29	3.83
Ii. Auxiliaries						
A. Boiler Auxiliaries						
1. I.D. Fans Problem	4	4	292.37	620.47	1.17	1.63
2. F.D. Fans Problem	1	4	0.88	65.96	0	0.17
3. P.A. Fans Problem	6	18	230.99	673.49	0.93	1.77
4. Milling System /RC Feeder Problem	2	4	40.97	248.64	0.16	0.65
5. PIPES And VALVES BOILER SIDE	0	0	0	0	0	0
6. Boiler Aux. Misc. Problems	3	10	107.38	713.74	0.43	1.87
Total Boiler Aux.	16	40	672.59	2322.29	2.7	6.09
B. Turbine Auxiliaries						
7. Boiler Feed Pump/Motor Problem	6	8	91.79	178.21	0.37	0.47

Area/ cause of outage (660-800 MW Capacity group)	No. of Outages		MU Loss		% of Group F.O. Loss	
	14-15	15-16	14-15	15-16	14-15	15-16
8. Condensate Pump Problem	0	0	0	0	0	0
9. C.W. Pump Problem	2	4	9.54	225.44	0.04	0.59
10. Regenerative System Problem	2	6	840.85	1172.53	3.37	3.08
11. Turbine Pipes & Valves Problem	3	0	134	0	0.54	0
12. Deaerator Problem	0	0	0	0	0	0
13. Turbine Misc.	9	4	623.81	632.53	2.5	1.66
Total Turbine Aux.	22	22	1699.99	2208.71	6.82	5.8
Total Boiler & Turbine Aux.	38	62	2372.57	4531	9.52	11.89
Other Electrical Problems						
1. Unit Auxiliary/Station Transformer Problems	4	5	157.19	567.24	0.63	1.49
2. Gen. Transformer Tripping/ Damaged	3	5	9.97	37.87	0.04	0.1
3. H.T./L.T. Supply Problem	3	2	56.44	2.62	0.23	0.01
4. Dc Supply Problem	0	2	0	4.14	0	0.01
5. Switch Yard/Bus Bar Problem	6	13	29.85	232.74	0.12	0.61
6. Breaker/Isolator Problems	0	2	0	9.26	0	0.02
7. Electrical Miscellaneous Problems	16	17	714.9	1076.75	2.87	2.83
Total Other Electrical Problems	35	52	1369.53	1930.62	5.5	5.43
B. Fuel Supply And Other Misc. Problems						
9. Coal FEEDING PROBLEM	3	3	612.57	1396.43	2.46	3.66
10. Lignite Feeding Problem	7	0	1073.48	0	4.31	0
12. Fuel Oil Problem	0	2	0	141.15	0	0.37
13. Cooling Tower Problem	0	1	0	150.6	0	0.4
14. Ash Handling System Problem	5	3	1392.86	505.92	5.59	1.33
15. Raw Water Problem	0	0	0	0	0	0
16. E.S.P. / Pollution Problem	0	1	0	54.63	0	0.14
17. Non-Readiness Of Residual Work Of New Unit	2	2	376.25	1005.13	1.51	2.64
18. Vintage Unit Withdrawn And Closed For Operation	0	0	0	0	0	0
19. Fuel Supply & Other Misc. Problems	1	6	421.09	135.56	0.08	0.36
20. Other Misc. Problems	3	1	401.19	336.3	1.61	0.88

Area/ cause of outage (660-800 MW Capacity group)	No. of Outages		MU Loss		% of Group F.O. Loss	
	14-15	15-16	14-15	15-16	14-15	15-16
21. Coal Shortage	1	1	516.97	151.46	2.08	0.4
22. Lignite Shortage	1	0	27.74	0	0.11	0
Total Fuel Supply And Other Misc. Problems	23	20	4420.96	3877.18	17.75	10.18
Grid System						
24. Transmission Constraints/ Grid Disturbance	16	15	347.95	166.21	1.4	0.44
25. Reserve Shut Down/ Low Schedule	12	49	1883.66	10144.52	7.56	26.62
27. NO Power Purchase Agreement	0	1	0	2516.52	0	6.6
Total Grid System	28	65	2231.61	12827.25	8.96	33.66
Total Miscellaneous	89	190	9741.82	18635.1	39.09	49.27

6.2.2 490-600 MW CAPACITY GROUP

6.2.2.1 Performance of 490-600 MW capacity group units during the years 2013-14 ,2014-15 and 2015-16 are given below-

S.N.	PARTTICULARS	2013-14	2014-15	2015-16
1	Units Commissioned By The End Of The Year			
	(a) Number	99	111	129
	(b) Capacity (MW)	51730	58730	68670
2	Units Reviewed			
	(a) Number	87	101	118
	(b) Capacity (MW)	45130	52930	62750
	(c) Generation (MU)	256684.27	290852.83	331017.39
3	Planned Maintenance (%)	4.03	4.13	4.16
4	Forced outage (%)	16.06	18.66	18.26
5	Operating Availability (%)	79.91	77.21	77.58
6	Plant Load Factor (%)	67.66	63.95	65.03

Details of outages and energy loss of 490-600 MW capacity group units on account of outages of various equipment and auxiliaries for the previous three years are shown below.

Area/ cause of Outage	No. of Outages	MU Loss	% of Group F.O. Losses
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Area/ cause of outage (490- 600MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
(A) Furnace Fire Out/Flame Failure	67	68	50	1257.97	1642.46	284.98	2.09	1.96	0.31
(B) Furnace Draft Abnormal	20	26	26	68.96	346.88	255.35	0.11	0.41	0.27
(C) Drum Level High/ Low	36	24	31	838.73	1316.93	156.23	1.39	1.57	0.17
8. Others	8	9	31	181.55	910.86	1761.16	0.3	1.09	1.89
Total Boiler	408	396	455	12170.88	16370.4	15613.45	20.24	19.57	16.76
B. Turbine									
1.Turbine Bearing Problem	3	3	6	44.34	693.11	438.19	0.07	0.83	0.47
2.Governing / Oil System Problem	3	6	8	10.6	51.56	415	0.02	0.06	0.45
3.Turbine Differential Expansion	2	1	4	3.62	1.74	10.78	0.01	0	0.01
4.Turbine Axial Shift/ Thrust Pad	1	1	0	1.43	23.3	0	0	0.03	0
5.Turbine Eccentricity/ High Vibration	9	14	22	2976.24	2344.7	1380.23	4.95	2.8	1.48
6.Turbine Rotor Failure/Damaged	0	0	0	0	0	0	0	0	0
7.Turbine Control Valve Problem	4	3	6	96.34	8.26	195.3	0.16	0.01	0.21
8.Condenser Tube Leakage/ Cleaning	2	4	5	51.37	261.3	190.09	0.09	0.31	0.2
9.Main Steam Line Problem	9	6	12	77.3	53.97	190.15	0.13	0.06	0.2
10.Emergency Safety Valve Closure	1	0	3	1.5	0	74.98	0	0	0.08
11.Condenser Low Vacuum	17	19	16	486.08	206.71	125.58	0.81	0.25	0.13
12. H.P. & L.P. Bypass System	6	1	7	66.85	267.53	243.75	0.11	0.32	0.26
13.Turbine Misc. Problem	17	21	17	192.01	392.33	918.41	0.32	0.47	0.99
Total Turbine	74	79	106	4007.68	4304.52	4182.48	6.66	5.15	4.49
C. Generator									
1. Stator/ Stator Earth Fault	12	5	14	142.27	39.73	184.49	0.24	0.05	0.2
2. Rotor/ Rotor Earth Fault	0	1	3	0	2.41	91.37	0	0	0.1
3. Gen. Transformer Tripping/ Damaged	7	8	3	473.96	2226.76	16.58	0.79	2.66	0.02
4. Excitation Problem	4	6	7	15.62	18.26	1088.72	0.03	0.02	1.17
5. Gen. Cooling System Failure	3	0	3	8.66	0	227.01	0.01	0	0.24

Area/ cause of outage (490- 600MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
6. Seal Oil System Problem	1	3	1	13.42	29.9	7.52	0.02	0.04	0.01
7. Fire In Turbo Gen. Bushing/ Bushing Failure	1	1	1	966.11	3268.5	1.63	1.61	3.91	0
8. Generator Bearing Problem	0	1	2	0	546.05	93.27	0	0.65	0.1
9. A.V.R. Problem	2	3	6	51.69	283.36	208.89	0.09	0.34	0.22
10. Generator Protection/ Relay Operation Problem	33	75	38	513.88	4024.63	1536.26	0.85	4.81	1.65
11. Hydrogen Pressure Problem	7	5	2	1069.86	1778.15	36.64	1.78	2.13	0.04
12. Generator Miscellaneous Maintenance	7	8	7	18.8	12.19	76.65	0.03	0.01	0.08
Total Generator	77	116	87	3274.29	12230	3569.04	5.44	14.62	3.83
ii Auxiliaries									
A. Boiler Auxiliaries									
1. I.D. Fans Problem	16	7	17	423.79	264.74	239.99	0.7	0.32	0.26
2. F.D. Fans Problem	2	1	6	1.73	18.84	94.32	0	0.02	0.1
3. P.A. Fans Problem	17	30	32	95.59	347.47	410.01	0.16	0.42	0.44
4. Milling System /RC Feeder Problem	5	4	3	103.69	90.28	196.16	0.3	0.15	0.21
5. Pipes And Valves Boiler Side	20	27	31	68.08	191.86	554.53	0.19	0.32	0.6
6. Boiler Aux. Misc. Problems	16	14	8	1689.97	303.41	136.32	4.84	0.5	0.15
Total Boiler Aux.	74	80	97	2884.33	1106.64	1631.33	8.26	1.84	1.75
B. Turbine Auxiliaries									
1. Boiler Feed Pump/Motor Problem	13	11	29	200.5	293.14	298.65	0.33	0.35	0.32
2. Condensate Pump Problem	0	0	4	0	0	20.66	0	0	0.02
3. C.W. Pump Problem	5	9	11	62.5	253.08	544.54	0.1	0.3	0.58
4. Regenerative System Problem	1	0	0	1.2	0	0	0	0	0
5. Turbine Pipes & Valves Problem	0	0	0	0	0	0	0	0	0
6. Deaerator Problem	0	0	0	0	0	0	0	0	0
7. Turbine Misc.	15	10	14	183.04	365.14	132.79	0.3	0.44	0.14
Total Turbine Aux.	34	30	58	447.24	911.36	996.64	0.74	1.09	1.07
Total Boiler & Turbine Aux.	114	110	155	1553.88	2584.32	2627.97	2.58	3.09	2.82

Area/ cause of outage (490- 600MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
IIIii Others Misc. Problems									
A. Other Electrical Problems									
1. Unit Aux. Transformer/ Station Transformer Problems	15	5	12	397.72	75.86	38.4	0.66	0.09	0.04
2. Gen. Transformer Tripping/ Damaged	16	12	21	445.86	756.95	328.55	0.74	0.9	0.35
3. H.T./L.T. Supply Problem	2	3	4	13.78	6.02	50.8	0.02	0.01	0.05
4. Dc Supply Problem	7	7	5	420.39	18.87	17.12	0.7	0.02	0.02
5. Switch Yard/Bus Bar Problem	9	9	14	64.68	229.47	64.13	0.11	0.27	0.07
6. Breaker / Isolator Problems	2	9	3	4.68	773.64	265.56	0.01	0.92	0.29
7. Misc. Fire Hazards / Fire In Cable Gallery	3	1	1	136.34	3.76	1.59	0.23	0	0
8. Instrumentation Problem	6	1	0	161.39	19.32	0	0.27	0.02	0
9. Air Supply Problem	0	0	1	0	0	4.1	0	0	0
10. Electrical Miscellaneous Problems	68	62	88	617.77	531.63	1094.8	1.03	0.64	1.17
Total Other Electrical Problems	129	117	169	2264.26	4953.75	1865.05	3.77	5.9	3.49
B. Fuel And Other Misc. Problems									
12. Lignite Feeding Problem	6	32	2	182.45	6642.99	1793.74	0.3	7.94	1.93
13. Coal Feeding Problem	21	23	15	1732.1	4109.49	6483.31	2.88	4.91	6.96
14. Wet/ Poor Quality Coal	2	1	1	19.74	109.22	24.81	0.03	0.13	0.03
15. Fuel Oil Problem	3	4	2	56.8	4.8	3.46	0.09	0.01	0
16. Cooling Tower Problem	1	2	1	0.84	36.05	11.14	0	0.04	0.01
17. Ash Handling System Problem	14	11	20	520.42	4564.46	6245.3	0.87	5.46	6.7
18. Raw Water Problem	3	4	6	539.59	133.04	805.32	0.9	0.16	0.86
19. D.M. Water Problem	0	2	0	0	178.01	0	0	0.21	0
20. E.S.P. / Pollution Problem	1	0	0	288.86	0	0	0.48	0	0
21. E.S.P. Problem	2	0	2	62.19		224.91	0.1		0.24
22. Non-Readiness Of Residual Work Of New Unit	0	2	2	0	488.52	109.28	0	0.58	0.12
23. Fuel Supply & Other Misc. Problems	6	8	20	163.05	2538.22	1397.81	0.27	3.03	1.5
24. Other Misc. Problems	5	2	8	205.06	544.11	3049.53	0.34	0.65	0.48

Area/ cause of outage (490- 600MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
25. Coal Shortage	25	20	9	6112.93	1544.52	1230.56	10.16	1.85	1.32
Total Fuel Supply And Other Misc Problems	89	111	88	9882.35	20893.43	21379.2	16.42	24.97	20.15
C. Grid System									
27. Transmission Constraints/ Grid Disturbance	41	34	40	2820.51	7186.16	6698.26	4.69	8.59	7.19
28. Reserve Shut Down	84	74	156	21538.4	17110.96	34118.69	35.81	20.46	36.62
29. No Power Purchase Agreement	0	0	1	0	0	3123.44	0	0	3.35
Total Grid System	125	108	197	24358.92	24297.12	43940.4	40.5	29.05	47.17
Total Miscellaneous	343	336	454	36505.53	50144.3	67184.6	65.07	59.94	72.12

6.2.3 300-360 MW CAPACITY GROUP

6.2.3.1 2015-16 the operating availability of this capacity group was slightly higher as compared to the previous year. Performance of 300-360 MW capacity group units during the year 2013-14, 2014-15 and 2015-16 is given below: -

S.N.	PARTTICULARS	2013-14	2014-15	2015-16
1	Units Commissioned By The End Of The Year			
	(a) Number	29	32	38
	(b) Capacity (MW)	8970	9870	11840
2	Units Reviewed			
	(a) Number	26	29	37
	(b) Capacity (MW)	8020	8970	11490
	(c) Generation (MU)	42142.67	52980.93	60158.30
3	Planned Maintenance (%)	2.05	3	1.99
4	Forced outage (%)	18.72	17.65	17.45
5	Operating Availability (%)	79.23	79.35	80.56
6	Plant Load Factor (%)	62.83	66.02	65.12

6.2.3.2 Forced outage details due to failure of equipment and auxiliaries and energy loss of 300-360 MW capacity group units for the years 2013-14, 2014-15 and 2015-16 is shown below:

Area/ cause of Outage of(300- 360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
I. EQUIPMENT									
1. Boiler	54	68	92	1079.93	2298.5	1513.23	8.66	16.57	9.42
2. Turbine	40	22	33	3823.06	702.81	1661.86	30.64	5.07	10.35
3. Generator	15	14	19	895.61	599.41	96.29	7.18	4.32	0.6
Total	109	104	144	5798.6	3600.72	3271.38	46.47	25.96	20.37
II. AUXILIARIES									
1. Boiler	5	10	26	270.5	833.09	719.24	2.17	6.01	4.48
2. Turbine	9	10	15	127.28	188.71	287.58	1.02	1.36	1.79
Total	14	20	41	397.77	1021.8	1006.82	3.19	7.37	6.27
III. Boiler & Boiler Aux.	59	78	118	1350.42	3131.59	2232.47	10.82	22.58	13.9
IV. Turbine & Turbine Aux.	49	32	48	3950.33	891.52	1949.44	31.66	6.43	12.14
V. Generator	15	14	19	895.61	599.41	96.29	7.18	4.32	0.6
VI. Misc. (Elect. /Mech.)	56	57	66	2739.04	7546.49	6961.28	21.95	54.41	43.35
VII. Total excluding RSD of the Group	179	181	251	8935.4	12169.01	11239.49	71.61	87.74	69.99
VIII. RSD	31	26	43	3541.85	1700.09	4818.38	28.39	12.26	30.01
Total	210	207	294	12477	13869.1	16057.9	100	100	100

6.2.3.3 The break-up of the area/causes of forced outages and energy loss of 300-360 MW capacity group units during the years 2013-14, 2014-15 and 2015-16 is given below: -

Area/ cause of outage of (300-360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
I. EQUIPMENTS									
A. Boiler									
1. Water Wall Tube Leakage	24	28	29	609.72	1504.34	738.94	4.89	10.85	4.6
2. Super Heater Tube Leakage	1	2	5	46.28	166.79	149.33	0.37	1.2	0.93

Area/ cause of outage of (300-360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
3. Reheater Tube Leakage	1	3	1	120.52	230.99	185.28	0.97	1.67	1.15
4. Economiser Tube Leakage	3	4	0	30.28	110.98	0	0.24	0.8	0
5. Air Preheaters Problem	6	6	6	59.27	94.93	42.36	0.48	0.68	0.26
6. Boiler Operational Problems	0	0	0	0	0	0	0	0	0
(A) Furnace Fire Out/Flame Failure	9	16	13	76.25	27.31	95	0.61	0.2	0.59
(B) Furnace Draft Abnormal	5	3	14	26.03	4.64	17.99	0.21	0.03	0.11
(C) Drum Level High/ Low	0	5	8	0	149.87	28.72	0	1.08	0.18
7. Others	5	1	16	111.57	8.65	255.61	0.89	0.06	1.59
Total Boiler	54	68	92	1079.93	2298.5	1513.23	8.66	16.57	9.42
B. Turbine									
1.Turbine Bearing Problem	6	0	3	1333.92	0	672.69	10.69	0	4.19
2.Governing / Oil System Problem	3	2	6	6.11	101.48	26.03	0.05	0.73	0.16
3.Turbine Differential Expansion Problem	1	0	0	1.78	0	0	0.01	0	0
4.Turbine Axial Shift/ Thrust Pad Problem	0	0	0	0	0	0	0	0	0
5.Turbine Eccentricity/ High Vibration	6	4	6	1601.26	380.12	17.09	12.83	2.74	0.11
6.Turbine Rotor Failure/Damaged	0	0	0	0	0	0	0	0	0
7.Turbine Control Valve Problem	0	1	0	0	82.79	0	0	0.6	0
8.Condenser Tube Leakage/ Cleaning	9	5	7	358.49	85.82	301.8	2.87	0.62	1.88
9.Main Steam Line Problem	2	5	1	20.81	22.5	0.2	0.17	0.16	0
10.Emergency Safety Valve Closure	0	0	0	0	0	0	0	0	0
11.Condenser Low Vacuum	2	1	5	2.58	0.68	220.09	0.02	0	1.37
12. H.P. & L.P. Bypass System	1	0	0	3.89	0	0	0.03	0	0
13.Turbine Misc. Problem	10	4	5	494.22	29.41	423.96	3.96	0.21	2.64
Total Turbine	40	22	33	3823.06	702.81	1661.86	30.64	5.07	10.35
C. Generator									
1. Stator/ Stator Earth Fault	2	2	3	415.66	87.22	7.49	3.33	0.63	0.05
2. Gen. Transformer Tripping/ Damaged	3	1	0	3.99	0.91	0	0.03	0.01	0

Area/ cause of outage of (300-360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
2. Rotor/ Rotor Earth Fault	0	1	2	0	201.34	7.01	0	1.45	0.04
3. Excitation Problem	0	0	3	0	0	3.69	0	0	0.02
4. Gen. Cooling System Failure	1	0	3	0.76	0	18.87	0.01	0	0.12
5. Seal Oil System Problem	0	0	0	0	0	0	0	0	0
6. Fire In Turbo Gen. Bushing/ Bushing Failure	0	0	0	0	0	0	0	0	0
6. Generator Bearing Problem	0	0	0	0	0	0	0	0	0
7. A.V.R. Problem	0	0	0	0	0	0	0	0	0
8. Generator Protection/ Relay Operation Problem	5	8	7	20.94	31.05	57.41	0.17	0.22	0.36
9. Hydrogen Pressure Problem	2	1	0	340.94	269.73	0	2.73	1.94	0
10. Generator Miscellaneous Maintenance	2	1	1	113.32	9.17	1.81	0.91	0.07	0.01
Total Generator	15	14	19	895.61	599.41	96.29	7.18	4.32	0.6
A. Boiler Auxiliaries									
1. I.D. Fans Problem	0	3	10	0	434.27	378.4	0	3.13	2.36
2. F.D. Fans Problem	0	1	1	0	0.36	0.63	0	0	0
3. P.A. Fans Problem	1	0	9	26.31	0	259.07	0.21	0	1.61
4. Milling System /RC Feeder Problem	1	0	3	38.84	0	79.09	0.31	0	0.49
5. PIPES And VALVES BOILER SIDE	2	0	2	2.61	0	1.5	0.02	0	0.01
6. Boiler Aux. Misc. Problems	1	6	1	202.74	398.46	0.55	1.62	2.87	0
Total Boiler Aux.	5	10	26	270.5	833.09	719.24	2.17	6.01	4.48
B. Turbine Auxiliaries									
1. Boiler Feed Pump/Motor Problem	0	0	8	0	0	210.51	0	0	1.31
2. Condensate Pump Problem	0	0	0	0	0	0	0	0	0
3. C.W. Pump Problem	3	2	3	43.98	20.08	38.18	0.35	0.14	0.24
4. Regenerative System Problem	1	1	0	62.32	39.73	0	0.5	0.29	0
5. Turbine Pipes & Valves Problem	0	1	0	0	1.78	0	0	0.01	0
6. Deaerator Problem	0	0	0	0	0	0	0	0	0
7. Turbine Misc.	5	6	4	20.98	127.12	38.88	0.17	0.92	0.24
Total Turbine Aux.	9	10	15	127.28	188.71	287.58	1.02	1.36	1.79

Area/ cause of outage of (300-360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
Total Boiler & Turbine Aux.	14	20	41	397.77	1021.8	1006.82	3.19	7.37	6.27
Iii Others Misc. Problems									
A. Other Electrical Problems									
1. Unit Aux. Transformer/ Station Transformer Problems	1	2	3	0.91	3.64	3.91	0.01	0.03	0.02
2. Gen. Transformer Tripping/ Damaged	2	4	6	2.52	22.25	12.23	0.02	0.16	0.08
3. H.T./L.T. Supply Problem	0	1	2	0	0.82	9.52	0	0.01	0.06
4. Dc Supply Problem	0	1	4	0	1.23	674.28	0	0.01	4.2
5. Switch Yard/Bus Bar Problem	0	3	7	0	246.27	676.38	0	1.78	4.21
6. Breaker/Isolator Problems	0	2	0	0	2.32	0	0	0.02	
7. Electrical Miscellaneous Problems	23	14	11	228.48	827.85	49.35	1.83	5.97	0.31
Total Other Electrical Problems	26	27	33	231.92	1104.37	1425.67	1.86	7.98	8.88
B. Fuel And Other Misc. Problems									
8. Coal Feeding Problem	2	4	3	157.79	2929.76	1900.22	1.26	21.12	11.83
9. Lignite Feeding Problem	2	9	0	297.71	715.78	0	2.39	5.16	0
10. Wet/ Poor Quality Coal	2	0	0	454.57	0	0	3.64	0	0
11. Fuel Oil Problem	1	1	0	165.48	2.44	0	1.33	0.02	0
12. Cooling Tower Problem	0	0	1	0	0	21.01	0	0	0.13
13. Ash Handling System Problem	3	2	10	202.14	109.18	166.53	1.62	0.79	1.04
14. E.S.P. / Pollution Problem	0	2	1	0	112.55	215.54	0	0.81	1.34
15. Fuel Supply & Other Misc. Problems	4	0	6	491.13	0	487.3	3.94	0	3.03
16. Other Misc. Problems	1	0	1	21.09	0	0.84	0.17	0	0.01
17. Coal Shortage	0	1	0	0	14.31	0	0	0.1	0
Total Fuel Supply And Other Misc Problems	15	19	28	1789.9	3884.02	2791.44	14.35	28	17.38
16. Grid System									
17. Transmission Constraints/ Grid Disturbance	15	11	9	717.22	2558.1	108.97	5.75	18.44	0.68
18. Reserve Shut Down/ Low Schedule	31	26	43	3541.85	1700.09	4818.38	28.39	12.26	30.01
24. NO Power Purchase Agreement	0	0	2	0	0	2635.2	0	0	16.41

Area/ cause of outage of (300-360MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
Total Grid System	46	37	54	4259.07	4258.19	7562.55	34.14	30.7	47.1
Total Miscellaneous	87	83	115	6280.89	9246.58	11779.66	50.34	66.67	73.36

6.2.4 250-270 MW CAPACITY GROUP

6.2.4.1 The 250-270 MW capacity group units continued to perform well with average PLF% and operating availability. Forced outage % of this capacity group units increased from 19.12% to 29.79%. Performance of 250-270 MW capacity group units during the years 2013-14, 2014-15 and 2015-16 is given below:

S.N.	PARTTICULARS	2013-14	2014-15	2015-16
1	Units Commissioned By The End Of The Year			
	(a) Number	57	63	69
	(b) Capacity (MW)	14370	15930	17470
2	Units Reviewed			
	(a) Number	51	58	64
	(b) Capacity (MW)	12830	14620	16180
	(c) Generation (MU)	78895.92	84573.8	80118.41
3	Planned Maintenance (%)	4.6	2.85	4.31
4	Forced outage (%)	13.93	19.27	29.79
5	Operating Availability (%)	81.47	77.88	65.9
6	Plant Load Factor (%)	71.96	68.01	57.45

6.2.4.2 The details of area/ causes of forced outage and MU losses of 250-270 MW capacity group 2013-14, 2014-15 and 2015-16 are shown below:

Area/ cause of Outage of (250-270) MW capacity group	No. of Outages			MU Loss			% of Group F.O. Loss		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
I. Equipment									
1. Boiler	380	370	312	3129.6	3061.32	4417.38	20.8	13	10.68
2. Turbine	82	62	56	2324.02	2781.38	434.79	15.45	11.81	1.05

Area/ cause of Outage of (250-270) MW capacity group	No. of Outages			MU Loss			% of Group F.O. Loss		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
3. Generator	41	64	64	712.27	3291.8	4128.77	4.73	13.98	9.98
Total	503	496	432	6165.89	9134.49	8980.95	40.98	38.8	21.71
Ii. Auxiliaries									
1. Boiler	47	58	77	343.36	454.08	2823.08	2.28	1.93	6.83
2. Turbine	30	24	21	107.07	855.97	221.73	0.71	3.64	0.54
Total	77	82	98	450.43	1310.05	3044.81	2.99	5.56	7.36
III. Boiler & Boiler Aux.	427	428	389	3472.95	3515.4	7240.46	23.08	14.93	17.51
IV. Turbine & Turbine Aux.	112	86	77	2431.09	3637.35	656.52	16.16	15.45	1.59
V. Generator	41	64	64	712.27	3478.55	4128.77	4.73	13.98	9.98
VI. Misc. (Elect. /Mech.)	175	181	185	6000.74	7735.19	14155.23	39.88	32.86	34.22
VII. Total excluding RSD of the Group	755	760	715	12617.05	18366.48	26180.98	83.85	77.23	63.3
VIII. RSD	64	82	144	2429.84	5355.5	15181.04	16.15	22.77	36.7
Total	819	841	859	15046.89	23541.23	41362.02	100	100	100

6.2.4.3 Breakup of the forced outage and energy loss of 250-270 MW capacity group units due to equipment and auxiliaries during 2013-14, 2014-15 and 2015-16 are given below:

Area/ cause of outage (250-270 MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
I. EQUIPMENTS									
A. Boiler									
1. Water Wall Tube Leakage	95	98	87	1664.35	1637.85	1894.69	11.06	11.4	4.58
2. Super Heater Tube Leakage	15	3	9	147.54	29.44	138.42	0.98	0.21	0.33
3. Reheater Tube Leakage	7	8	14	57.75	76.8	114.48	0.38	0.53	0.28

Area/ cause of outage (250-270 MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
4. Economiser Tube Leakage	19	18	25	243.85	314.33	404.86	1.62	2.19	0.98
5. Air Preheaters Problem	10	19	15	103.51	328.44	272.42	0.69	2.29	0.66
6. Furnace Trouble	1	0	1	0.87	0	59.48	0.01	0	0.14
7. Boiler Operational Problems	0	0	0	0	0	0	0	0	0
(A) Furnace Fire Out/Flame Failure	133	87	62	640.6	266.8	376.5	4.26	1.86	0.91
(B) Furnace Draft Abnormal	69	70	38	215.73	199.04	409.79	1.43	1.39	0.99
(C) Drum Level High/ Low	25	47	32	40.1	34.2	145.38	0.27	0.24	0.35
8. Others	6	10	29	15.29	71.84	601.35	0.1	0.5	1.45
Total Boiler	380	360	312	3129.6	2958.75	4417.38	20.8	20.6	10.68
B. Turbine									
1. Turbine Bearing Problem	1	2	1	0.72	7.5	2.62	0	0.03	0.01
2. Governing / Oil System Problem	10	7	8	8.14	106.85	32.78	0.05	0.45	0.08
3. Turbine Differential Expansion Problem	0	0	1	0	0	0.44	0	0.03	0
4. Turbine Axial Shift/ Thrust Pad Problem	1	8	1	1139.08	581.66	46.22	7.57	2.47	0.11
5. Turbine Eccentricity/ High Vibration	18	17	5	254.73	169.58	65.17	1.69	0.72	0.16
6. Turbine Rotor Failure/Damaged	1	0	0	9.5	0	0	0.06	0	0
7. Turbine Control Valve Problem	10	0	1	41.41	0	0.47	0.28	0	0
8. Condenser Tube Leakage/ Cleaning	2	3	2	9.47	8.59	8.96	0.06	0.04	0.02
9. Main Steam Line Problem	8	4	7	39.02	10.66	88.91	0.26	0.05	0.21
10. Emergency Safety Valve Closure	0	0	0	0	0	0	0	0	0
11. Condenser Low Vacuum	10	15	12	6.87	137.58	33.24	0.05	0.58	0.08
12. H.P. & L.P. Bypass System	1	4	3	16.06	80.45	12.35	0.11	0.34	0.03

Area/ cause of outage (250-270 MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
13. Turbine Misc. Problem	20	9	15	799.03	1678.5	143.63	5.31	7.13	0.35
Total Turbine	82	62	56	2324.02	2781.38	434.79	15.45	11.81	1.05
C. Generator									
1. Stator/ Stator Earth Fault	4	6	6	3.14	636.3	779.31	0.65	2.7	1.88
2. Rotor/ Rotor Earth Fault	1	4	1	3.44	3.36	1226.38	0.14	0.01	2.96
3. Gen. Transformer Tripping/ Damaged	4	0	22	1.66	0	866.06	0.41	0	2.09
4. Excitation Problem	3	2	3	1.2	10.08	11.98	0.2	0.04	0.03
5. Gen. Cooling System Failure	0	0	0	0	0	0	0	0	0
6. Seal Oil System Problem	1	2	0	8.22	1.47	0	0.07	0.01	0
7. Fire In Turbo Gen. Bushing/ Bushing Failure	0	1	0	0	1.94	0	0	0.01	0
8. Generator Bearing Problem	1	1	1	0.79	0.4	0.52	0.04	0	0
9. A.V.R. Problem	4	1	2	6.31	0.71	1.61	0.5	0	0.00
10. Generator Protection/ Relay Operation Problem	19	41	28	682.69	2622.78	1230.14	2.02	11.14	2.97
11. Hydrogen Pressure Problem	0	1	1	0	1.08	12.78	0	0	0.03
12. Generator Miscellaneous Maintenance	4	5	0	4.82	13.68	0	0.64	0.06	0
Total Generator	41	64	64	712.27	3291.8	4128.77	4.67	13.98	9.98
ii Auxiliaries									
A. Boiler Auxiliaries									
1. I.D. Fans Problem	3	8	6	4.98	7.24	5.08	0.34	0.03	0.01
2. F.D. Fans Problem	5	2	6	40.82	1.06	18.73	0.57	0	0.05
3. P.A. Fans Problem	11	21	21	144.19	357.6	410.21	1.61	1.52	0.99
4. Milling System /Rc Feeder Problem	13	5	26	105.77	8.22	399.43	1.9	0.03	0.97
5. PIPES And VALVES BOILER SIDE	10	15	10	22.15	13.09	111.94	1.09	0.06	0.27
6. Boiler Aux. Misc. Problems	5	7	8	25.45	66.86	1877.68	0.75	0.28	4.54

Area/ cause of outage (250-270 MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
Total Boiler Aux.	47	58	77	343.36	454.08	2823.08	6.27	1.93	6.83
B. Turbine Auxiliaries									
7. Boiler Feed Pump/Motor Problem	4	5	9	6.71	8	8.15	0.45	0.03	0.02
8. Condensate Pump Problem	1	1	0	1.91	0.89	0	0.17	0	0
9. C.W. Pump Problem	6	3	3	5.48	15.81	1.98	1.01	0.07	0
10. Regenerative System Problem	0	0	0	0	0	0	0	0	0
11. Turbine Pipes & Valves Problem	1	0	2	1.53	0	61.46	0.09	0	0.15
12. Deaerator Problem	0	0	0	0	0	0	0	0	0
13. Turbine Misc.	18	15	7	91.44	831.27	150.14	2.46	3.53	0.36
Total Turbine Aux.	30	24	21	107.07	855.97	221.73	4.19	3.64	0.54
Total Boiler & Turbine Aux.	77	82	98	450.43	1310.05	3044.81	10.46	5.56	7.36
Iii. Others Misc. Problems									
A. Other Electrical Problems									
1. Unit Aux. Transformer/ Station Transformer Problems	87	17	9	44.25	70.25	15.17	1.82	0.3	0.04
2. Gen. Transformer Tripping/ Damaged	89	12	7	50.65	136.83	1906.8	1.83	0.58	4.61
3. H.T./L.T. Supply Problem	44	6	10	22.46	9.22	27.6	0.93	0.04	0.07
4. Dc Supply Problem	16	7	4	3.92	58.45	20.21	0.33	0.25	0.05
5. Switch Yard/Bus Bar Problem	37	7	6	1.99	15.76	36.72	0.8	0.07	0.09
6. Breaker/Isolator Problems	14	2	3	19.89	6.85	2.07	0.28	0.03	0.01
7. Misc. Fire Hazards / Fire In Cable Gallery	8	1	0	745.07	46.86	0	0.13	0.2	0
8. Instrumentation Problem	4	1	0	0	0.39	0	0.09	0	0
10. Air Supply Problem	7	0	0	0.25	0	0	0.16	0	0

Area/ cause of outage (250-270 MW Capacity group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
11. Electrical Miscellaneous Problems	242	54	65	343.52	302.56	270.26	4.8	1.29	0.65
Total Other Electrical Problems	639	113	104	1288.98	707.87	2278.84	13.14	3.02	5.52
B. Fuel And Other Misc., Problems									
12. Lignite Feeding Problem	7	7	5	84.18	339.67	419.37	0.56	1.44	1.01
13. Coal Feeding Problem	5	22	8	364.6	1082.45	1218.82	2.42	4.6	2.95
14. Wet/ Poor Quality Coal	2	0	3	97.39	0	1.58	0.65	0	0
15. Wet/ Poor Quality Lignite	0	0	1	0	0	12.16	0	0	0.03
16. Fuel Oil Problem	4	5	9	3.16	5.92	8.44	0.02	0.03	0.02
17. Ash Handling System Problem	2	4	10	79.86	169.16	162.44	0.53	0.72	0.39
18. Raw Water Problem	2	2	2	1345.44	383.41	1627.96	8.94	1.63	3.94
19. E.S.P. / Pollution Problem	2	0	1	27.3	0	320.38	0.18	0	0.77
20. Non-Readiness Of Residual Work Of New Unit	3	2	1	2.28	10.96	6.64	0.02	0.05	0.02
21. Fuel Supply & Other Misc. Problems	91	6	12	56.98	60.7	1777.35	0.38	0.26	4.3
22. Other Misc. Problems	1	1	1	2365.2	11.09	19.37	15.72	0.05	0.05
23. Coal Shortage	9	3	0	234.7	38.26	0	1.56	0.16	0
Total Fuel Supply And Other Misc Problems	45	53	53	4661.1	2114.86	5574.51	30.98	9	13.48
C. Grid System									
28. Transmission Constraints/ Grid Disturbance	28	20	26	107.63	2607.96	1558.52	0.72	11.08	3.77
29. Reserve Shut Down	64	81	144	2429.84	4989.16	15181.04	16.15	22.77	36.7
25. NO Power Purchase Agreement	20	0	1	0	0	2371.68	0	0	5.73
Total Grid System	92	102	171	2537.47	7969.46	19111.2	16.87	33.85	46.2
30. Uneconomical Operation	0	1	1	0	2365.2	2371.68	0	10.05	5.73

Area/ cause of Outage of 210MW capacity group	No. of Outages			MU Loss			% of Group F.O. Loss		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
1. Boiler	923	771	701	7510	7688.22	8232.6	21.18	19.47	14.17
2. Turbine	166	94	156	2265.63	1121.44	2248.52	6.3	2.84	3.87
3. Generator	134	129	96	1624.01	1992.41	2426.44	4.51	5.05	4.18
Total	1223	994	953	11399.82	10802.07	12907.57	31.99	27.36	22.22
II. AUXILIARIES									
1. Boiler	134	118	87	1052.7	951.06	773.01	2.93	2.41	1.33
2. Turbine	54	29	55	351.82	150.69	570.15	0.98	0.38	0.98
Total	188	147	142	1404.51	1101.76	1343.16	3.9	2.79	2.31
III. Boiler & Boiler Aux.	1057	889	788	8562.88	8639.28	9005.61	24.11	21.88	15.5
IV. Turbine & Turbine Aux.	220	123	211	2617.45	1272.13	2818.67	7.27	3.22	4.85
V. Generator	134	129	96	1624.01	1992.41	2426.44	4.51	5.05	4.18
VI. Misc. (Elect. /Mech.)	380	289	273	8668.21	11306.62	14770.6	18.26	28.63	25.43
VII. Total excluding RSD of the Group	1797	1430	1368	21472.54	23210.44	29021.32	54.15	58.78	49.96
VIII. RSD	240	258	345	16243.95	16243.95	29061.43	45.85	41.22	50.03
Total	2037	1688	3081.00	35989.24	39488.29	58082.75	100	100	100

6.2.5.3 Break-up of the area/ cause of forced outages and energy loss for 210 MW units for the years 2013-14, 2014-15 and 2015-16 are shown below: -

Area/ cause of outage (210 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
I. EQUIPMENTS									
A. Boiler									
1. Water Wall Tube Leakage	295	309	237	3764.21	4059.13	4457.51	9.98	10.28	7.67
2. Super Heater Tube Leakage	47	36	37	534.84	686.62	655.06	1.42	1.74	1.13
3. Reheater Tube Leakage	59	35	46	681.35	589.14	549.7	1.81	1.49	0.95

Area/ cause of outage (210 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
4. Economiser Tube Leakage	108	66	97	1239.69	941.16	1014.88	3.29	2.38	1.75
5. Air Preheaters Problem	24	16	23	217.1	220	165.7	0.58	0.56	0.29
6. Furnace Trouble	4	2	0	31.75	5.99	0	0.08	0.02	0
7. Boiler Operational Problems	0	0	0	0	0	0	0	0	0
(A) Furnace Fire Out/Flame Failure	151	171	107	372.56	652.88	395.42	0.99	1.65	0.68
(B) Furnace Draft Abnormal	168	74	68	378.34	352.77	122.84	1	0.89	0.21
(C) Drum Level High/ Low	47	36	36	83.51	77.36	295.07	0.22	0.2	0.51
8. Others	20	26	50	206.82	103.17	576.43	0.55	0.26	0.99
Total Boiler	923	771	701	7510.18	7688.22	8232.6	19.91	19.47	14.17
B. Turbine									
1. Turbine Bearing Problem	3	4	11	156.88	71.4	278.55	0.42	0.18	0.48
2. Governing / Oil System Problem	9	2	9	20.33	11.66	226.6	0.05	0.03	0.39
3. Turbine Differential Expansion	3	0	5	7.66	0	9.09	0.02	0	0.02
4. Turbine Axial Shift/ Thrust Pad	10	5	2	403.26	102.11	3.2	1.07	0.26	0.01
5. Turbine Eccentricity/ High Vibration	12	14	12	828.86	283.46	508.92	2.2	0.72	0.88
6. Turbine Rotor Failure/Damaged	1	0	0	0.24	0	0	0	0	0
7. Turbine Control Valve	6	4	6	85.36	16.97	28.68	0.23	0.04	0.05
8. Condenser Tube Leakage/ Cleaning	23	13	16	202.97	147.44	727.85	0.54	0.37	1.25
9. Main Steam Line Problem	16	3	8	160.5	33.94	59.05	0.43	0.09	0.1
10. Emergency Safety Valve Closure	2	2	2	18.28	1.51	38.19	0.05	0	0.07
11. Condenser Low Vacuum	25	22	41	27.74	76.35	29.01	0.07	0.19	0.05
12. H.P. & L.P. Bypass System	2	2	6	5.11	14.65	41.34	0.01	0.04	0.07
13. Turbine Misc. Problem	54	23	38	348.45	361.95	298.05	0.92	0.92	0.51
Total Turbine	166	94	156	2265.63	1121.44	2248.52	6.01	2.84	3.87
C. Generator									
1. Stator/ Stator Earth Fault	25	13	14	236.64	259.57	1179.58	0.66	0.66	2.03

Area/ cause of outage (210 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
2. Rotor/ Rotor Earth Fault	3	4	4	13.52	114.07	107.56	0.04	0.29	0.19
3. Gen. Transformer Tripping/ Damaged	12	7	12	705.76	621.32	671.56	1.96	1.57	1.16
4. Excitation Problem	16	17	16	56.06	47.03	16.26	0.16	0.12	0.03
5. Gen. Cooling System Failure	2	0	5	0.46	0	2.89	0	0	0
6. Seal Oil System Problem	3	3	0	13.53	25.22	0	0.04	0.06	0
7. Generator Bearing Problem	1	1	0	4.52	3.96	0	0.01	0.01	0
8. Fire In Turbo Gen. Bushing/ Bushing Failure	2	2	1	3	2.28	115.56	0.01	0.01	0.2
9. A.V.R. Problem	2	3	6	1.69	5.35	146.16	0	0.01	0.25
10. Generator Protection/ Relay Operation Problem	49	63	24	122.62	544.65	72.04	0.34	1.38	0.12
11. Hydrogen Pressure Problem	6	7	2	424.64	74.19	18.65	1.18	0.19	0.03
12. Generator Miscellaneous Maintenance	13	9	12	41.58	294.77	96.19	0.12	0.75	0.17
Total Generator	134	129	96	1624.01	1992.41	2426.44	4.51	5.05	4.18
Ii. Auxiliaries									
A. Boiler Auxiliaries									
1. I.D. Fans Problem	40	36	21	722.16	542.13	409.32	2.01	1.37	0.7
2. F.D. Fans Problem	9	14	11	29.67	53.86	13.87	0.08	0.14	0.02
3. P.A. Fans Problem	40	42	16	162.12	213.68	81.16	0.45	0.54	0.14
4. Milling System /RC Feeder Problem	11	1	8	76.46	1.17	154.99	0.21	0	0.27
5. PIPES And VALVES BOILER SIDE	24	12	20	42.07	81.01	79.27	0.12	0.21	0.14
6. Boiler Aux. Misc. Problems	10	13	11	20.22	59.21	34.4	0.06	0.15	0.06
Total Boiler Aux.	134	118	87	1052.7	951.06	773.01	2.93	2.41	1.33
B. Turbine Auxiliaries									
7. Boiler Feed Pump/Motor Problem	15	13	13	88.04	66.33	17.19	0.24	0.17	0.03
8. Condensate Pump Problem	0	1	1	0	0.43	0.43	0	0	0
9. C.W. Pump Problem	14	4	5	65.73	6.92	13.78	0.18	0.02	0.02

Area/ cause of outage (210 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
10. Regenerative System Problem	1	0	2	0.35	0	5.25	0	0	0.01
11. Turbine Pipes & Valves Problem	4	1	2	39.22	16.52	7.11	0.11	0.04	0.01
12. Deaerator Problem	0	0	1	0	0	8.59	0	0	0.01
13. Turbine Misc.	20	10	31	158.48	60.49	517.78	0.44	0.15	0.89
Total Turbine Aux.	54	29	55	351.82	150.69	570.15	0.98	0.38	0.98
Total Boiler & Turbine Aux.	208	188	142	1320.94	1404.51	1343.16	6.28	3.9	2.31
Iii. Others Misc. Problems									
A. Other Electrical Problems									
1. Unit Aux. Transformer/ Station Transformer Problems	22	19	16	116.06	29.34	281.96	0.32	0.07	0.49
2. Gen. Transformer Tripping/ Damaged	28	16	12	340.88	86.39	1951.31	0.95	0.22	3.36
3. H.T./L.T. Supply Problem	20	2	2	105.02	1.63	19.46	0.29	0	0.03
4. Dc Supply Problem	11	6	14	12.57	8.95	113.9	0.03	0.02	0.2
5. Switch Yard/Bus Bar Problem	45	10	32	394.07	63.85	77.81	1.09	0.16	0.13
6. Breaker/Isolator Problems	2	3	8	1.09	10.67	11.44	0	0.03	0.02
7. Misc. Fire Hazards / Fire In Cable Gallery	3	1	3	8.06	10.8	44.96	0.02	0.03	0.08
8. Instrumentation Problem	2	1	19	3.08	0.72	2621.6	0.01	0	4.51
9. Air Supply Problem	0	0	6	0	0	7.27	0	0	0.01
10. Electrical Miscellaneous Problems	101	86	92	260.1	650.72	449.48	0.72	1.65	0.77
Total Other Electrical Problems	244	155	206	1324.01	2052.59	5579.19	3.66	5.19	9.6
B. Fuel And Other Misc. Problems									
12. Coal Feeding Problem	12	22	0	445.81	1575.75	0	1.24	3.99	0
13. Lignite Feeding Problem	17	20	6	214.86	1850.76	607.17	0.6	4.69	1.05
14. Wet/ Poor Quality Lignite	1	1	1	14.54	21.69	9.39	0.04	0.05	0.02
15. Wet/ Poor Quality Coal	18	6	2	367.76	51.82	135.44	1.02	0.13	0.23
16. Fuel Oil Problem	7	10	7	77.18	34.58	18.65	0.21	0.09	0.03

Area/ cause of outage (210 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
17. Cooling Tower Problem	2	0	0	51.87	0	0	0.14	0	
18. Ash Handling System Problem	8	8	3	75.16	78.94	53.24	0.21	0.2	0.09
19. Raw Water Problem	5	3	8	1698.51	2489.01	1711.85	4.72	6.3	2.95
20. D.M. Water Problem	0	1	0	0	3.35		0	0.01	0
21. E.S.P. / Pollution Problem	4	4	4	1099.05	557.46	293.28	3.05	1.41	0.5
22. Vintage Unit Withdrawn And Closed For Operation	0	1	1	0	7.66	5.51	0	0.02	0.01
23. Fuel Supply & Other Misc. Problems	10	11	19	83.09	1189.53	2623.89	0.23	3.01	4.51
24. Other Misc. Problems	6	3	3	425.61	14.32	2101.31	1.18	0.04	0.07
25. Lignite Shortage Problem	0	0	7	0	0	182.63	0	0	0.31
26. Coal Shortage	9	29	2	360.23	863.03	37.92	1	2.19	0.07
Total Fuel Supply And Other Misc Problems	99	119	63	4913.65	8738.32	7780.28	13.64	22.13	13.39
C. Grid System									
28. Transmission Constraints/ Grid Disturbance	51	24	16	417.37	522.53	18.94	1.16	1.32	0.03
29. Reserve Shut Down	241	257	349	16500.61	16274.15	29061.43	45.85	41.22	50.03
Total Grid System	292	282	365	16917.98	16800.4	29080.4	47.01	42.54	50.06
30. Uneconomical Operation	0	2	3	0	1183.7	1392.19	0	3	2.40
Total Miscellaneous	639	559	637	23242.69	28777.7	43832	64.11	72.88	75.46

6.2.6 195-200 MW CAPACITY GROUP

6.2.6.1 The forced Outage of 195-200 MW capacity group units decreased to 7.53 % in 2015-16 from to 9.75% in 2014-15. The PLF of the 195-210 MW Capacity Group however increased to 72.72 % in 2015-16 from 71.55 % in 2014-15. Performance details of 195-200 MW capacity group units during the years 2013-14, 2014-15 and 2015-16 are given below: -

PARTTICULARS	2013-14	2014-15	2015-16
1.UNITS COMMISSIONED BY THE END OF THE YEAR			

(a) Number	25	26	26
(b) Capacity (MW)	4990	5185	5185
2.UNITS CONSIDERED IN THE REVIEW			
(a) Number	25	25	25
(b) Capacity (MW)	4990	4990	4990
(c) Generation (MU)	32009.22	31187.9	31875.35
3. Planned Maintenance (%)	12.7	11.05	11.81
4. Forced outage (%)	6.77	9.75	7.53
5. Operating Availability (%)	80.53	79.2	80.66
6. Plant Load Factor (%)	73.23	71.35	72.72

6.2.6.2 Forced outage details due to equipment and auxiliaries and energy loss of 195-200 MW capacity group units for the years 2013-14, 2014-15 and 2015-16 are shown below:

Area/ Cause of Outage of 195-200 MW capacity group	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
I. EQUIPMENTS									
1. Boiler	94	89	80	839.78	1104.98	729.51	28.39	25.93	22.09
2. Turbine	21	9	13	208.63	471.05	82.83	7.05	11.06	2.51
3. Generator	8	18	18	29.09	62.9	99.33	0.98	1.48	3.01
Total	123	116	111	1077.49	1638.93	911.67	36.43	38.47	27.61
II. AUXILIARIES									
1. Boiler	46	20	34	888.71	1891.63	365.09	30.05	44.4	11.05
2. Turbine	6	3	15	11.58	1.25	329.86	0.39	0.03	9.99
Total Aux.	52	23	49	900.3	1892.87	694.95	30.44	44.43	21.04
III. Boiler & Boiler Aux.	140	109	114	1728.49	2996.6	1094.6	58.44	70.33	33.14
IV. Turbine & Turbine Aux.	27	12	28	220.21	472.3	412.7	7.44	11.09	12.5
V. Generator	8	18	18	29.09	62.9	99.33	0.98	1.48	3.01
VI. Misc. (Elect. /Mech.)	31	34	32	249.52	553.55	286.13	8.44	12.99	8.66
VII. Total excluding RSD of the Group	206	173	192	2227.31	4085.35	1892.76	75.3	95.89	57.31
VII. RSD	15	9	21	730.6	175.23	1409.77	24.7	4.11	42.69
Total	221	182	213	2957.91	4260.58	3302.53	100	100	100

[illegible]

Area/ cause of outage (195-200 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
13. Turbine Misc. Problems	5	3	2	26.34	2.61	4.2	0.89	0.06	0.13
Total Turbine	21	9	13	208.63	471.05	82.83	7.05	11.06	2.51
C. Generator									
1. Stator/ Stator Earth Fault	2	4	7	17.93	22.68	20.89	0.61	0.53	0.63
2. Gen. Transformer Tripping/ Damaged	0	1	0	0	0.47	0	0	0.01	0
3. Rotor/ Rotor Earth Fault	1	0	3	2.36	0	4.68	0.08	0	0.14
4. Excitation Problem	2	5	2	7	22.01	35.77	0.24	0.52	1.08
5. Gen. Cooling System Failure	0	0	1	0	0	4.76	0	0	0.14
6. Seal Oil System Problem	0	0	1	0	0	26.67	0	0	0.81
7. Fire In Turbo Gen. Bushing/ Bushing Failure	0	0	0	0	0	0	0	0	0
8. A.V.R. Problem	0	1	2	0	5.06	3.22	0	0.12	0.1
9. Generator Protection/ Relay Operation Problem	2	5	1	1.47	5.57	2.71	0.05	0.13	0.08
10. Hydrogen Pressure Problem	0	1	0	0	6.53	0	0	0.15	0
11. Generator Miscellaneous Maintenance	1	1	1	0.33	0.59	0.63	0.01	0.01	0.02
Total Generator	8	18	18	29.09	62.9	99.33	0.98	1.48	3.01
Ii. Auxiliaries									
A. Boiler Auxiliaries									
1. I.D. Fans Problem	27	11	19	684.07	1782.59	291.21	23.13	41.84	8.82
2. F.D. Fans Problem	0	0	1	0	0	0.89	0	0	0.03
3. P.A. Fans Problem	10	6	5	77.74	37.83	32.16	2.63	0.89	0.97
4. Milling System /Rc Feeder Problem	2	1	4	56.53	50.28	29.39	1.91	1.18	0.89
5. PIPES And VALVES BOILER SIDE	3	0	4	1.44	0	10.37	0.05	0	0.31
6. Boiler Aux. Misc. Problems	4	2	1	68.94	20.92	1.07	2.33	0.49	0.03
Total Boiler Aux.	46	20	34	888.71	1891.63	365.09	30.05	44.4	11.05
B. Turbine Auxiliaries									
7. Boiler Feed Pump/Motor Problem	4	1	2	10.21	1.06	31.77	0.35	0.02	0.96
8. Condensate Pump Problem	0	0	0	0	0	0	0	0	0
9. C.W. Pump Problem	2	0	11	1.37	0	281.01	0.05	0	8.51

[illegible]

Area/ cause of outage (195-200 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
27. Transmission Constraints/ Grid Disturbance	2	2	2	20.75	8.02	1.41	0.7	0.19	0.04
28. Reserve Shut Down	15	9	21	730.6	175.23	1409.77	24.7	4.11	42.69
TOTAL GRID SYSTEM	17	11	23	751.35	183.25	1411.19	25.4	4.3	42.73
Total Miscellaneous	46	43	53	980.12	728.78	1695.9	33.14	17.11	51.35

6.2.7 100-150 MW CAPACITY GROUP

6.2.7.1. Performance details of 100-150 MW capacity group units during the years 2013-14, 2014-15 and 2015-16 are given below. As may be seen, this group had very large forced outage of over 38%. The high forced outages are mainly on account of reserve shutdown & old units closed for operation, which together account for almost two third of the forced outages.

PARTTICULARS	2013-14	2014-15	2015-16
1. Units commissioned by the end of the year			
(a) Number	102	102	102
(b) Capacity (MW)	12295	12580	12362
2. Units considered in the review			
(a) Number	101	103	102
(b) Capacity (MW)	12145	12430	12362
(c) Generation (MU)	48604.74	51045.94	49891.01
Planned Maintenance (%)	10.44	9.43	5.39
Forced outage (%)	33.88	32.54	38.48
Operating Availability (%)	55.68	58.03	56.13
Plant Load Factor (%)	46.36	47.87	50.76

6.2.7.2 Forced outage details due to equipment and auxiliaries and energy loss of 100-150 MW capacity group units for the years 2013-14, 2014-15 and 2015-16 are shown below:

Area/ cause of Outage	No. of Outages			MU Loss			% of Group F.O. Loss		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
I. EQUIPMENT									
1. Boiler	644	518	575	6583.55	5394.27	4214.71	19.25	13.31	10.18
2. Turbine	144	145	159	2183.15	3110.45	1924.78	6.38	6.47	4.65
3. Generator	83	57	77	2594.8	2785.35	988.89	7.59	2.45	2.39
Total	871	720	811	11361.51	11290.08	7128.38	33.22	22.22	17.21
II. AUXILIARIES									
1. Boiler	115	83	72	3801.18	3836.92	487.01	11.11	10.95	1.18
2. Turbine	87	44	56	338.68	968.07	289.72	0.99	2.76	0.7
Total	202	127	128	4139.86	4804.99	776.73	12.1	13.71	1.88
III. Boiler & Boiler Aux.	759	601	647	10384.74	9231.19	4701.72	30.36	26.35	11.35
IV. Turbine & Turbine Aux.	231	189	215	2521.83	4078.52	2214.5	7.37	11.64	5.35
V. Generator	83	57	77	2594.8	2785.35	988.89	7.59	7.95	2.39
VI. Misc. (Elect. /Mech.)	368	233	293	9504.52	7613.75	19258.21	27.79	21.73	46.49
VII. Total excluding RSD of the Group	1441	1080	1232	25005.89	23708.81	27163.32	73.11	67.67	65.58
VIII. RSD	113	104	148	9197.03	11326.96	14249.49	26.89	32.33	34.40
Total	1554	1184	1380	34202.92	35035.77	41412.81	100	100	100

6.2.7.3 The break-up of the area/causes of forced outages and energy loss of 100-150 MW capacity group units during the years 2013-14, 2014-15 and 2015-16 are given below:

Area/ cause of outage (100-150 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
I. EQUIPMENTS									
A. Boiler									
1. Water Wall Tube Leakage	228	204	131	4268.77	3386.68	1385.03	12.48	9.67	3.34
2. Super Heater Tube Leakage	29	36	36	293.12	322.08	289.79	0.86	0.92	0.7
3. Reheater Tube Leakage	12	12	13	39.2	45.43	73.14	0.11	0.13	0.18
4. Economiser Tube Leakage	59	56	37	362.22	614.65	291.42	1.06	1.75	0.7
5. Air Preheaters Problem	3	5	4	28.86	13.99	4.47	0.08	0.04	0.01

Area/ cause of outage (100-150 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
6. Furnace Trouble	0	3	0	0	11.92	0	0	0.03	0
7. Boiler Operational Problems	0	0	0	0	0	0	0	0	0
(A) Furnace Fire Out/Flame Failure	84	84	122	188.53	123.29	144.9	0.55	0.35	0.35
(B) Furnace Draft Abnormal	134	56	83	592.88	418.31	157.59	1.73	1.19	0.38
(C) Drum Level High/ Low	36	21	39	40.32	11.85	27.08	0.12	0.03	0.07
8. Others	59	41	110	769.65	446.06	1841.3	2.25	1.27	4.45
Total Boiler	644	518	575	6583.55	5394.27	4214.71	19.25	15.4	10.18
B. Turbine									
1. Turbine Bearing Problem	10	2	9	16.6	27.97	690.03	0.05	0.08	1.67
2. Governing / Oil System Problem	23	8	24	67.77	2.36	133.09	0.2	0.01	0.32
3. Turbine Differential Expansion Problem	5	11	6	53.6	42	10.51	0.16	0.12	0.03
4. Turbine Axial Shift/ Thrust Pad Problem	3	3	2	37.05	21.38	2.01	0.11	0.06	0
5. Turbine Eccentricity/ High Vibration	14	34	22	596.06	1166.96	545.9	1.74	3.33	1.32
6. Turbine Rotor Failure/Damaged	1	0	2	46.09	0	57.06	0.13	0	0.14
7. Turbine Control Valve Problem	6	4	4	15.1	38.54	18.64	0.04	0.11	0.05
8. Condenser Tube Leakage/ Cleaning	5	12	17	68.59	140.06	128.54	0.2	0.4	0.31
9. Main Steam Line Problem	10	14	8	60.38	263.89	11.48	0.18	0.75	0.03
10. Emergency Safety Valve Closure	0	1	0	0	128.59	0	0	0.37	0
11. Condenser Low Vacuum	28	23	43	89.61	159.47	260.01	0.26	0.46	0.63
12. H.P. & L.P. Bypass System	0	3	1	0	1.34	0.22	0	0	0
13. Turbine Misc. Problem	39	30	21	1132.3	1117.9	67.28	3.31	3.19	0.16
Total Turbine	144	145	159	2183.15	3110.45	1924.78	6.38	8.88	4.65
C. Generator									
1. Stator/ Stator Earth Fault	8	9	13	970.36	1388.51	546.69	2.84	3.96	1.32
2. Gen. Transformer Tripping/ Damaged	1	4	4	0.52	205.79	323.3	0	0.59	0.78
3. Rotor/ Rotor Earth Fault	4	0	0	10.3	0	0	0.03	0	0
4. Excitation Problem	16	6	9	90.49	12.29	18.03	0.26	0.04	0.04
5. Gen. Cooling System Failure	2	0	0	12.52	0	0	0.04	0	0

Area/ cause of outage (100-150 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
1. Unit Aux. Transformer/ Station Transformer Problems	10	8	8	88.26	22.15	6.07	0.26	0.06	0.01
2. Gen. Transformer Tripping/ Damaged	18	8	17	68.88	3.8	30.33	0.2	0.01	0.07
3. H.T./L.T. Supply Problem	8	2	7	64.2	1.01	5.1	0.19	0	0.01
4. Dc Supply Problem	7	8	15	235.14	56.22	141.32	0.69	0.16	0.34
5. Switch Yard/Bus Bar Problem	27	13	26	49.91	121.17	45.25	0.15	0.35	0.11
6. Breaker/Isolator Problems	5	0	2	1.36	0	2.55	0	0	0.01
7. Misc. Fire Hazards / Fire In Cable Gallery	4	3	2	12.83	85.22	588.19	0.04	0.24	1.42
8. Instrumentation Problem	4	0	12	1.05	0	97.29	0	0	0.23
9. Air Supply Problem	2	0	2	14.11	0	0.65	0.04	0	0
10. Electrical Miscellaneous Problems	96	56	58	255.63	230.28	113.22	0.75	0.66	0.27
Total Other Electrical Problems	183	108	149	792.44	1029.97	1029.97	2.32	3.12	2.49
B. Fuel and Other Misc. problem									
12. Coal Feeding Problem	11	2	1	44.68	64.07	0.69	0.13	0.18	0
13. Lignite Feeding Problem	54	21	19	1908.53	121.16	430.08	5.58	0.35	1.04
14. Wet/ Poor Quality Lignite	11	1	0	122.18	24.8	0	0.36	0.07	
15. Wet/ Poor Quality Coal	1	4	7	0.61	2.02	94.87	0	0.01	0.23
16. Fuel Oil Problem	3	6	4	0.37	11.37	29.31	0	0.03	0.07
17. Cooling Tower Problem	1	0	0	13.32	0	0	0.04	0	0
18. Ash Handling System Problem	10	4	8	182.4	223.59	167.54	0.53	0.64	0.4
19. Raw Water Problem	2	0	1	28.64	0	6.61	0.08	0	0.02
20. D.M. Water Problem	0	1	0	0	8.69	0	0	0.02	0
21. E.S.P. / Pollution Problem	7	4	15	390.2	561.02	494.16	1.14	1.6	1.19
22. Non-Readiness Of Residual Work Of New Unit	2	0	1	10.86	0	1.67	0.03	0	0
23. Vintage Unit Withdrawn And Closed For Operation	4	4	13	3679.2	3679.2	12648.96	10.76	10.5	30.54
24. Other Misc. Problems	2	15	12	1315.9	230.16	97.29	3.85	0.66	0.23
25. Fuel Supply & Other Misc. Problems	4	10	16	1.05	573.44	1392.84	0	1.64	3.36
26. Coal Shortage	6	13	1	549.17	176.23	7.06	1.61	0.5	0.02

Area/ cause of outage (100-150 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
Total Fuel Supply And Other Misc Problems	118	85	98	8247.12	5675.76	15371.1	24.11	16.2	37.1
C. Grid System									
27. Transmission Constraints/ Grid Disturbance	70	47	49	465.83	99.01	106.48	1.36	0.28	0.26
28. Reserve Shut Down	113	104	150	9197.03	11326.96	14249.49	26.89	32.33	34.40
29. NO Power Purchase Agreement	0	0	4	0	0	1433.08	0	0	3.46
Total Grid System	151	0	203	11425.97	0	15789.1	32.61	0	38.12
30. Uneconomical Operation	0	2	1	0	1318.79	1317.6	0	3.76	3.18
Total Miscellaneous	484	346	451	18702.42	19513.8	33507.7	54.68	55.7	80.90

6.2.8 25 -99 MW (<100MW) CAPACITY GROUP

6.2.8.1 Performance of 25 -99 MW capacity group units during the year 2015-16 continued to be much below national average mainly due to uneconomic operation and frequent outages in these vintage units. Almost three fourth of the forced outages losses were due to reserve shutdown, no PPA, fuel supply issues & old units closed for operation. Performance details of these units during 2013-14, 2014-15 and 2015-16 are given below: -

PARTTICULARS	2013-14	2014-15	2015-16
1.Units Commissioned By The End Of The Year			
(a) Number	84	84	84
(b) Capacity (MW)	4767	4729.5	4729.5
2.Units Considered In The Review			
(a) Number	82	84	83
(b) Capacity (MW)	4692	4767	4704.5
(c) Generation (MU)	19778.73	18271.46	13152.11
3. Planned Maintenance (%)	4.89	4.85	5.56
4. Forced outage (%)	34.22	38.72	50.62
5. Operating Availability (%)	60.89	56.43	43.82
6. Plant Load Factor (%)	47.85	44.81	33.63

6.2.8.2 Forced outage details due to equipment and auxiliaries and energy loss of 25- 99 MW capacity group units for the years 2013-14, 2014-15 and 2015-16 are shown below:

Area/ cause of outage (25-99 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
1. WATER WALL TUBE LEAKAGE	161	163	110	1042.03	1075.15	633.8	7.25	6.81	3.03
2. SUPER HEATER TUBE LEAKAGE	55	23	28	529.1	1398.22	118.31	3.68	8.86	0.57
3. REHEATER TUBE LEAKAGE	2	1	5	1.51	0.09	39.87	0.01	0	0.19
4. ECONOMISER TUBE LEAKAGE	67	52	57	247.53	140.98	256.24	1.72	0.89	1.22
5. AIR PREHEATERS PROBLEM	3	2	4	6.25	8.02	38.02	0.04	0.05	0.18
6. FURNACE TROUBLE	4	4	5	5.38	8.48	8.53	0.04	0.05	0.04
7. BOILER OPERATIONAL PROBLEMS	0	0	0	0	0	0	0	0	0
(A) Furnace Fire Out/Flame Failure	58	48	14	57.82	58.26	5.03	0.4	0.37	0.02
(B) Furnace Draft Abnormal	63	46	37	53.92	48.15	19.89	0.38	0.31	0.1
(C) Drum Level High/ Low	11	13	11	11.12	21.13	17.75	0.08	0.13	0.08
8. OTHERS	31	28	26	423.29	405.58	134.78	2.94	2.57	0.64
Total Boiler	455	380	297	2377.94	3164.06	1272.23	16.54	20.05	6.08
B. Turbine									
1. TURBINE BEARING PROBLEM	4	3	6	9.6	0.19	34.41	0.07	0	0.16
2. GOVERNING / OIL SYSTEM PROBLEM	6	5	6	105.7	5.68	12.71	0.74	0.04	0.06
3. TURBINE DIFFERENTIAL EXPANSION PROBLEM	3	0	1	21.27	0	1.41	0.15	0	0.01
4. TURBINE AXIAL SHIFT/ THRUST PAD PROBLEM	12	13	2	609.91	575.52	12.56	4.24	3.65	0.06
5. TURBINE ECCENTRICITY/ HIGH VIBRATION	19	15	22	199.91	38.04	85	1.39	0.24	0.41
6. TURBINE ROTOR FAILURE/DAMAGED	0	0	1	0	0	10.08	0	0	0.05
7. TURBINE CONTROL VALVE PROBLEM	15	0	0	96.21	0	0	0.67	0	0
8. CONDENSER TUBE LEAKAGE/ CLEANI	39	26	6	78.35	559.27	22.88	0.55	3.54	0.11
9. MAIN STEAM LINE PROBLEM	25	11	2	29.98	4.18	0.38	0.21	0.03	0
10. Emergency Safety Valve closure	5	2	1	2.25	1.9	0.22	0.02	0.01	0
11. CONDENSER LOW VACCUM	37	23	10	100.13	20.3	4.47	0.7	0.13	0.02

Area/ cause of outage (25-99 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
12. H.P. & L.P. bypass system	2	0	0	0.39	0	0	0	0	0
13. TURBINE MISC. PROBLEM	37	14	18	109.94	29.23	56.96	0.77	0.19	0.27
Total Turbine	204	112	75	1363.63	1234.31	241.09	9.49	7.82	1.15
C. Generator									
1. STATOR/ STATOR EARTH FAULT	11	4	20	3.47	0.99	2.04	0.02	0.01	0.01
2. ROTOR/ ROTOR EARTH FAULT	11	0	2	12.45	0	51.72	0.09	0	0.25
3. GEN. TRANSFORMER TRIPPING/ DAMAGED	1	5	2	0.06	5.51	12.28	0	0.03	0.06
4. EXCITATION PROBLEM	12	12	4	28.39	4.58	3.35	0.2	0.03	0.02
5. GEN. COOLING SYSTEM FAILURE	0	0	0	0	0	0	0	0	0
6. SEAL OIL SYSTEM PROBLEM	2	2	0	0.06	1.07		0	0.01	
7. FIRE IN TURBO GEN. BUSHING/ BUSHING FAILURE	0	0	1	0	0	0.07	0	0	0
8. GENERATOR BEARING PROBLEM	0	2	2	0	0.08	130.59	0	0	0.62
9. A.V.R. PROBLEM	2	6	3	1.33	348.2	4.32	0.01	2.21	0.02
10. GENERATOR PROTECTION/ RELAY OPERATION PROBLEM	11	15	19	42.31	15.83	19.75	0.29	0.1	0.09
11. HYDROGEN PRESSURE PROBLEM	0	0	1	0	0	13	0	0	0.06
12. GENERATOR MISCELLANEOUS MAINTENANCE	4	7	5	309.93	614.14	20.18	2.16	3.89	0.1
Total Generator	54	53	59	397.99	990.41	257.3	2.77	6.28	1.23
A. Boiler Auxiliaries									
1. I.D. FANS PROBLEM	12	17	4	15.42	39.45	7.47	0.11	0.25	0.04
2. F.D. FANS PROBLEM	4	5	4	4.37	2.82	2.73	0.03	0.02	0.01
3. P.A. FANS PROBLEM	10	15	2	29.38	32.43	12.32	0.2	0.21	0.06
4. MILLING SYSTEM /RC FEEDER PROBLEM	42	18	49	332.24	124.21	472.67	2.31	0.79	2.26
5. PIPES and VALVES BOILER SIDE	9	1	3	12.23	0.04	8.49	0.09	0	0.04
6. BOILER AUX. MISC. PROBLEMS	20	13	8	1614.59	1182.59	18.66	11.23	7.49	0.09
Total Boiler Aux.	97	69	70	2008.23	1381.54	522.33	13.97	8.76	2.5

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Area/ cause of outage (25-99 MW Cap. group)	No. of Outages			MU Loss			% of Group F.O. Loss		
	13-14	14-15	15-16	13-14	14-15	15-16	13-14	14-15	15-16
12. COAL FEEDING PROBLEM	10	4	4	951.99	17.28	16.98	6.62	0.11	0.08
13. LIGNITE FEEDING PROBLEM	7	12	24	10	208.8	140.64	0.07	1.32	0.67
15. WET/ POOR QUALITY COAL	11	6	6	7.54	28.41	31.24	0.05	0.18	0.14
16. FUEL OIL PROBLEM	1	2	1	0.42	0.78	0.1	0	0	0
17. COOLING TOWER PROBLEM	2	0	0	1	0	0	0.01	0	0
18. ASH HANDLING SYSTEM PROBLEM	6	7	12	27.53	15.2	42.88	0.19	0.1	0.2
19. RAW WATER PROBLEM	4	2	0	9.11	4.48	0	0.06	0.03	0
20. E.S.P. / POLLUTION PROBLEM	3	2	6	826.16	982.49	1677.84	5.75	6.23	8.02
21. NON-READINESS OF RESIDUAL WORK OF NEW UNIT	3	0	1	4.65	0	1.63	0.03	0	0.01
22. VINTAGE UNIT WITHDRAWN AND CLOSED FOR OPERATION	0	0	13	0	0	6512.24	0	0	31.13
23. FUEL SUPPLY & OTHER MISC. PROBLEMS	4	25	15	1377.9	3730.89	1408.59	1.88	23.64	6.73
24. OTHER MISC. PROBLEMS	21	1	1	1377.9	1	2.77	9.59	0.01	0.01
25. LIGNITE SHORTAGE	0	0	1	0	0	9.93	0	0	0.05
26. COAL SHORTAGE	8	4	1	67.25	35.87	3.85	0.47	0.23	0.02
TOTAL FUEL SUPPLY AND OTHER MISC PROBLEMS	80	65	82	3553.74	5025.19	9848.69	24.72	31.85	47.06
C. Grid System									
27. TRANSMISSION Constraints/ GRID DISTURBANCE	122	40	104	695.55	9.28	156.14	4.84	0.06	0.75
28. RESERVE SHUT DOWN	219	113	62	3502.47	3113.56	4430.52	24.36	19.73	21.18
TOTAL GRID SYSTEM	341	153	166	4198.02	3122.84	4586.66	29.2	19.79	21.93
29. NO Power purchase agreement	0	0	7	0	0	3522.38	0	0	16.84
30. UNECONOMICAL OPERATION	0	1	1	0	262.8	263.52	0	1.67	1.26
Total Miscellaneous	766	490	407	9537.86	12451.03	18370.2	56.76	78.91	87.77

SECTION-7

PARTIAL UNAVAILABILITY AND NON – UTILIZATION OF ENERGY DUE TO SYSTEM LOAD VARIATION

7.1 Partial unavailability under review comprises the following: -

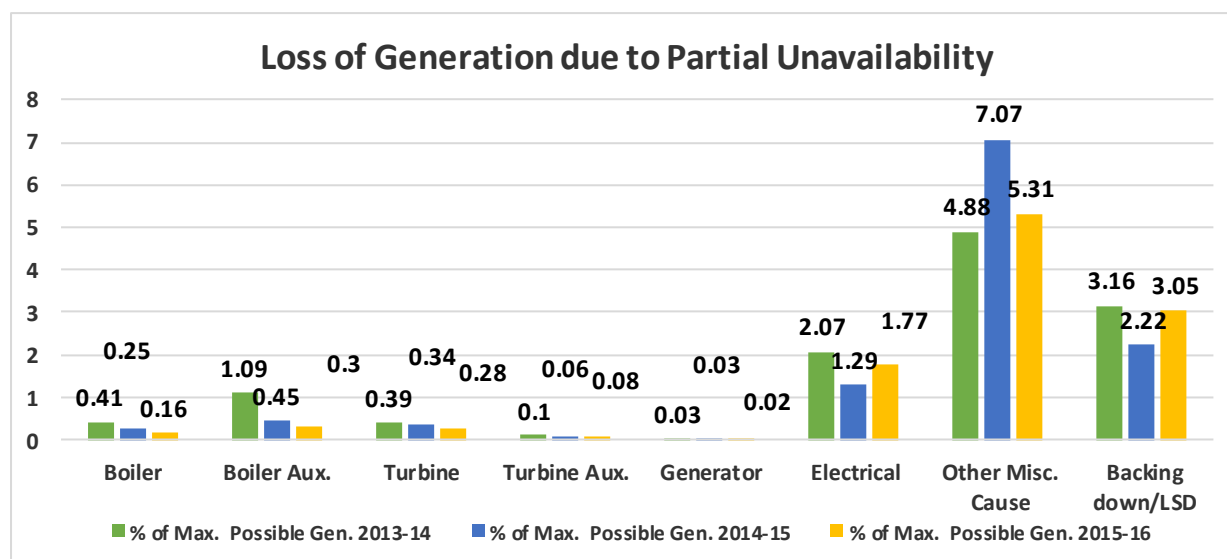
- i) Unavailability due to internal constraints in equipment or auxiliaries as a result of which the operating units could not deliver the rated output despite no grid or other external constraints.
- ii) Unavailability due to external constraints not attributable to power station such as shortage of fuel or cooling water and low system demand including grid constraints resulting in reduced generation of the units (excluding shutdown).

7.2 OVERALL PARTIAL UNAVAILABILITY

Energy loss due to partial unavailability of the thermal generating units considered in the Review during 2015-16 decreased to 10.99% of the maximum possible generation from 11.62% in 2014-15. **The energy loss due to partial unavailability on account of miscellaneous problems such as poor quality coal, coal shortages, backing down continued to be the main cause for Partial Unavailability of units.** The broad details of energy loss due to Partial Unavailability of the thermal generating units due to various equipment (on All India basis) during the period, 2013-14, 2014-15 and 2015-16 are shown below: -

Sl. No	Constraint Area	MU Loss			% Total Partial Loss			% of Max. Possible Gen.		
		2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
1	Boiler	4560.57	3072.97	2312.5	3.36	2.09	1.48	0.41	0.24	0.16
2	Boiler Aux.	12171.28	5741.45	4233.6	8.97	3.91	2.7	1.09	0.45	0.3
	Boiler + Boiler Aux.	16731.85	8814.42	6546.11	12.33	6.01	4.18	1.5	0.7	0.46
3	Turbine	4349.46	4333.72	3960.01	3.2	2.95	2.53	0.39	0.34	0.28
4	Turbine Aux.	1106.84	721.46	1189.48	0.82	0.49	0.76	0.1	0.06	0.08
	Turbine + Turbine Aux.	5456.3	5055.18	5149.49	4.02	3.44	3.29	0.49	0.4	0.36
5	Generator	359.86	397.01	304.35	0.27	0.27	0.19	0.03	0.03	0.02
6	Electrical	23214.17	15273.01	25321.56	17.11	10.41	16.17	2.07	1.21	1.77
7	Other Miscellaneous	54558.82	89257.63	75779.87	40.2	60.81	48.39	4.88	7.07	5.31
	Total	100321.01	118797	113101.38	73.92	80.94	72.22	8.97	9.41	7.93
8	Backing down/LSD	35394.23	27972.76	43509.47	26.08	19.06	27.78	3.16	2.22	3.05
	Grand Total	135715.23	146770	156610.85	100	100	100	12.13	11.62	10.99

The pictorial representation of the loss of generation on account of Partial Unavailability of the various parts in the main equipment & its auxiliaries and because of low system demand including grid constraints during the financial years 2013-14 ,2014-15 and 2015-16 is given below: -



7.3 REGION-WISE ENERGY LOSS UE TO PARTIAL UNAVAILABILITY:

Region wise broad details of the energy loss due to Partial Unavailability of the thermal generating units in terms of percentage of maximum possible generation due to failure of various equipment's during the period 2014-15 and 2015-16 are shown below: -

Type of Equip.	Northern Region		Western Region		Southern Region		Eastern Region		ALL INDIA	
	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16	14-15	15-16
Main Equipment ⁶	5.1	5.1	4.1	5.1	2.1	4.1	4.1	5.1	4.1	5.2
Axillaries	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3
Other Reasons	6.1	5.1	6.1	4.1	7.1	5.1	8.1	6.1	7.1	5.3
Total	11.3	10.3	11.3	10.3	9.3	9.3	12.3	11.3	11.3	10.8

Region-wise details of Partial Unavailability due to various long and short duration constraints in the main equipment and its auxiliaries during 2015-16(in MUs) are given in **Annexure 7.1**.

7.4 CAPACITY GROUP-WISE PARTIAL UNAVAILABILITY:

The Partial Unavailability loss in terms of percentage of All India Maximum Possible Generation in different capacity groups during the years 2013-14, 2014-15 and 2015-16 are shown below:

⁶ Includes partial loss due to Low System Demand (LSD)

Capacity Group(MW)	Partial Unavailability as percentage of Maximum Possible Generation											
	Main equipment			Auxiliary			Others			Total		
	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
660-800	1.21	0.83	1.35	0.09	0.04	0.02	0.22	0.56	0.44	1.52	1.43	1.8
490-600	2.07	1.22	1.56	0.46	0.1	0.08	1.6	2.95	2.42	4.13	4.27	4.06
300-360	0.46	0.35	0.48	0.01	0.05	0.03	0.49	0.34	0.32	0.95	0.75	0.83
250-270	0.62	0.39	0.54	0.03	0.03	0.03	0.39	0.57	0.23	1.03	0.99	0.79
210-210	0.84	0.59	0.66	0.28	0.15	0.09	1.46	1.56	1.17	2.58	2.3	1.93
195-200	0.11	0.05	0.06	0.07	0.03	0.03	0.15	0.21	0.16	0.33	0.29	0.26
100-150	0.34	0.24	0.25	0.11	0.05	0.06	0.26	0.43	0.3	0.7	0.73	0.61
25-99	0.4	0.17	0.18	0.09	0.03	0.01	0.3	0.17	0.15	0.8	0.37	0.34
Total	6.29	4.04	5.29	1.24	0.51	0.38	5.05	7.07	5.31	12.58	11.62	10.99

Detail breakup of cause wise Partial Unavailability during 2015-16 for major capacity groups of thermal units is given in **Annexure 7.2**.

7.5 MAKE-WISE PARTIAL UNAVAILABILITY

Make-wise energy loss due to Partial Unavailability of the thermal generating units in terms of percentage of All India Maximum Possible Generation during 2014-15 and 2015-16 are shown **below**. **It was maximum (17.05% of the make-wise maximum possible generation) in respect of BHEL/ABL make vintage units.**

Make of Units	PARTIAL UNAVAILABILITY (%)			
	(%) of make-wise Maximum Possible Generation		(%) of All India Maximum Possible Gener	
	2014-2015	2015-2016	2014-2015	2015-2016
BHEL/BHEL	11.15	10.26	6.26	5.88
BHEL/ABL	20.31	17.05	0.4	0.27
RUSSIA/RUSSIA	13.25	13.59	0.31	0.28
CHINA/CHINA	11.82	12.10	2.13	3.02
OTHER/OTHER	17.23	13.96	2.58	1.54
ALL MAKES	11.68	10.99	11.62	10.99

7.6 SECTOR WISE PARTIAL UNAVAILABILITY INCLUDING LOW SYSTEM DEMAND:

Sector wise details of energy loss due to Partial Unavailability of the thermal generating units in terms of percentage of All India Maximum Possible Generation during 2014-15 and 2015-16 are shown below:

Year	Central Sector	Private Sector	State Sector	All India Average
2014-2015	3	4.84	3.79	11.62
2015-2016	2.97	3.82	4.19	10.99

7.7 NON – UTILISATION OF ENERGY DUE TO SYSTEM LOAD VARIATION

Loss of generation due to backing down of coal/ lignite based thermal units increased from 27,972.8 MU in 2014-15 to 43,509.47 MU in 2015-16. Also, the losses due to reserve shutdown (RSD) of units increased from 56,573.77 MU during 2014-15 to 113413.88 MU during 2015-16. **Thus the RSD and low system demand together resulted into loss of 11% of maximum possible generation of the units considered.** Details of non-utilization of energy due to system load variations in different regions during 2014-15 and 2015-16 are given at **Annexure 7.3.**

ANNEXURE - 7.1

REGION WISE DETAILS OF PARTIAL UNAVAILABILITY DUE TO VARIOUS LONG AND SHORT DURATION CONSTRAINTS IN THE MAIN EQUIPMENT AND ITS AUXILLIARIES DURING 2015-2016 (in MU)

Cause Of Partial (Due To Equipme Aux.)	NORTHERN REGION			WESTERN REGION			SOUTHERN REGION			EASTERN REGION			ALL INDIA		
	Regional G	% Of R Poss. G	% Of Tot Regional Loss	Regional G	% Of R Poss. G	% Of Tot Regional	Regional G	% Of R Poss. G	% Of Tot Regional Loss	Regional G	% Of R Poss. G	% Of Tot Regional Loss	Regional Ge	% Of M Gen.	% Of Tot Regional Loss
Main Boiler	292.21	0.09	0.86	1120.45	0.19	1.79	625.78	0.24	2.54	274.07	0.1	0.78	2312.5	0.16	1.48
Boiler Auxiliaries	847.81	0.27	2.48	1711.28	0.29	2.73	590.04	0.23	2.39	1084.48	0.41	3.09	4233.6	0.3	2.7
Boiler & Its Auxil	1140.02	0.37	3.34	2831.72	0.48	4.52	1215.82	0.47	4.93	1358.55	0.52	3.87	6546.11	0.46	4.18
Main Turbine	771.17	0.25	2.26	1631.36	0.27	2.6	1050.57	0.41	4.26	506.91	0.19	1.44	3960.01	0.28	2.53
Turbine Auxiliaries	2.27	0	0.01	428.71	0.07	0.68	434.08	0.17	1.76	324.42	0.12	0.92	1189.48	0.08	0.76
Turbine & Its Au	773.44	0.25	2.27	2060.07	0.35	3.29	1484.65	0.58	6.02	831.33	0.32	2.37	5149.49	0.36	3.29
Generator	0.15	0	0	265.08	0.04	0.42	23.06	0.01	0.09	16.07	0.01	0.05	304.35	0.02	0.19
Electrical	5799.54	1.86	17.00	10632.69	1.79	16.96	3572.62	1.39	14.50	5316.71	2.02	15.13	25321.56	1.77	16.17
Other Misc. Causes	16946.82	5.44	49.67	27433.91	4.61	43.75	13304.75	5.19	53.99	18094.4	6.88	51.49	75779.87	5.31	48.39
Total	24659.96	7.92	72.25	43223.47	7.26	68.93	19600.89	7.64	79.53	25617.06	9.74	72.90	113101.38	7.93	72.22
Backing down/ LSD	9455.72	3.04	27.72	19486.69	3.27	31.07	5044.29	1.97	20.47	9522.77	3.62	27.10	43509.47	3.05	27.78
Grand Total	34115.68	10.96	100.00	62710.17	10.54	100.00	24645.17	9.61	100.00	35139.83	13.35	100.00	156610.85	10.99	100.00

Annexure-7.2

CAUSE WISE PARTIAL UNAVAILABILITY DURING 2015-2016 OF MAJOR CPACITY GROUP OF THERMAL UNITS																
Particulars	660-800 MW		490-600 MW		300-360 MW		250-270 MW		100-150 MW		210-210 MW		195-200 MW		25-99 MW	
	MU LOSS	%	MU LOS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%
MAIN BOILER																
Pressure Parts Leakage	25.21	0.1	31.82	0.05	8.45	0.07	3.53	0.03	5.14	0.05	50.31	0.18	0	0	0	0
Drum Pressure Restriction	0	0	144.75	0.24	2.36	0.02	1.04	0.01	10.71	0.1	114.83	0.4	0	0	1.17	0.02
Air Heaters	12.37	0.05	133.11	0.22	0	0	2.88	0.03	23.19	0.23	207.73	0.73	0	0	0	0
Furnace	0	0	19.05	0.03	0	0	6.04	0.05	90.02	0.88	65.04	0.23	0	0	0.22	0
Furnace Draft	0	0	0	0	0	0	0.56	0	1.1	0.01	0	0	0	0	0	0
High Fuel Gas/ Steam Temperature	0	0	11.86	0.02	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous Problems - Main Boiler	526.89	2.05	43.42	0.07	55.16	0.47	73.19	0.65	235	2.29	353.07	1.24	10.24	0.28	43.05	0.83
Total Main Boiler	564.47	2.2	384.01	0.64	65.97	0.56	87.24	0.77	365.15	3.57	790.98	2.77	10.24	0.28	44.44	0.85
BOILER AUXILIARIES																
I.D. Fan	6.12	0.02	233.74	0.39	194.2	1.65	41.65	0.37	144.35	1.41	255.82	0.9	42.34	1.14	29.63	0.57
P.A. Fan	8.22	0.03	129.49	0.22	19.16	0.16	1.3	0.01	43.93	0.43	22.99	0.08	108.4	2.93	5.51	0.11
F.D. Fan	0.39	0	0	0	130.39	1.11	8.92	0.08	12.64	0.12	8.34	0.03	0	0	2.56	0.05
Milling System	132.69	0.52	193.63	0.32	43.27	0.37	197.11	1.74	421.83	4.12	672.21	2.35	193.36	5.23	132.23	2.54
P.C & R.C. Feeders	0	0	0	0	20.97	0.18	49.57	0.44	98.28	0.96	3.48	0.01	0	0	56.62	1.09
ESP	5.08	0.02	47.2	0.08	3.91	0.03	67.59	0.6	11.8	0.12	1	0	0	0	0	0
Miscellaneous Problems-	0.29	0	148.72	0.25	0	0	12.77	0.11	50.76	0.5	209.03	0.73	10	0.27	0.13	0

CAUSE WISE PARTIAL UNAVAILABILITY DURING 2015-2016 OF MAJOR CPACITY GROUP OF THERMAL UNITS																
Particulars	660-800 MW		490-600 MW		300-360 MW		250-270 MW		100-150 MW		210-210 MW		195-200 MW		25-99 MW	
	MU LOSS	%	MU LOS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%
Boiler Auxiliaries																
Total Boiler Auxiliaries	152.79	0.59	752.78	1.26	411.90	3.5	378.91	3.35	783.5	7.66	1172.87	4.1	354.1	9.57	226.68	4.36
BOILER & BOILER AUX																
Boiler & Boiler Aux	717.26	2.79	1136.79	1.89	477.87	4.06	466.15	4.12	1148.75	11.22	1963.85	6.88	364.34	9.85	271.12	5.21
Total Boiler & Boiler Aux	717.26	2.79	1136.79	1.89	477.87	4.06	466.15	4.12	1148.75	11.22	1963.85	6.88	364.34	9.85	271.12	5.21
MAIN TURBINE																
Vibrations/Eccentricity	0	0	5.1	0.01	293.8	2.49	0	0	10.29	0.1	48.46	0.17	9.37	0.25	7.2	0.14
Turbine Differential	0	0	0	0	2.19	0.02	0	0	0	0	0.67	0	0	0	0	0
High Curtis Wheel Pressure	0	0	0	0	0	0	0	0	0	0	26.84	0.09	0	0	0	0
Condenser Tube Leakages	0	0	212.88	0.35	7.68	0.07	24.11	0.21	835.57	8.15	73.05	0.26	78.04	2.11	57.3	1.1
Startup/ Shut Down	387.55	1.51	782.11	1.3	41.65	0.35	133.02	1.18	192.1	1.87	519.85	1.82	51.82	1.4	60.02	1.15
Axial Shift	0	0	0	0	0	0	0	0	0	0	24.5	0.09	0	0	0	0
Control Valve	0.17	0	2.74	0	0	0	0	0	0	0	24.55	0.09	0	0	0	0
Condenser	0	0	0	0	2.03	0.02	0	0	0	0	0	0	0	0	0	0
Governing System	1.28	0	0	0	4.47	0.04	0	0	26.71	0.26	12.8	0.04	0	0	0.09	0
Total Main Turbine	389	1.51	1002.83	1.66	351.82	2.99	157.13	1.39	1064.67	10.38	730.72	2.56	139.23	3.76	124.61	2.39
TURBINE AUXILIARIES																
B.F. Pumps	14.76	0.06	72.23	0.12	52.8	0.45	11.8	0.1	13.37	0.13	12.68	0.04	89.03	2.41	0	0
Regenerative System	92.86	0.36	2.55	0	0	0	0	0	10.7	0.1	11.55	0.04	0	0	0	0

CAUSE WISE PARTIAL UNAVAILABILITY DURING 2015-2016 OF MAJOR CPACITY GROUP OF THERMAL UNITS																
Particulars	660-800 MW		490-600 MW		300-360 MW		250-270 MW		100-150 MW		210-210 MW		195-200 MW		25-99 MW	
	MU LOSS	%	MU LOS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%
C.W. Pumps	1.22	0	275.46	0.46	4.16	0.04	0.04	0	3.64	0.04	26.16	0.09	0	0	0	0
Condensate Pump	0	0	0.05	0	0	0	0	0	0	0	1.55	0.01	0	0	0	0
Miscellaneous Problems - Turbine Aux.	2.36	0.01	91.34	0.15	0	0	39.89	0.35	174.58	1.7	182.15	0.64	0	0	2.55	0.05
Total Turbine Auxiliaries	111.2	0.43	441.63	0.73	56.96	0.48	51.74	0.46	202.29	1.97	234.09	0.82	89.03	2.41	2.55	0.05
TURBINE & TURBINE AUX																
Turbine & Turbine Aux	500.2	1.94	1444.46	2.39	408.78	3.47	208.87	1.85	1266.96	12.35	964.81	3.38	228.26	6.17	127.16	2.44
Total Turbine & Turbine Aux	500.2	1.94	1444.46	2.39	408.78	3.47	208.87	1.85	1266.96	12.35	964.81	3.38	228.26	6.17	127.16	2.44
GENERATOR																
Hydrogen Pressure/ Purity	0	0	7.89	0.01	11.65	0.1	0	0	18.36	0.18	0.74	0	0	0	0	0
Winding Temperature	0	0	0	0	0	0	0	0	0	0	7.91	0.03	0	0	0	0
Generator Cooling System	0	0	0.36	0	247.67	2.1	0	0	0	0	0.15	0	0	0	0	0
Miscellaneous Problem Generator	0	0	0.05	0	0	0	0.6	0.01	0.39	0	8.44	0.03	0	0	0.14	0
Total Generator	0	0	8.3	0.01	259.33	2.2	0.6	0.01	18.75	0.18	17.24	0.06	0	0	0.14	0
ELECTRICAL																
Main Transformer	0	0	0	0	0	0	12.09	0.11	0	0	26.84	0.09	0	0	0	0
Miscellaneous Others	0	0	9.11	0.02	1.05	0.01	0	0	0	0	7.36	0.03	0	0	0.01	0
Commercial Reason/Grid System	7497.74	29.19	10443.9	17.34	2814.84	23.86	1593.37	14.1	748.1	7.3	2102.07	7.36	2.05	0.06	63.08	1.21

CAUSE WISE PARTIAL UNAVAILABILITY DURING 2015-2016 OF MAJOR CPACITY GROUP OF THERMAL UNITS																
Particulars	660-800 MW		490-600 MW		300-360 MW		250-270 MW		100-150 MW		210-210 MW		195-200 MW		25-99 MW	
	MU LOSS	%	MU LOS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%
Total Electrical	7497.74	29.19	10453	17.36	2815.89	23.87	1605.46	14.21	748.1	7.3	2136.27	7.48	2.05	0.06	63.09	1.21
OTHER MISCELLANEOUS CAUSES																
Coal Shortage	318.41	1.24	983.54	1.63	0.88	0.01	86.68	0.77	104.26	1.02	1342.58	4.7	3.42	0.09	6.5	0.12
Coal Handling Problem / Feeding Trouble	106.71	0.42	655.49	1.09	4.04	0.03	68.05	0.6	76.03	0.74	597.84	2.09	5.83	0.16	40.74	0.78
Poor Quality/ Wet Coal	171.01	0.67	1835.43	3.05	274.44	2.33	858.97	7.6	1067.34	10.41	4453.01	15.58	413.14	11.17	192.98	3.7
Fuel Oil Shortage	664.53	2.59	6.05	0.01	16.48	0.14	0.26	0	28.43	0.28	88.26	0.31	0	0	10.59	0.2
D.M. Water	0	0	3.97	0.01	0	0	0	0	1.41	0.01	5.66	0.02	0	0	0	0
Cooling Water Problems	0	0	3.53	0.01	0	0	0	0	1.83	0.02	9.88	0.03	0	0	0.26	0
Operational Problems	5.64	0.02	116.65	0.19	0	0	0.35	0	352.98	3.44	8.85	0.03	0	0	274.18	5.26
Air Supply Problems	0	0	2.5	0	0	0	0	0	4.34	0.04	3.13	0.01	0	0	0	0
Ash Handling Problems	158.06	0.62	589.28	0.98	10.13	0.09	140.1	1.24	53.83	0.53	68.87	0.24	1.05	0.03	45.09	0.86
Malfunction Of Relays/ Instrument Trouble	0	0	0	0	0	0	3.11	0.03	0	0	12.93	0.05	0	0	0	0
Miscellaneous Problems - Others	4751.85	18.5	30398.5	50.48	4234.34	35.89	2054.22	18.17	3516.62	34.31	10578.1	37.02	1919.09	51.88	1796.86	34.46
Transmission Constraints / Evacuation Problem	29.6	0.12	0	0	0	0	0	0	0.22	0	140.96	0.49	0	0	0	0
Total Other Miscellaneous Causes	6205.81	24.16	34594.9	57.45	4540.31	38.49	3211.73	28.41	5207.27	50.8	17310.1	60.58	2342.54	63.33	2367.2	45.4
LOW SYSTEM DEMAND																
Low System Demand	10763.3	41.91	12554.4	20.85	3293.21	27.92	5805.09	51.36	1827.42	17.83	6120.13	21.42	761.39	20.58	2384.49	45.73

CAUSE WISE PARTIAL UNAVAILABILITY DURING 2015-2016 OF MAJOR CPACITY GROUP OF THERMAL UNITS																
Particulars	660-800 MW		490-600 MW		300-360 MW		250-270 MW		100-150 MW		210-210 MW		195-200 MW		25-99 MW	
	MU LOSS	%	MU LOS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%	MU LOSS	%
Total Low System Demand	10763.3	41.91	12554.4	20.85	3293.21	27.92	5805.09	51.36	1827.42	17.83	6120.13	21.42	761.39	20.58	2384.49	45.73
Grand Total	25684	100.00	60192	100.00	11795	100.0	11298	100.00	10217	100.00	28512	100.00	3698.58	100.00	5213.2	100.0

Annexure - 7.3**NON UTILIZATION OF ENERGY DUE TO SYSTEM LOAD VARIATIONS IN DIFFERENT REGIONS DURING 2014-15 AND 2015-16**

Region	Energy not utilized due to											
	Reserve Shut Down of units				Backing down of the units				Total			
	MU		% of Maximum poss generation		MU		% of Maximum poss generation		MU		% of Maximum poss generation	
	2014-15	2015-16	2014-15	2015-16	2014--15	2015-16	2014-15	2015-16	2014-15	2015-16	2014-15	2015-16
Northern	25277.14	43761.87	2.02	3.06	10557.58	9455.72	0.84	0.66	35834.72	53217.59	2.85	3.72
Western	24633.42	52646.13	1.96	3.68	10905.57	19486.69	0.86	1.37	35538.99	72132.82	2.83	5.06
Southern	485.38	4174.08	0.04	0.29	1538.03	5044.29	0.12	0.35	2023.41	9218.37	0.16	0.65
Eastern	6177.82	12831.95	0.49	0.9	4971.58	9522.77	0.39	0.67	11149.4	22354.72	0.89	1.57
North-Eastern	0	0	0	0	0	0	0	0	0	0	0	0
All India	56573.77	113413.88	4.51	7.95	27972.8	43509.47	2.22	3.05	84546.57	156923.5	6.73	11.0

SECTION-8

PATTERN OF OUTAGES AND OPERATION RELIABILITY

- 8.1** Outages of thermal units affect their operational reliability. Due to rapid addition of generation capacity over the years, additional/reserve generation capability available has significantly increased. Thus outages of units do not significantly affect the overall generation availability and reliability in the country. However, the outages trends are indicative of the operational reliability of generating units and have been discussed in this chapter. It should also be kept in view that all unit outages are not attributable to the unit constraints and some outages also occur on account of system constraints like coal shortages, transmission constraints, RSD etc. Thus the outage trend discussed in the chapter is indicative of the overall operation reliability of the units including the system constraints.

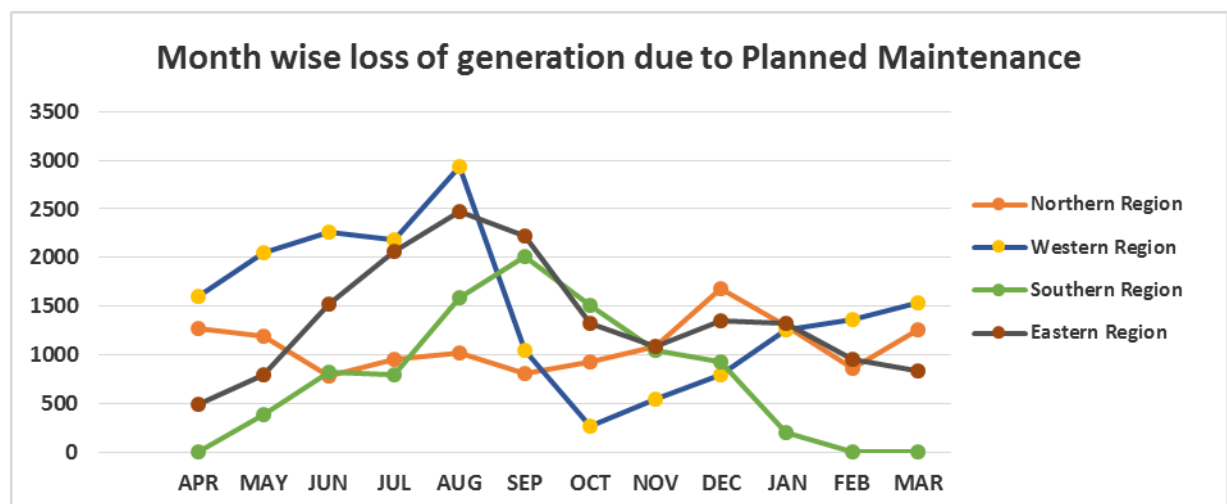
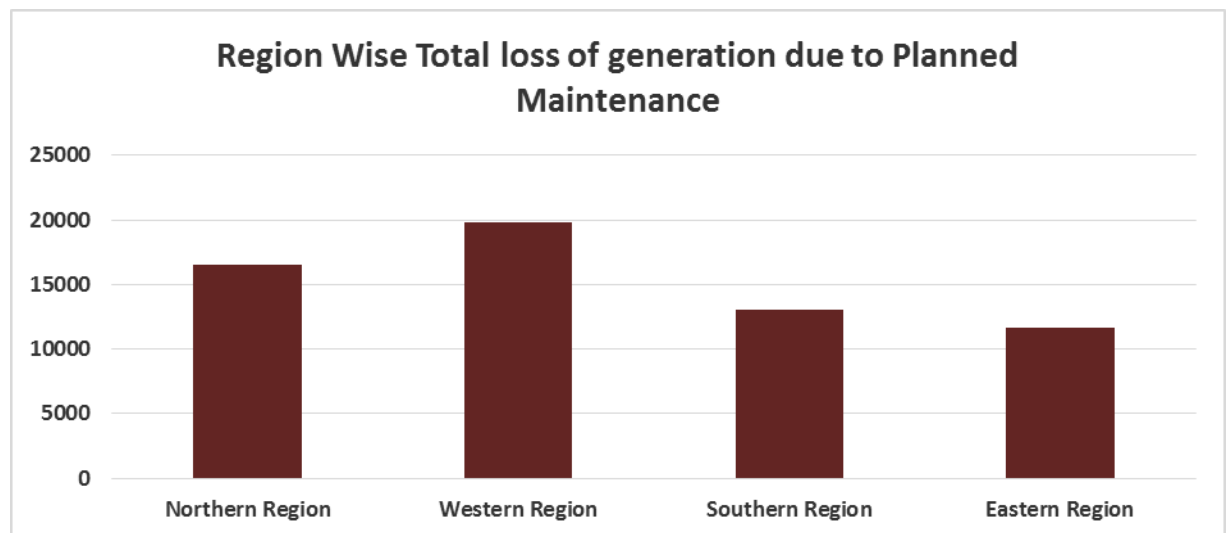
EFFECT OF PLANNED MAINTENANCE ON OPERATION RELIABILITY

- 8.2** Each power system in the country formulated generation program for 2015-16 to meet its system requirements. All the power systems program to carry out the Planned Maintenance of their thermal units in a phased manner keeping in view the operational requirements of their systems. Region-wise month-wise details of loss of generation due to Planned Maintenance (actual) of thermal units during 2015-16 are given below:

Region and Month Wise Loss of generation (MU) due to Planned Maintenance					
<u>Month</u>	Northern Region	Western Region	Southern Region	Eastern Region	Total All India
APR	1893.52	2121.87	35.79	1175.06	5226.24
MAY	1237.25	1292.26	324.14	870.14	3723.79
JUN	1603.56	1972.42	1028.03	1557.2	6161.21
JUL	1550.68	2436.96	2022.03	1205.41	7215.08
AUG	1286.45	1874.05	1703.45	1603.03	6466.98
SEP	1221.06	1242.46	2301.42	1444.39	6209.33
OCT	1058.81	1544.27	1540.3	1052.55	5195.93
NOV	853.55	1409.2	1362.6	948.12	4573.47
DEC	765.46	1211.03	1567.95	518.91	4063.35

Region and Month Wise Loss of generation (MU) due to Planned Maintenance					
Month	Northern Region	Western Region	Southern Region	Eastern Region	Total All India
JAN	731.36	1249.25	707.1	566.27	3253.98
FEB	1819.39	1384.62	257.54	402.93	3864.48
MAR	2507.52	2090.84	156.67	333.4	5088.43
Total	16528.62	19829.23	13007.02	11677.41	61042.28

Note: North-Eastern Region has not been considered as all the thermal units at Chandrapura (Assam) were under forced outage throughout the year.

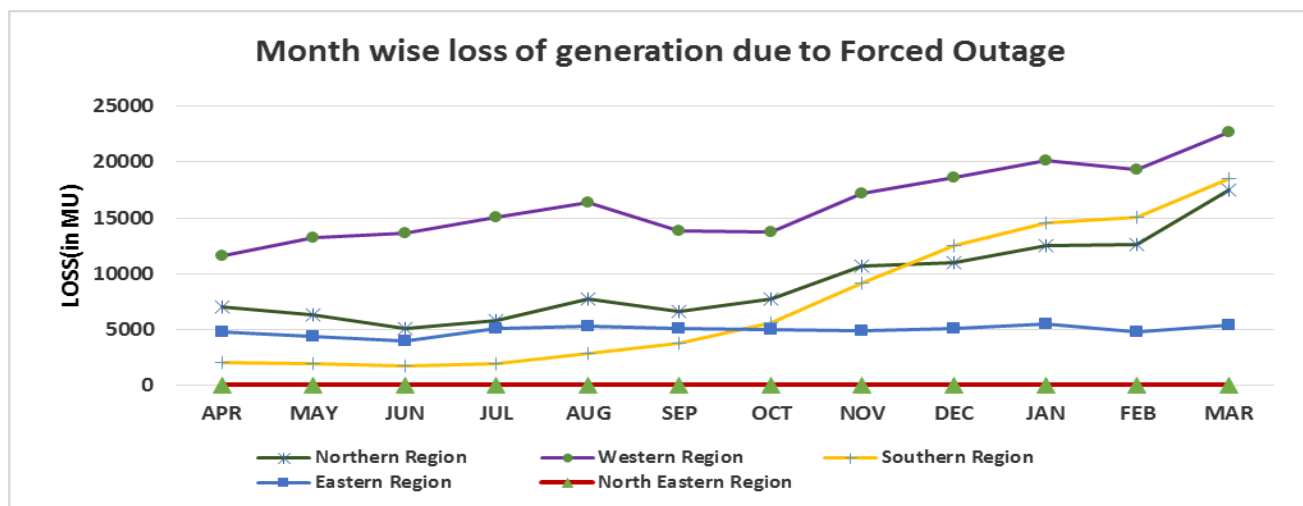
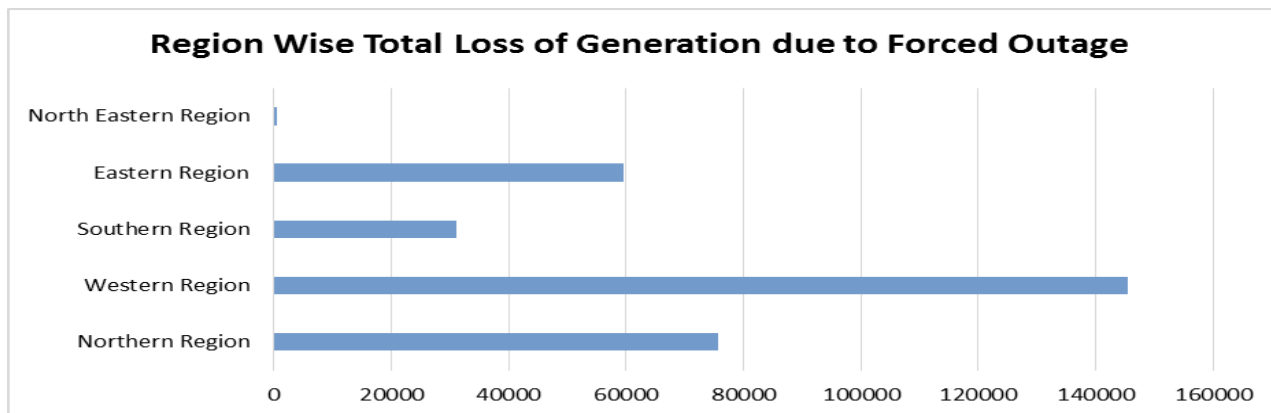


During July, 2015 the total loss of generation (7215.08 MU) due to planned maintenance of thermal units was highest.

8.3 EFFECT OF FORCED OUTAGE ON GENERATION RELIABILITY

Loss of generation due to various forced outages was maximum during the month of Jan'16(36599.43 MU). Loss of generation due to various forced outages was minimum (18889.42 MU) during May'15. Western Region experienced maximum forced outage losses. The Region wise and month wise generation loss due to Forced outages is given below:

Region-wise and month-wise generation Loss (in MUs) due to Forced Outage						
MONTH	NORTHERN	WESTERN	SOUTHERN	EASTERN	NORTH EASTERN	ALL INDIA
APR	4080.28	8576.02	1511.16	4855.4	43.2	19066.06
MAY	4231.61	9218.87	969.62	4424.68	44.64	18889.42
JUN	4083.37	10681.67	1082.44	4022.71	43.2	19913.39
JUL	5808.05	13070.38	1178.47	5069.52	44.64	25171.06
AUG	5737.98	11412.65	979.14	5317.17	44.64	23491.58
SEP	4658.99	9861.29	1185.18	5111.25	43.2	20859.91
OCT	5748.54	7788.15	1767.64	4983.96	44.64	20332.93
NOV	8657.47	9230.77	1296.91	4922.63	43.2	24150.98
DEC	8020.12	15609.8	6551.08	5066.13	44.64	35291.77
JAN	7493.79	17188.8	6308.46	5563.74	44.64	36599.43
FEB	7617.08	15345.95	7104.64	4759.36	41.76	34868.79
MAR	9527.59	17562.66	1215.27	5437.53	44.64	33787.69
Total	75664.87	145547.01	31150.01	59534.08	527.04	312423.01



8.4 MEAN TIME BETWEEN FAILURE

The degree of reliability of thermal generation is directly proportionate to the Mean Time between Failures (MTBF) of the units. Number of units in different MTBF ranges of different capacity groups during 2014-15 & 2015-16 are given at **Annexure 8.1**. All India / Region wise and Capacity Group-wise details of Mean Time between Failures (MTBF) of thermal units for 2015-16 are given in **Annexure 8.2**.

8.5 CONTINUOUS UNINTERRUPTED OPERATION OF COAL/ LIGNITE BASED UNITS:

Measurement of maximum continuous uninterrupted operation between two consecutive shutdowns and/or failures of a thermal unit also provides the degree of reliability of that unit. It was observed that till the end of 31st March 2016:

- Twenty-eight coal/lignite based thermal generating units continuously operated for more than 250 days. NEYVELI TPS- I Unit-7 (100 MW) of NLC & DADRI (NCTPP) Unit-1 of NTPC Ltd. had operated continuously for 350 days.
- Fifty coal/lignite based thermal generating units (NTPC-18, MAHAGENCO-5, TATA PCL-5, JSWEL-4, CESC-3, CGPL-2 NLC-2, APL-2, and one each of WBPDC, GSECL, DVC, GMR ENERG, LANCO, NSPCL, JPL, VIP and TOR. POW. (UNOSUGEN) operated continuously for more than 200 days.

DETAILS OF UNITS OPERATED CONTINUOUSLY FOR MORE THAN 200 DAYS IN THE YEAR 2015-16

S. NO.	STATION NAME	UNIT NO	CAPACITY	ORGANIZATION NAME	FROM DATE	TO DATE	DAYS
1	NEYVELI TPS- I	7	100	NLC	13-Aug-2014	29-JUL-15	350
2	DADRI (NCTPP)	1	210	NTPC Ltd.	01-May-2014	17-APR-15	350
3	BHILAI TPS	2	250	NSPCL	15-Sep-2014	21-AUG-15	340
4	JOJOBERA TPS	3	120	TATA PCL	28-Sep-2014	02-SEP-15	339
5	BUDGE BUDGE TPS	3	250	CESC	17-Feb-2015	27-DEC-15	313
6	BUTIBORI TPP	1	300	VIP	11-Aug-2014	17-JUN-15	310
7	JOJOBERA TPS	2	120	TATA PCL	01-Jun-2015	CONTINUE TO OPERATE	304
8	KOLAGHAT TPS	2	210	WBPDC	03-Jul-2014	03-MAY-15	303
9	KORBA STPS	4	500	NTPC Ltd.	24-Jan-2015	20-NOV-15	300
10	KAHALGAON TPS	6	500	NTPC Ltd.	14-Jul-2014	07-MAY-15	297
11	RAMAGUNDEM STPS	3	200	NTPC Ltd.	04-Nov-2014	23-AUG-15	292
12	SINGRAULI STPS	1	200	NTPC Ltd.	09-Dec-2014	24-SEP-15	289
13	MUNDRA UMTTP	1	800	CGPL	26-Sep-2014	12-JUL-15	288
14	PARLI TPS	6	250	MAHAGENCO	21-Jun-2015	CONTINUE TO OPERATE	283
15	PARLI TPS	7	250	MAHAGENCO	22-Jun-2015	CONTINUE TO OPERATE	283
16	DADRI (NCTPP)	4	210	NTPC Ltd.	08-Oct-2014	11-JUL-15	276
17	SIPAT STPS	4	500	NTPC Ltd.	30-Jun-2015	CONTINUE TO OPERATE	274
18	SIMHADRI	2	500	NTPC Ltd.	15-Feb-2015	15-NOV-15	273
19	PARLI TPS	4	210	MAHAGENCO	05-Jul-2015	CONTINUE TO OPERATE	269

S. NO.	STATION NAME	UNIT NO	CAPACITY	ORGANIZATION NAME	FROM DATE	TO DATE	DAYS
20	MUNDRA TPS	2	330	APL	07-Apr-2015	30-DEC-15	267
21	DURGAPUR STEEL TPS	1	500	DVC	02-May-2015	24-JAN-16	266
22	KORADI TPS	6	210	MAHAGENCO	08-Jul-2015	CONTINUE TO OPERATE	266
23	MUNDRA TPS	4	330	APL	09-Jul-2015	CONTINUE TO OPERATE	266
24	TITAGARH TPS	1	60	CESC	11-Jul-2015	CONTINUE TO OPERATE	264
25	TITAGARH TPS	3	60	CESC	13-Jul-2015	CONTINUE TO OPERATE	262
26	TALCHER STPS	4	500	NTPC Ltd.	21-Sep-2014	06-JUN-15	258
27	MUNDRA UMTTP	5	800	CGPL	11-May-2015	23-JAN-16	257
28	UNCHAHAR TPS	1	210	NTPC Ltd.	25-Dec-2014	07-SEP-15	256
29	TROMBAY TPS	8	250	TATA PCL	04-Jun-2015	07-FEB-16	248
30	KAHALGAON TPS	1	210	NTPC Ltd.	26-Jul-2015	CONTINUE TO OPERATE	248
31	PATHADI TPP	1	300	LANCO	21-Dec-2014	25-AUG-15	246
32	JSW RATNAGIRI TPP	1	300	JSWEL	28-Jul-2015	CONTINUE TO OPERATE	246
33	JSW RATNAGIRI TPP	3	300	JSWEL	05-Mar-2015	02-NOV-15	242
34	VINDHYACHAL STPS	1	210	NTPC Ltd.	22-Sep-2014	17-MAY-15	237
35	TORANGALLU TPS(SBU-II)	4	300	JSWEL	07-Aug-2015	CONTINUE TO OPERATE	236
36	SIPAT STPS	2	660	NTPC Ltd.	27-Jan-2015	18-SEP-15	234
37	KHAPARKHEDA TPS	1	210	MAHAGENCO	10-Sep-2014	27-APR-15	229
38	UNCHAHAR TPS	5	210	NTPC Ltd.	16-Aug-2015	28-MAR-16	225
39	OP JINDAL TPS	3	250	JPL	07-Dec-2014	19-JUL-15	224
40	JOJOBERA TPS	4	120	TATA PCL	22-May-2015	30-DEC-15	221
41	TROMBAY TPS	5	500	TATA PCL	29-Jun-2015	26-JAN-16	212
42	GMR WARORA TPS	2	300	GMR ENERG	13-Jun-2015	10-JAN-16	211
43	TORANGALLU TPS(SBU-II)	3	300	JSWEL	14-Sep-2014	12-APR-15	209
44	KORBA STPS	3	200	NTPC Ltd.	02-May-2015	26-NOV-15	208
45	SINGRAULI STPS	3	200	NTPC Ltd.	08-Sep-2014	05-APR-15	208
46	SABARMATI (C STATION)	16	30	TOR. POW. (UNOSUGEN)	05-Sep-2015	CONTINUE TO OPERATE	207

S. NO.	STATION NAME	UNIT NO	CAPACITY	ORGANIZATION NAME	FROM DATE	TO DATE	DAYS
47	NEYVELI TPS- I	5	50	NLC	03-Jan-2015	28-JUL-15	206
48	RAMAGUNDEM STPS	2	200	NTPC Ltd.	18-Aug-2015	10-MAR-16	205
49	SIKKA REP. TPS	1	120	GSECL	12-Sep-2015	CONTINUE TO OPERATE	200
50	DADRI (NCTPP)	6	490	NTPC Ltd.	05-May-2015	21-NOV-15	200

Annexure- 8.1**STATEMENT OF MEANTIME BETWEEN FAILURES OF THERMAL UNITS
OUTAGES DURING 2015-16****ALL INDIA****Number of Units : 617****Capacity(in MW):173291.5**

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
Above 270 Days	0	0	0	0	0	0	0	0	0
>180 and Up to 270 Days	0	1	0	1	0	1	2	1	6
>120 and Up to 180 Days	1	3	3	0	1	1	0	3	12
>90 and Up to 120 Days	2	4	3	1	3	1	1	0	15
>80 and Up to 90 Days	0	3	1	1	2	1	1	0	9
>70 and Up to 80 Days	4	5	4	4	2	1	1	0	21
>60 and Up to 70 Days	4	5	1	0	3	0	0	1	14
>50 and Up to 60 Days	1	7	2	1	7	3	3	3	27
>40 and Up to 50 Days	4	12	4	5	19	4	4	2	54
>30 and Up to 40 Days	8	17	3	4	17	2	6	4	61
>25 and Up to 30 Days	2	9	3	2	13	2	9	6	46
>20 and Up to 25 Days	2	5	3	7	14	2	14	5	52
>15 and Up to 20 Days	4	12	4	11	23	4	9	9	76
>10 and Up to 15 Days	6	14	2	9	26	1	8	10	76
>5 and Up to 10 Days	4	12	1	14	9	0	16	16	72
>3 and Up to 5 Days	2	2	0	0	3	0	3	3	13
>1 and Up to 3 Days	0	2	1	1	0	0	3	0	7
Up to 1 Day	1	5	2	3	1	2	22	20	56
Total	45	118	37	64	143	25	102	83	617

Northern region**Number of Units : 148****Capacity(in MW):38063**

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
Above 270 Days	0	0	0	0	0	0	0	0	0
>180 and Up to 270 Days	0	0	0	0	0	1	0	0	1
>120 and Up to 180 Days	0	0	0	0	0	0	0	0	0
>90 and Up to 120 Days	0	0	0	0	1	1	0	0	2
>80 and Up to 90 Days	0	1	0	0	0	1	0	0	2
>70 and Up to 80 Days	0	0	0	0	1	0	0	0	1
>60 and Up to 70 Days	0	3	0	0	1	0	0	0	4
>50 and Up to 60 Days	0	1	0	0	4	1	2	0	8
>40 and Up to 50 Days	0	5	2	0	1	1	2	0	11
>30 and Up to 40 Days	2	3	0	0	3	0	3	0	11
>25 and Up to 30 Days	1	2	2	0	2	1	3	0	11
>20 and Up to 25 Days	0	1	2	1	0	1	4	0	9
>15 and Up to 20 Days	2	1	0	5	4	3	2	0	17
>10 and Up to 15 Days	2	4	0	5	6	0	1	4	22
>5 and Up to 10 Days	2	0	0	7	5	0	6	11	31
>3 and Up to 5 Days	1	0	0	0	1	0	1	2	5
>1 and Up to 3 Days	0	0	0	0	0	0	3	0	3
Up to 1 Day	1	0	0	0	0	2	4	3	10
Total	11	21	6	18	29	12	31	20	148

Western Region**Number of Units : 222****Capacity(in MW):70781**

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
Above 270 Days	0	0	0	0	0	0	0	0	0
>180 and up to 270 Days	0	0	0	1	0	0	0	0	1
>120 and up to 180 Days	1	2	1	0	1	0	0	0	5
>90 and up to 120 Days	2	2	3	0	0	0	0	0	7

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
>80 and up to 90 Days	0	1	1	0	0	0	0	0	2
>70 and up to 80 Days	4	2	4	2	1	1	0	0	14
>60 and up to 70 Days	4	0	1	0	1	0	0	0	6
>50 and up to 60 Days	1	2	2	1	2	0	1	0	9
>40 and up to 50 Days	4	4	2	3	6	1	1	1	22
>30 and up to 40 Days	6	6	2	4	6	1	2	0	27
>25 and up to 30 Days	0	1	0	0	4	1	2	2	10
>20 and up to 25 Days	2	2	0	4	4	1	3	1	17
>15 and up to 20 Days	1	6	2	2	6	1	5	4	27
>10 and up to 15 Days	2	4	0	4	12	1	4	3	30
>5 and up to 10 Days	1	7	0	3	3	0	3	2	19
>3 and up to 5 Days	0	0	0	0	0	0	1	1	2
>1 and up to 3 Days	0	0	1	1	0	0	0	0	2
up to 1 Day	0	2	2	3	1	0	7	7	22
Total	28	41	21	28	47	7	29	21	222

Southern Region

Number of Units : 115

Capacity(in MW):32022.5

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
Above 270 Days	0	0	0	0	0	0	0	0	0
>180 and Up to 270 Days	0	1	0	0	0	0	0	0	1
>120 and Up to 180 Days	0	1	2	0	0	1	0	0	4
>90 and Up to 120 Days	0	1	0	0	1	0	0	0	2
>80 and Up to 90 Days	0	1	0	0	1	0	1	0	3
>70 and Up to 80 Days	0	2	0	0	0	0	1	0	3
>60 and Up to 70 Days	0	0	0	0	1	0	0	0	1
>50 and Up to 60 Days	0	1	0	0	1	1	0	0	3
>40 and Up to 50 Days	0	1	0	0	9	1	1	0	12
>30 and Up to 40 Days	0	3	0	0	5	0	1	1	10

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
>25 and Up to 30 Days	1	4	0	1	4	0	1	3	14
>20 and Up to 25 Days	0	1	0	0	7	0	5	3	16
>15 and Up to 20 Days	1	2	0	3	7	0	2	4	19
>10 and Up to 15 Days	2	3	0	0	3	0	3	1	12
>5 and Up to 10 Days	0	3	0	2	0	0	3	1	9
>3 and Up to 5 Days	0	2	0	0	0	0	1	0	3
>1 and Up to 3 Days	0	2	0	0	0	0	0	0	2
Up to 1 Day	0	0	0	0	0	0	1	0	1
Total	4	28	2	6	39	3	20	13	115

Eastern Region**Number of Units : 130****Capacity(in MW):32365**

RANGE	660-800	490-600	300-360	250-270	210-210	195-200	100-150	25-99	TOTAL
Above 270 Days	0	0	0	0	0	0	0	0	0
>180 and up to 270 Days	0	0	0	0	0	0	2	1	3
>120 and up to 180 Days	0	0	0	0	0	0	0	3	3
>90 and up to 120 Days	0	1	0	1	1	0	1	0	4
>80 and up to 90 Days	0	0	0	1	1	0	0	0	2
>70 and up to 80 Days	0	1	0	2	0	0	0	0	3
>60 and up to 70 Days	0	2	0	0	0	0	0	1	3
>50 and up to 60 Days	0	3	0	0	0	1	0	3	7
>40 and up to 50 Days	0	2	0	2	3	1	0	1	9
>30 and up to 40 Days	0	5	1	0	3	1	0	3	13
>25 and up to 30 Days	0	2	1	1	3	0	3	1	11
>20 and up to 25 Days	0	1	1	2	3	0	2	1	10
>15 and up to 20 Days	0	3	2	1	6	0	0	1	13
>10 and up to 15 Days	0	3	2	0	5	0	0	2	12
>5 and up to 10 Days	1	2	1	2	1	0	4	2	13
>3 and up to 5 Days	1	0	0	0	2	0	0	0	3
>1 and up to 3 Days	0	0	0	0	0	0	0	0	0
up to 1 Day	0	3	0	0	0	0	10	8	21

SECTION-9

FUEL SUPPLY TO POWER STATIONS DURING 2015-16

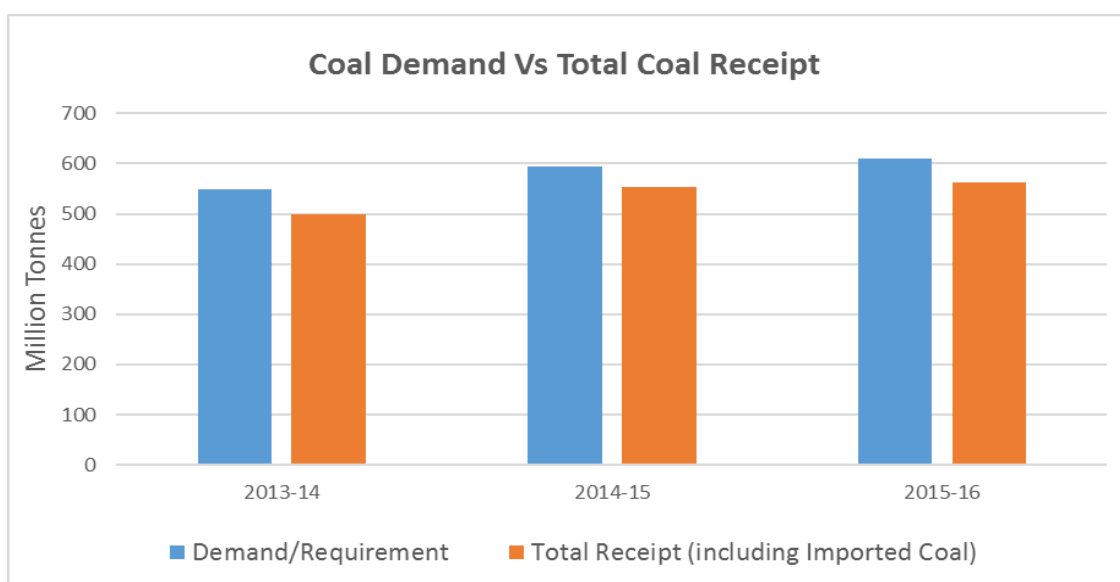
9.1 During the year 2015-16, coal supplies to 130 nos. of coal based thermal power plants, with a total capacity of **160,537.5** MW were monitored in CEA. The corresponding total coal consumption was around **545.9** Million Tonnes. The gas supply of 58 nos. of gas based power plants having capacity of 23075.6 MW were monitored during the year 2015-16. The total gas consumed by these gas based power plants was about 28.3 MMSCMD (Million Metric Standard Cubic Meter per Day) during 2015-16.

9.2 COMPARATIVE COAL SUPPLY POSITION IN THE YEAR 2013-14, 2014-15 & 2015-16

A Summary of coal receipt, consumption and stock position during the last 3 years at various power stations monitored by CEA is as under:

(Figs in Million Tonnes)

STATUS	YEAR		
	2013-14	2014-15	2015-16
Demand/Requirement	548.0	594.0	611.0
Receipt (indigenous coal)	414.8	461.5	480.9
Receipt (Imported coal)	80.0	91.2	80.6
Total Receipt (including Imported Coal)	494.8	552.7	561.5
Consumption (Includes imported coal)	489.4	530.4	545.9
Closing Stock (includes Imported coal)	22.1	29.5	43.2



The Plant wise details of total coal consumed during 2015-16 is at Annexure 9.1

9.3 COAL CONSUMPTION TREND

All India coal consumption in coal based thermal power stations monitored by CEA during 2015-16 was 545.9 Million Tonnes against 530.4 Million Tonnes during 2014-15.

Coal consumption from 2011-12 to 2015-16 is as under:

YEAR	MONITORED CAPACITY for COAL SUPPLY (MW)	CONSUMPTION* (Million Tonnes)
2011-12	105583.4	417.6
2012-13	123864.5	454.6
2013-14	139475.0	489.4
2014-15	158709.0	530.4
2015-16	160537.5	545.9

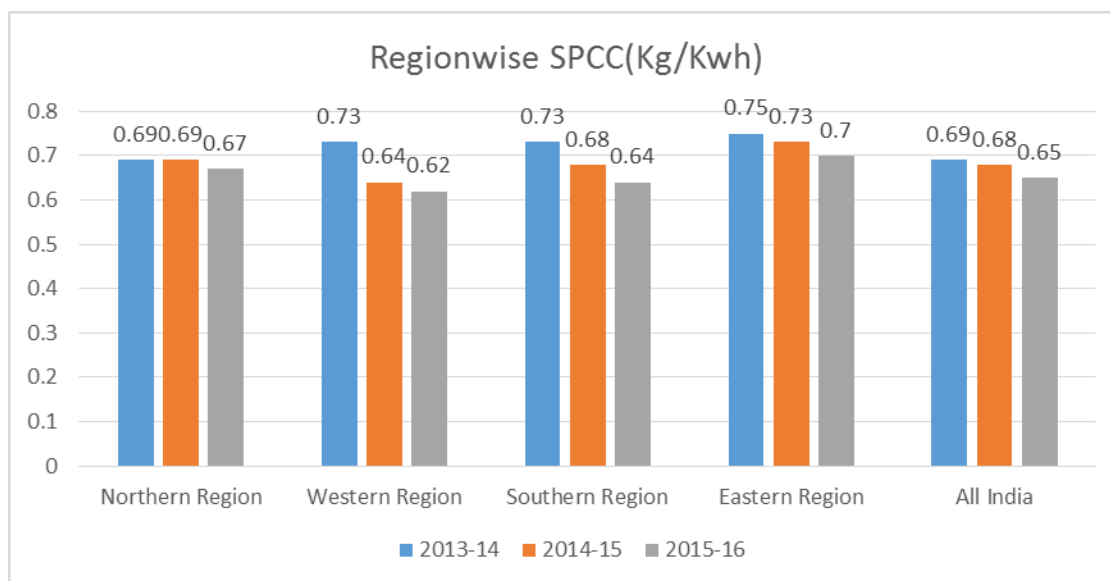
*Total consumption of the stations monitored by CEA

9.4 SPECIFIC COAL CONSUMPTION (Kg/Kwh)

Specific coal consumption (SPCC) of power plants monitored by CEA during the year 2015-16 was 0.65 kg/kWh as compared to 0.68 kg/kWh during the year 2014-15. The region-wise details of SPCC for last three years is given as under:

Specific Coal Consumption (Kg/Kwh)

REGION	2013-14	2014-15	2015-16
Northern Region	0.69	0.69	0.67
Western Region	0.73	0.64	0.62
Southern Region	0.73	0.68	0.64
Eastern Region	0.75	0.73	0.70
All India	0.69	0.68	0.65



Station wise details for the last three years is given in Annexure-9.2.

9.5 COAL QUALITY ISSUES

In order to address quality concern of the coal supplied to power plants, it has been decided that coal samples shall be collected and prepared by a Single Third Party Agency appointed by power utilities and coal companies. The power utilities and coal companies shall make necessary funding arrangement for third party sampling on equal sharing basis.

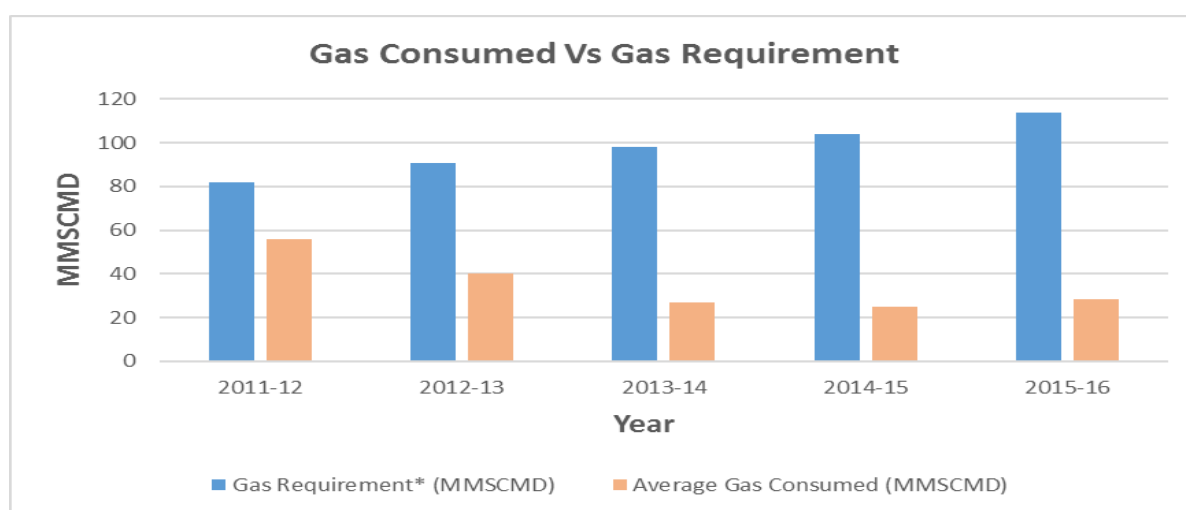
9.6 GAS SUPPLY TO GAS BASED POWER STATIONS

Out of total 24454.13 MW gas/liquid fuel based installed generating capacity in the country as on 31st March 2016, CEA monitored the supply of gas to 58 gas based power stations totalling to a capacity of 23075.6 MW (excluding liquid fuel based power plants). The details of gas consumed by these gas based power plants for the last five years is as under:

Gas Requirement and Supply Position

Years	Capacity (MW)	Gas Requirement* (MMSCMD)	Average Gas Consumed (MMSCMD)
2011-12	16,926.3	81.8	55.9
2012-13	18,362.3	90.7	40.0
2013-14	20385.3	97.9	27.1
2014-15	21665.6	104.0	25.2
2015-16	23075.6	113.6	28.3

MMSCMD – Million Standard Cubic Metres per Day: *Gas requirement at 90% PLF



The Plant wise detail of gas supplied/consumed for the year 2015-16 is at Annexure 9.3.

Annexure-9.1			
Coal Consumption of Power Stations (000 tons)			
Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Total Consumption
I	TPS Designed on Indigenous Coal		
NORTHERN REGION			
DELHI			
1	BADARPUR TPS	705	1715
2	RAJGHAT TPS	135	42
	Sub Total	840	1757.0
HARYANA			
3	PANIPAT TPS	1360	1167
4	YAMUNA NAGAR TPS	600	2612
	RAJIV GANDHI TPS	1200	3103
6	INDIRA GANDHI STPP	1500	4177
7	MAHATMA GANDHI TPS	1320	3206
	Sub Total	5980.0	14265.0
PUNJAB			
8	GND TPS(BHATINDA)	440	618
9	GH TPS (LEH.MOH.)	920	1876
10	ROPAR TPS	1260	2864
11	RAJPURA TPP	1400	4115
12	TALWANDI SABO TPP	1980	2162
	Sub Total	6000.0	11635.0
RAJASTHAN			
13	KOTA TPS	1240	5198
14	SURATGARH TPS	1500	3761
15	CHHABRA TPP	1000	2831
16	KAWAI TPS	1320	4108
17	KALISINDH TPS	1200	2748
	Sub Total	6260.0	18646.0
UTTAR PRADESH			

18	ANPARA TPS	2630	9200
19	HARDUAGANJ TPS	665	2595
20	OBRA TPS	1278	3453
21	PANKI TPS	210	500
22	PARICHHA TPS	1140	5338
23	TANDA TPS	440	2316
24	UNCHAHAHAR TPS	1050	4739
25	RIHAND STPS	3000	13860
26	SINGRAULI STPS	2000	11832
27	DADRI (NCTPP)	1820	6498
28	ROSA TPP Ph-I	1200	4655
29	ANPARA C TPS	1200	5549
30	BARKHERA TPS	90	305
31	MAQSODPUR TPS	90	281
32	KHAMBARKHERA TPS	90	289
33	KUNDARKI TPS	90	318
34	UTRAULA TPS	90	356
	Sub Total	17083.0	72084.0
	TOTAL N. R.	36163.0	118387.0
WESTERN REGION			
	GUJARAT		
35	SABARMATI (C STATION)	422	1388
36	GANDHI NAGAR TPS	870	1749
37	SIKKA REP. TPS	740	734
38	UKAI TPS	1350	3732
39	WANAKBORI TPS	1470	3889
	Sub Total	4852.0	11492.0
	MADHYAPRADESH		
40	AMARKANTAK EXT TPS	330	1059
41	SANJAY GANDHI TPS	1340	5032
42	SATPURA TPS	1330	4527
43	VINDHYACHAL STPS	4760	21548

44	BINA TPS	500	880
45	SASAN UMTTP	3960	16654
46	SHRI SINGHAJI TPP	1200	3018
47	ANUPPUR TPP	1200	1776
	Sub Total	14620.0	54494.0
	CHHATTISGARH		
48	DSPM TPS	500	2845
49	KORBA-II	440	2324
50	KORBA-WEST TPS	1340	6975
51	KORBA STPS	2600	14454
52	PATHADI TPP	600	2048
53	BHILAI TPS	500	2440
54	SIPAT STPS	2980	14026
55	AKALTARA TPS	1200	3916
56	OP JINDAL TPS	1000	3972
57	TAMNAR TPP	2400	3133
58	BARADARHA TPS	1200	0
	Sub Total	14760.0	56133.0
	MAHARASHTRA		
59	BHUSAWAL TPS	1420	6101
60	CHANDRAPUR(MAHARASHTRA) STPS	3340	10409
61	KORADI TPS	2360	2091
62	KHAPARKHEDA TPS	1340	6918
63	NASIK TPS	630	3390
64	PARLI TPS	1380	1097
65	PARAS TPS	500	2786
66	DAHANU TPS	500	2167
67	WARDHA WARORA TPP	540	1230
68	TIRORA TPS	3300	11906
69	AMARAVATI TPS	1350	3718
70	EMCO WARORA TPS	600	2508
71	MAUDA TPS	1660	1326

72	BUTIBORI TPP	600	2422
	Sub Total	19520.0	58069.0
	TOTAL W.R.	53752.0	180188.0
SOUTHERN REGION			
	ANDHRA PRADESH		
73	Dr. N.TATA RAO TPS	1760	9225
74	RAYALASEEMA TPS	1050	5340
75	SIMHADRI	2000	10027
76	DAMODARAM SANJEEVAIAH TPS	1600	1537
77	PAINAMPURAM TPP	1320	2846
	Sub Total	7730.0	28975.0
	TELANGANA		
78	KOTHAGUEDEM TPS	1720	9337
79	RAMAGUNDEM - B TPS	62.5	275
80	RAMAGUNDEM STPS	2600	13229
81	KAKATIYA TPS	1100	2323
	Sub Total	5482.5	25164.0
	KARNATAKA		
82	RAICHUR TPS	1720	7483
83	BELLARY TPS	1700	3797
	Sub Total	3420.0	11280.0
	TAMIL NADU		
84	ENNORE TPS	450	572
85	METTUR TPS	1440	6452
86	TUTICORIN TPS	1050	5222
87	NORTH CHENNAI TPS	1830	6934
88	VALLUR TPP	1500	5160
89	TUTICORIN (JV) TPP	1000	1680
	Sub Total	7270.0	26020.0
	TOTAL S.R.	23902.5	91439.0
EASTERN REGION			
	BIHAR		

90	BARAUNI TPS	210	0
91	MUZAFFARPUR TPS	415	595
92	KAHALGAON TPS	2340	12758
93	BARH II	1320	2777
	Sub Total	4285.0	16130.0
	JHARKHAND		
94	PATRATU TPS	770	520
95	TENUGHAT TPS	420	1987
96	BOKARO `B` TPS	630	1432
97	CHANDRAPURA(DVC) TPS	890	3727
98	MAITHON RB TPP	1050	4039
99	KODARMA TPP	1000	2176
100	MAHADEV PRASAD STPP	540	1800
	Sub Total	5300.0	15681.0
	WEST BENGAL		
101	DURGAPUR TPS	340	748
102	MEJIA TPS	2340	7684
103	BANDEL TPS	450	963
104	SAGARDIGHI TPS	1100	1837
105	SANTALDIH TPS	980	2482
106	KOLAGHAT TPS	1260	5036
107	BAKRESWAR TPS	1050	4623
108	TITAGARH TPS	240	477
109	SOUTHERN REPL. TPS	135	409
110	BUDGE BUDGE TPS	750	3459
111	D.P.L. TPS	880	1370
112	FARAKKA STPS	2100	8562
113	DURGAPUR STEEL TPS	1000	3057
114	HALDIA TPP	600	2387
	Sub Total	13225.0	43094.0
	ORISSA		
115	TALCHER (OLD) TPS	460	3097

116	TALCHER STPS	3000	18000
117	IB VALLEY TPS	420	2785
118	STERLITE TPP	2400	5597
119	DERANG TPP	1200	2775
120	KAMALANGA TPS	1050	3932
	Sub Total	8530.0	36186.0
	TOTAL E.R.	31340.0	111091.0
	Total All India (Indigenous Coal Based)	145157.5	501105.0
II	Thermal Power Stations Designed on imported coal		
1	TROMBAY TPS	1400	2705
2	TORANGALLU TPS(SBU-I)	260	1293
3	TORANGALLU TPS(SBU-II)	600	1096
4	MUNDRA TPS	4620	17189
5	JSW RATNAGIRI TPP	1200	3353
6	UDUPI TPP	1200	3352
7	SALAYA TPP	1200	2100
8	MUNDRA UMTTP	4000	9901
9	SIMHAPURI TPS	600	2612
10	THAMMINAPATNAM TPS	300	1167
	Total All India (Imported Coal Based)	15380.0	44768.0
	ALL INDIA TOTAL	160537.5	545873.0

Annexure -9.2

Specific coal consumption

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
			2013-14	2014-15	2015-16
I. TPS Designed On Indigenous Coal					
NOTHERN					

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
DELHI					
1	BADARPUR TPS	705	0.87	0.86	0.77
2	RAJGHAT TPS	135	0.9	0.9	0.90
	Sub Total	840			
HARYANA					
3	INDIRA GANDHI STPP	1500	0.74	0.78	0.72
4	MAHATMA GANDHI TPS	1320	0.62	0.6	0.65
5	PANIPAT TPS	1360	0.7	0.72	0.68
6	RAJIV GANDHI TPS	1200	0.74	0.71	0.67
7	YAMUNA NAGAR TPS	600	0.65	0.65	0.64
	Sub Total	5980			
PUNJAB					
8	GH TPS (LEH.MOH.)	920	0.59	0.61	0.60
9	GND TPS(BHATINDA)	440	0.67	0.66	0.67
10	RAJPURA TPP	1400	-	0.52	0.53
11	ROPAR TPS	1260	0.63	0.71	0.72
12	TALWANDI SABO TPP	1980	-	0.47	0.67
	Sub Total	6000			
RAJASTHAN					
13	CHHABRA TPP	1000	0.6	0.64	0.63
14	KAWAI TPS	1320	-	0.52	-
15	KOTA TPS	1240	0.57	0.65	0.67
16	SURATGARH TPS	1500	0.67	0.68	0.63
17	KALISINDH TPS	1200	-	-	0.59
	Sub Total	6260			
UTTAR PRADESH					
18	ANPARA C TPS	1200	0.67	0.68	0.64
19	ANPARA TPS	2630	0.75	0.76	0.76
20	BARKHERA TPS	90	0.87	0.89	0.90
21	DADRI (NCTPP)	1820	0.63	0.66	0.65

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
22	HARDUAGANJ TPS	665	0.7	0.72	0.69
23	KHAMBARKHERA TPS	90	0.86	0.9	0.90
24	KUNDARKI TPS	90	0.95	0.91	0.85
25	MAQSOODPUR TPS	90	0.85	0.87	0.90
26	OBRA TPS	1278	0.82	0.92	0.87
27	PANKI TPS	210	0.92	0.94	0.93
28	PARICHHA TPS	1140	0.78	0.77	0.79
29	RIHAND STPS	3000	0.71	0.69	0.66
30	ROSA TPP Ph-I	1200	0.61	0.61	0.66
31	SINGRAULI STPS	2000	0.69	0.7	0.73
32	TANDA TPS	440	0.81	0.79	0.74
33	UNCHAHAR TPS	1050	0.68	0.66	0.68
34	UTRAULA TPS	90	0.88	0.94	0.87
	Sub Total	17083			
	NOTHERN Total	36163			
WESTERN					
CHHATTISGARH					
35	AKALTARA TPS	1200	-	0.58	0.61
36	BARADARHA TPS	1200	-	-	-
37	BHILAI TPS	500	0.67	0.7	0.69
38	DSPM TPS	500	0.88	0.72	0.71
39	KORBA STPS	2600	0.73	0.72	0.71
40	KORBA-II	440	0.9	1.11	1.04
41	KORBA-WEST TPS	1340	0.53	0.71	0.77
42	OP JINDAL TPS	1000	0.66	0.7	0.77
43	PATHADI TPP	600	0.71	0.71	0.69
44	TAMNAR TPP	2400	-	0.53	0.71
45	SIPAT STPS	2980	0.64	0.61	0.63
	Sub Total	14760			
GUJARAT					

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
46	GANDHI NAGAR TPS	870	0.65	0.64	0.64
47	SABARMATI (C STATION)	422	0.62	0.61	0.57
48	SIKKA REP. TPS	740	0.72	0.72	0.61
49	UKAI TPS	1350	0.71	0.68	0.67
50	WANAKBORI TPS	1470	0.69	0.7	0.69
	Sub Total	4852			
MADHYA PRADESH					
51	AMARKANTAK EXT TPS	330	0.74	0.64	0.59
52	BINA TPS	500	0.72	0.67	0.67
53	SANJAY GANDHI TPS	1340	0.74	0.75	0.71
54	SASAN UMTTP	3960	-	0.49	0.53
55	SATPURA TPS	1330	1	0.9	0.82
56	SHRI SINGHAJI TPP	1200	0	0.86	0.71
57	VINDHYACHAL STPS	4760	0.69	0.7	0.69
58	ANUPPUR TPP	1200	-	-	0.62
	Sub Total	14620			
MAHARASHTRA					
59	AMARAVATI TPS	1350	-	0.64	0.60
60	BHUSAWAL TPS	1420	0.92	0.94	0.75
61	BUTIBORI TPP	600	-	0.22	0.60
62	CHANDRAPUR(MAHARASHTRA) STPS	3340	0.89	0.88	0.84
63	DAHANU TPS	500	0.61	0.59	0.57
64	EMCO WARORA TPS	600	-	0.6	0.63
65	KHAPARKHEDA TPS	1340	0.89	0.84	0.85
66	KORADI TPS	2360	0.89	0.92	0.69
67	MAUDA TPS	1660	-	0.7	0.71
68	NASIK TPS	630	0.82	0.82	0.78
69	PARAS TPS	500	0.84	0.84	0.79

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
70	PARLI TPS	1380	0.87	0.83	0.83
71	TIRORA TPS	3300	0.6	0.58	0.59
72	WARDHA WARORA TPP	540	0.69	0.59	0.66
	Sub Total	19520			
	WESTERN Total	53752			
SOUTHERN					
ANDHRA PRADESH					
73	DAMODARAM SANJEEVAIAH TPS	1600	-	-	-
74	Dr. N.TATA RAO TPS	1760	0.74	0.74	0.76
75	RAYALASEEMA TPS	1050	0.7	0.76	0.73
76	SIMHADRI	2000	0.69	0.65	0.69
77	PAINAMPURAM TPP	1320	-	-	=
	Sub Total	7730			
TELANGANA					
78	KAKATIYA TPS	1100	0.67	0.64	0.64
79	KOTHAGUEDEM TPS	1720	0.9	0.84	0.84
80	RAMAGUNDEM - B TPS	62.5	0.79	0.7	0.69
81	RAMAGUNDEM STPS	2600	0.68	0.7	0.65
	Sub Total	5482.5			
KARNATAKA					
82	BELLARY TPS	1700	0.7	0.69	0.66
83	RAICHUR TPS	1720	0.79	0.78	0.66
	Sub Total	3420			
TAMIL NADU					
84	ENNORE TPS	450	1.21	1.16	1.29
85	METTUR TPS	1440	0.61	0.71	0.65
86	NORTH CHENNAI TPS	1830	0.72	0.64	0.63
87	TUTICORIN TPS	1050	0.79	0.78	0.74
88	VALLUR TPP	1500	0.7	0.66	0.67

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
89	TUTICORIN (JV) TPP	1000	-	-	0.47
	Sub Total	7270			
	SOUTHERN Total	23902.5			
EASTERN					
BIHAR					
90	BARAUNI TPS	210	-	-	-
91	BARH II	1320	-	0.64	0.62
92	KAHALGAON TPS	2340	0.89	0.86	0.84
93	MUZAFFARPUR TPS	415	-	0.9	0.76
	Sub Total	4285			
JHARKHAND					
94	BOKARO `B` TPS	630	-	0.82	0.77
95	CHANDRAPURA(DVC) TPS	890	0.78	0.73	0.73
96	KODARMA TPP	1000	0.78	0.71	0.65
97	MAHADEV PRASAD STPP	540	-	0.5	0.62
98	MAITHON RB TPP	1050	0.63	0.59	0.56
99	PATRATU TPS	770	-	0.96	0.88
100	TENUGHAT TPS	420	-	0.79	0.75
	Sub Total	5300			
ODISHA					
101	DERANG TPP	1200	-	-	0.70
102	IB VALLEY TPS	420	0.9	0.83	0.89
103	KAMALANGA TPS	1050	-	0.68	0.63
104	STERLITE TPP	2400	0.73	0.69	0.69
105	TALCHER (OLD) TPS	460	0.81	0.82	0.83
106	TALCHER STPS	3000	0.78	0.75	0.75
	Sub Total	8530			
WEST BENGAL					
107	BAKRESWAR TPS	1050	0.71	0.68	0.69
108	BANDEL TPS	450	0.88	0.85	0.87

Sl. No.	Name of TPS	Capacity (MW) as on 31.03.2016	Specific Coal Consumption (Kg /Kwh)		
109	BUDGE BUDGE TPS	750	0.6	0.6	0.60
110	D.P.L. TPS	880	0.85	0.76	0.69
111	DURGAPUR STEEL TPS	1000	0.63	0.69	0.69
112	DURGAPUR TPS	340	0.81	0.85	0.83
113	FARAKKA STPS	2100	0.73	0.73	0.69
114	HALDIA TPP	600	-	0.68	0.66
115	KOLAGHAT TPS	1260	0.86	0.86	0.87
116	MEJIA TPS	2340	0.7	0.7	0.64
117	SAGARDIGHI TPS	1100	0.75	0.68	0.68
118	SANTALDIH TPS	980	0.69	0.74	0.67
119	SOUTHERN REPL. TPS	135	0.71	0.72	0.77
120	TITAGARH TPS	240	0.64	0.66	0.72
	Sub Total	13225			
	EASTERN Total	31340			
II. TPS Designed On Imported Coal					
1	SIMHAPURI TPS	600	0.64	0.66	0.63
2	THAMMINAPATNAM TPS	300	0.79	0.66	0.69
3	TORANGALLU TPS(SBU-I)	260	0.33	0.31	0.59
4	TORANGALLU TPS(SBU-II)	600	-	-	0.37
5	UDUPI TPP	1200	0.42	0.44	0.41
6	MUNDRA TPS	4620	0.52	0.53	0.52
7	MUNDRA UMTTP	4000	0.48	0.40	0.39
8	SALAYA TPP	1200	0.52	0.44	0.42
9	JSW RATNAGIRI TPP	1200	0.49	0.48	0.40
10	TROMBAY TPS	1400	0.44	0.37	0.50
	Sub Total	15380			
	Total All India	160537.5			

SECTION-10 GAS TURBINE PLANTS

- 10.1** Generation performance of 235 GT (Gas/Naphtha) based units in 63 Gas Turbine Plants (25 MW & above) aggregating to **24454.13** MW was reviewed by CEA during the year 2015-16.

10.2 DETAILS OF GAS TURBINE STATIONS AS ON 31-3-2016

Region-wise and state-wise details of gas turbine stations and units under Central, State and Private Sectors operating as on 31 March 2016 are given at Annexure 10.1.

Sector-wise summary of these units are as under:

S. No.	Sector	No. of Stations	No. of units	Installed capacity (in MW)
1.	Central	15	60	7555.33*
2.	State	23	102	7165.70
3.	Pvt. Utilities+ IPP	25	73	9718.1
	Total	63	235	24454.13

* includes 90 MW capacity on High Speed Diesel at Maithon

Sector-wise details of gas turbine stations indicating unit-wise capacity, make, and date of synchronization/commissioning and primary fuel used are indicated in Annexure 10.2.

10.3 Performance of Gas Turbine Stations during 2015-16

Month-wise generation performance:

The prevailing gas shortages in the country led to reduction in gas-based generation. The PLF of gas based plants increased from 18.44% (in March'2015) to 25.54% during March'16

Contrast of month-wise energy generation of gas based plants in the country and their average PLF during the year 2015-16 with the energy generation and PLF% during the corresponding months in the year 2014-15 and month wise growth rate is given below:

Month	2014-15			2015-16			Growth (%)
	Monitored	Generation	PLF	Monitored	Generation	PLF	

	Capacity (MW)	(BU)	(%)	Capacity (MW)	(BU)	(%)	
Apr	21627.35	3907.63	24.98	23007.65	3246.28	19.6	-16.92
May	22027.35	3657.6	22.17	23007.65	3242.43	18.94	-11.35
Jun	22453.45	3817.37	23.91	22907.65	3796.41	23.02	-0.55
Jul	22453.45	3239.11	19.3	22907.65	3662.57	21.49	13.07
Aug	22453.45	3614.92	21.54	23278.65	3854.07	22.25	6.62
Sep	22453.45	3218.07	19.82	24033.65	4372.24	25.27	35.87
Oct	22453.45	3652.94	21.77	24418.53	4156.93	22.88	13.80
Nov	22816.75	3617.55	22.28	24418.53	4038.93	22.97	11.65
Dec	22816.75	3310.76	19.42	24418.53	4263.18	23.47	28.77
Jan	22816.75	3140.19	18.42	24454.13	3946.31	21.69	25.67
Feb	22816.75	2741.7	17.8	24454.13	3943.45	23.17	43.83
Mar	22907.65	3157.23	18.44	24454.13	4599.28	25.28	45.67
Total		41075.07	20.82		47122.09	22.54	14.72

Station-wise gas based generation performance:

Comparison of Station-wise energy generation from gas based plants in the country and their average PLF during the year 2015-16 with the energy generation and PLF% during the year 2015-16 is given below:

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014-2015	Actual 2015-2016	Year
				Target	Actual				
CENTRAL SECTOR									
DVC									
1.	Maithon	90	0	0	0	0	0	0	
NEEPCO.									
2	AGARTALA GT	109.5	627.8	689	763.6	110.8	82.42	79.39	121.6
3	KATHALGURI CCPP	291	1741	1725	1758.8	102	68.3	68.81	101
4	MONARCHAK CCPP	101	0.7	67	127.1	189.6	0	19.48	18151.4

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014-2015	Actual 2015-2016	Year
				Target	Actual				
	Total- NEEPCO.	501.5	2369.6	2481	2649.5	106.79	72.13	63.53	111.81
NTPC Ltd.									
5	ANTA CCPP	419.33	1653.4	1200	942	78.5	45.01	25.57	57
6	AURAIYA CCPP	663.36	1664.1	1900	1511.3	79.5	28.64	25.94	90.8
7	DADRI CCPP	829.78	2530.2	2300	3000	130.4	34.81	41.16	118.6
8	FARIDABAD CCPP	431.59	1571.4	1200	1100.6	91.7	41.56	29.03	70
9	GANDHAR CCPP	657.39	1608.5	1650	961.5	58.3	27.93	16.65	59.8
10	KAWAS CCPP	656.2	1741.2	1800	1212.4	67.4	30.29	21.03	69.6
11	R. GANDHI CCPP (Liq.)	359.58	819.1	500	142.8	28.6	26	4.52	17.4
	Total- NTPC Ltd.	4017.23	11588	10550	8870.6	84.08	32.93	25.14	76.55
ONGC									
12	TRIPURA CCPP	726.6	2469.4	4800	3479.5	72.5	58.28	54.52	140.9
	Total- ONGC	726.6	2469.4	4800	3479.5	72.49	58.28	54.52	140.9
RGPPPL									
13	RATNAGIRI CCPP I	740	0	0	0	0	0	0	0
14	RATNAGIRI CCPP II	740	0	0	765.81	0	0	11.78	0
15	RATNAGIRI CCPP III	740	0	0	467.86	0	0	7.2	0
	Total- RGPPPL	2220	0	0	1233.7	0	0	6.33	0
	Total- CENTRA SECTOR	7465.33	16427	17831	16233.2	91.04	26.07	24.55	98.82
STATE SECTOR									
APGPCL									
16	LAKWA GT	157.2	935.3	861	947.9	110.1	68.52	68.64	101.4
17	NAMRUP CCPP	119	591.6	556	507.6	91.3	56.76	48.56	85.8
GPPCL									

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014- 2015	Actual 2015- 2016	Year
				Target	Actual				
18	PIPAVAV CCPP	702	0	0	114.8	0	0	1.86	0
GSECL									
19	DHUVARAN CCPP	594.72	153	201	416.4	207.2	3.49	7.97	272.1
20	UTRAN CCPP	518	133.5	0	1272	0	2.94	27.95	952.6
GSEGL									
21	HAZIRA CCPP	156.1	214.7	180	143.5	79.7	15.7	10.47	66.8
22	HAZIRA CCPP EXT	351	0	0	0	0	0	0	0
IPGPCL									
23	I.P.CCPP	270	936.1	1000	467.2	46.7	39.58	19.7	49.9
JKSPDC									
24	PAMPORE GPS (Liq.)	175	0	0	0	0	0	0	0
25	URAN CCPP	672	3567.2	3525	2886.5	81.9	60.6	48.9	80.9
P&ED, Puducherry									
26	KARAIKAL CCPP	32.5	102.1	200	227.6	113.8	35.88	79.72	222.8
PRAGATI									
27	PRAGATI CCGT-III	1500	2235.1	2000	1911.6	95.6	17.01	14.51	85.53
28	PRAGATI CCPP	330.4	1846.9	2400	1539.3	64.1	63.81	53.04	83.34
RRVUNL									
29	DHOLPUR CCPP	330	878.3	900	328.4	36.5	30.38	11.33	37.4
30	RAMGARH CCPP	273.8	1218.9	1000	1564.5	156.4	51.6	65.05	128.4
TNGDCL									
31	BASIN BRIDGE GT (Liq.)	120	2.8	0	8.72	0	0.27	0.83	306
32	KOVIKALPAL CCPP	107.88	413.7	375	399.1	106.4	44.14	42.29	96.5
33	KUTTALAM CCPP	100	497.4	488	564.2	115.6	56.78	64.23	113.4

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014-2015	Actual 2015-2016	Year
				Target	Actual				
34	VALUTHUR CCPP	186.2	1069	1100	721	65.6	65.54	44.08	67.4
TSECL									
35	BARAMURA GT	58.5	306	340	232.9	68.5	59.72	45.33	76.1
36	ROKHIA GT	111	420.4	406	506.3	124.7	43.24	51.93	120.4
WBPDC									
37	HALDIA GT (Liq.)	40	0	0	0	0	0	0	0
38	KASBA GT (Liq.)	40	0	0	0	0	0	0	0
	Total- STATE SECTOR	6945.3	15532.2	15532	14759.5	95.03	25.88	24.19	95.09
PVT UTILITY									
TATA PCL									
39	TROMBAY CCPP	180	1148.5	1110	1179.7	106.3	72.84	74.61	102.72
	Total- PVT UTILITY	180	1148.5	1110	1179.7	106.28	72.84	74.61	102.72
IPP									
ABAN POWR									
40	KARUPPUR CCPP	119.8	578.8	500	632.8	126.6	55.15	60.14	109.3
APGPCL									
41	VIJESWARAM CCP	272	663.8	500	701.7	140.3	27.86	29.37	105.7
BSES(C)									
42	COCHIN CCPP (Liq.)	174	154.7	50	0	0	10.15	0	0
BSES(P)									
43	PEDDAPURAM CCPP	220	186.6	250	25	10	9.68	1.29	13.4
CIPL									
44	PEGUTHAN CCPP	655	589.7	300	898.4	299.5	14.78	15.61	152.35
ESSAR									
45	ESSAR CCPP	515	0	0	0	0	0	0	0

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014-2015	Actual 2015-2016	Year
				Target	Actual				
GAUTAMI									
46	GAUTAMI CCPP	464	0	0	104.3	0	0	2.56	0
GIPCL									
47	BARODA CCPP	160	38.2	50	235.9	471.7	2.73	16.78	616.8
GMR ENERG									
48	GMR Energy Ltd Kakinada	220	0	0	0	0	0	0	0
GREL									
49	GREL CCP (Rajahmundry)	768	0	0	589.6	0	0	16.16	0
GVKP&IL									
50	JEGURUPADU CCPP	455.4	0	185	869.66	470.1	14.78	21.74	0
KONA									
51	KONASEEMA CCPP	445	0	0	0	0	0	0	0
KONDAPALI									
52	KONDAPALLI EXT CCPP.	366	0	500	972	194.4	0	30.23	0
53	KONDAPALLI CCPP	350	574.7	0	484.5	0	18.74	15.76	84.3
54	KONDAPALLI ST-CCPP	742	—	0	615.6	0	—	15.13	—
NDPL									
55	RITHALA CCPP	108	0	0	0	0	0	0	0
PENNA									
56	VALANTARVY CCPP	52.8	378.8	364	195.1	53.6	81.9	42.06	51.5
57	P.NALLUR CCPP	330.5	1171.4	100	150.8	150.8	40.46	5.19	12.9
RELIANCE									
58	GOA CCPP (Liq.)	48	12.6	0	0	0	3	0	0
SPGL									

Sl. No.	Name of the Station	Capacity (MW)	GENERATION(MU)				PLF%		% of Last
			Actual Generation 2014-2015	2015-2016		% of Target	Actual 2014-2015	Actual 2015-2016	Year
				Target	Actual				
59	GODAVARI CCPP	208	546.2	900	552.7	61.4	29.98	30.25	101.2
TOR. POW. (SUGEN)									
60	SUGEN CCPP	1147.5	2600.6	2500	3512.1	140.5	25.87	34.84	135
TOR. POW. (UNOSUGEN)									
61	DGEN MEGA CCPP	1200	0	0	2731.3	0	0	25.91	0
62	UNOSUGEN CCPP	382.5	0	0	876.1	0	0	26.08	0
VEMAGIRI									
63	VEMAGIRI CCPP	370	0	0	620.5	0	0	19.09	0
	Total- IPP	9773.5	7977.3	6359	14949.7	235.09	11.06	18.43	187.4
	Total- Private	9953.5	9125.8	7469	16129.4	215.95	12.14	18.62	176.74
	Total- All India	24454.1	41075	40832	47122.1	115.4	20.89	22.54	114.72

10.4 NEW UNITS SYNCHRONISED DURING 2015-16

Following 6 gas based units aggregating to 1510 MW were synchronized during the year 2015-16:

Sl. No.	Station Name	Unit Name	Capacity	Organization	State	Date of Sync.	Fuel Used
1	GREL CCPP (Rajahmundry)	1	240	GREL	ANDHRA PRADESH	12-Sep-15	NATURAL GAS
2	GREL CCPP (Rajahmundry)	2	144	GREL	ANDHRA PRADESH	12-Sep-15	NATURAL GAS
3	GREL CCPP (Rajahmundry)	3	240	GREL	ANDHRA PRADESH	05-Oct-15	NATURAL GAS
4	GREL CCPP (Rajahmundry)	4	144	GREL	ANDHRA PRADESH	05-Oct-15	NATURAL GAS
5	KONDAPALLI ST-3 CCPP	1	371	KONDAPALI	ANDHRA PRADESH	07-Aug-15	NATURAL GAS
6	KONDAPALLI ST-3 CCPP	2	371	KONDAPALI	ANDHRA PRADESH	05-Sep-15	NATURAL GAS

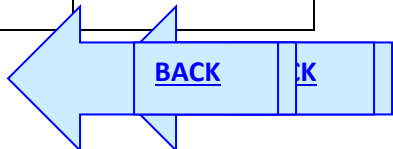
Region/State	Central Sector			State Sector			Private Utility			Private IPP's			Total		
	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed capacity	No. of Stations	No. of Units	Installed Capacity
NORTHERN REGION															
DELHI	0	0	0	3	18	2100.4	0	0	0	1	3	108	4	21	2208.4
HARYANA	1	3	431.59	0	0	0	0	0	0	0	0	0	1	3	431.59
JAMMU AND KASHMIR	0	0	0	1	7	175	0	0	0	0	0	0	1	7	175
JHARKHAND	1	3	90	0	0	0	0	0	0	0	0	0	1	3	90
RAJASTHAN	1	4	419.33	2	9	603.8	0	0	0	0	0	0	3	13	1023.13
UTTAR PRADESH	2	12	1493.14	0	0	0	0	0	0	0	0	0	2	12	1493.14
TOTAL NORTHERN REGION	5	22	2434.06	6	34	2879.2	0	0	0	1	3	108	11	56	5421.26
WESTERN REGION															

Region/State	Central Sector			State Sector			Private Utility			Private IPP's			Total		
	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed Capacity	No. of Stations	No. of Units	Installed capacity	No. of Stations	No. of Units	Installed Capacity
WEST BENGAL	0	0	0	2	4	80	0	0	0	0	0	0	2	4	80
TOTAL EASTERN REGION	1	3	90	2	4	80	0	0	0	0	0	0	3	7	170
NORTH EASTERN REGION															
ASSAM	1	9	291	2	13	261.2	0	0	0	0	0	0	3	22	567.2
TRIPURA	3	10	937.1	2	11	169.5	0	0	0	0	0	0	5	21	1106.6
TOTAL NORTH EASTERN REGION	4	19	1228.1	4	24	430.7	0	0	0	0	0	0	8	43	1673.8
ALL INDIA TOTAL	13	63	7555.33	24	102	7165.7	1	2	180	25	71	9538.1	63	235	24454.13

Annexure- 10.2

SECR-WISE DETAILS OF GAS TURBINE STATIONS DURING 2015-16

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
CENTRAL SECTOR							
	DVC						
1	MAITHON GT	JHARKHAND	HSD				
				GT-1	30		08/03/1989
				GT-2	30		13/03/1989
				GT-3	30		20/03/1989
NEEPCO.							
2	AGARTALA GT	TRIPURA	Natural Gas				
				GT-1	21	BHEL	5/2/1998
				GT-2	21	BHEL	25-02-98
				GT-3	21	BHEL	29-03-98
				GT-4	21	BHEL	26-06-98
				ST-5	0	Thermax	23-08-15
				ST-6	25.5	Thermax	22-03-15
	AGARTALA GT				109.5		
3	KATHALGURI CCPP	ASSAM	Natural Gas				
				GT-1	33.5	MITS/MITS	18-03-95
				GT-2	33.5	MITS/MITS	22-03-95
				GT-3	33.5	MITS/MITS	30-06-95
				GT-4	33.5	BHEL	30-07-95
				GT-5	33.5	BHEL	2/3/1996
				GT-6	33.5	BHEL	15-10-96
				ST-7	30	BHEL	1/3/1998
				ST-8	30	BHEL	28-03-98
				ST-9	30	BHEL	5/7/1998


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Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
	KATHALGURI CCPP				291		
4	MONARCHAK CCPP	TRIPURA	Natural Gas				
				GT-1	65.4	BHEL	30-03-15
				GT-2	35.6	BHEL	14-01-16
	MONARCHAK CCPP				101		
	NTPC Ltd.						
5	ANTA CCPP	RAJASTHAN	Natural Gas				
				GT-1	88.71	ABB	20-01-89
				GT-2	88.71	ABB	6/3/1989
				GT-3	88.71	ABB	4/5/1989
				ST-4	153.2	ABB	5/3/1990
	ANTA CCPP				419.33		
6	AURAIYA CCPP	UTTAR PRADESH	Natural Gas				
				GT-1	111.19	Mitsubishi, Japan	29-03-89
				GT-2	111.19	Mitsubishi, Japan	21-07-89
				GT-3	111.19	Mitsubishi, Japan	9/8/1989
				GT-4	111.19	Mitsubishi, Japan	29-09-89
				ST-5	109.3	Mitsubishi Japan	29-12-89
				ST-6	109.3	Mitsubishi Japan	12/6/1990
	AURAIYA CCPP				663.36		
7	DADRI CCPP	UTTAR PRADESH	Natural Gas				
				GT-1	130.19	SIEMENS	21-02-92
				GT-2	130.19	SIEMENS	26-03-92
				GT-3	130.19	SIEMENS	6/6/1992
				GT-4	130.19	SIEMENS	14-10-92
				ST-5	154.51	BHEL	26-02-94
				ST-6	154.51	BHEL	27-03-94
	DADRI CCPP				829.78		

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
8	FARIDABAD CCPP	HARYANA	Natural Gas				
				GT-1	137.76	SIEMENS	18-10-99
				GT-2	137.76	SIEMENS	18-10-99
				ST-3	156.07	BHEL	31-07-00
	FARIDABAD CCPP				431.59		
9	GANDHAR CCPP	GUJARAT	Natural Gas				
				GT-1	144.3	ABB	17-03-94
				GT-2	144.3	ABB	31-03-94
				GT-3	144.3	ABB	20-05-94
				ST-4	224.49	ABB	30-03-95
	GANDHAR CCPP				657.39		
10	KAWAS CCPP	GUJARAT	Natural Gas				
				GT-1	106	EGT	22-03-92
				GT-2	106	EGT	25-05-92
				GT-3	106	EGT	30-06-92
				GT-4	106	EGT	27-08-92
				ST-5	116.1	GEC ALSTOM	23-02-93
				ST-6	116.1	GEC Alstom	19-03-93
	KAWAS CCPP				656.2		
11	R. GANDHI CCPP (Liq.)	KERALA	Naptha				
				GT-1	115.2	BHEL/GE	2/11/1998
				GT-2	115.2	BHEL/GE	28-02-99
				ST-3	129.18	BHEL/GE	30-10-99
	R. GANDHI CCPP (Liq.)				359.58		
	ONGC						
12	TRIPURA CCPP	TRIPURA	Natural Gas				
				GT-1	363.3	BHEL/BHEL	2/1/2013

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-2	363.3	BHEL/BHEL	16-11-14
	TRIPURA CCPP				726.6		
	RGPPPL						
13	RATNAGIRI CCPP I	MAHARASH TRA	Natural Gas				
				GT-1	240	GE/BHEL	12/11/1998
				GT-2	240	GE/BHEL	12/11/1998
				ST-3	260	GE/BHEL	12/11/1998
					740		
14	RATNAGIRI CCPP II	MAHARASH TRA	Natural Gas				
				GT-1	240	GE/BHEL	30-04-06
				GT-2	240	GE/BHEL	14-05-06
				ST-3	260	GE/BHEL	7/5/2006
					740		
15	RATNAGIRI CCPP III	MAHARASH TRA	Natural Gas				
				GT-1	240	GE/BHEL	28-10-07
				GT-2	240	GE/BHEL	28-10-07
				ST-3	260	GE/BHEL	28-10-07
					740		
STATE SECTOR							
	APGPCL						
16	LAKWA GT	ASSAM	Natural Gas				
				GT-1	15	WH	27-04-81
				GT-2	15	WH	2/8/1981
				GT-3	15	WH	29-07-83
				GT-4	15	GE/BHEL	6/10/1986
				GT-5	20	GE/BHEL	3/1/1994
				GT-6	20	GE/BHEL	21-07-94
				GT-7	20	GE/BHEL	28-05-95

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				ST-8	37.2		17-01-12
	LAKWA GT				157.2		
17	NAMRUP CCPP	ASSAM	Natural Gas				
				GT-1	20	BHEL	1/4/1987
				GT-2	21	BHEL	1/7/1987
				GT-3	21	BHEL	1/7/1987
				GT-4	11	BHEL	1/4/1992
				ST-5	24	BHEL/BHEL	6/3/1976
				ST-6	22	BHEL/BHEL	27-03-85
	NAMRUP CCPP				119		
	GPPCL						
18	PIPAVAV CCPP	GUJARAT	Natural Gas				
				ST-1	351	BHEL	5/2/2014
				ST-2	351	BHEL	22-03-13
	PIPAVAV CCPP				702		
	GSECL						
19	DHUVARAN CCPP	GUJARAT	Natural Gas				
				GT-1	67.85	BHEL	4/6/2003
				ST-2	38.77	BHEL	22-09-03
				GT-3	72	BHEL	17-03-06
				ST-4	40	BHEL	13-08-07
				GT-5	376.1		21-05-14
	DHUVARAN CCPP				594.72		
20	UTRAN CCPP	GUJARAT	Natural Gas				
				GT-1	33	GE/BHEL	17-12-92
				GT-2	33	GE/BHEL	28-12-92
				GT-3	33	GE/BHEL	7/5/1993
				ST-4	45	BHEL	17-07-93

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-5	240	ALSTOM	8/8/2009
				ST-6	134	ALSTOM	10/10/2009
	UTRAN CCPP				518		
	GSEGL						
21	HAZIRA CCPP	GUJARAT	Natural Gas				
				GT-1	52	ALSTOM	30-09-01
				GT-2	52	ALSTOM	30-09-01
				ST-3	52.1	ALSTOM	30-09-01
	HAZIRA CCPP				156.1		
22	HAZIRA CCPP EXT	GUJARAT	Natural Gas				
				GT-1	351	BHEL	18-02-12
	HAZIRA CCPP EXT				351		
	IPGPCL						
23	I.P.CCPP	DELHI	Natural Gas				
				GT-1	30	ALSTOM	28-05-86
				GT-2	30	ALSTOM	24-06-86
				GT-3	30	ALSTOM	31-07-86
				GT-4	30	ALSTOM	10/9/1986
				GT-5	30	ALSTOM	15-11-86
				GT-6	30	ALSTOM	14-05-86
				ST-7	30	BHEL	29-03-95
				ST-8	30	BHEL	31-10-95
				ST-9	30	BHEL	26-03-96
	I.P.CCPP				270		
	JKSPDC						
24	PAMPORE GPS (Liq.)	JAMMU AND KASHMIR	High Speed Diesel				
				GT-1	25	GE/BHEL	31-03-89
				GT-2	25	GE/BHEL	20-07-89

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-3	25	GE/BHEL	11/12/1989
				GT-4	25	GE/BHEL	7/1/1994
				GT-5	25	GE/BHEL	7/2/1994
				GT-6	25	GE/BHEL	4/4/1994
				GT-7	25	GE/BHEL	30-03-95
	PAMPORE GPS (Liq.)				175		
	MAHAGENCO						
25	URAN CCPP	MAHARASH TRA	Natural Gas				
				GT-5	108	KWU	1/4/1986
				GT-6	108	KWU	1/4/1986
				GT-7	108	KWU	1/4/1986
				GT-8	108	KWU	1/4/1986
				GT-9	120	SIEMENS,GERMA NY	16-03-94
				GT-10	120	SIEMENS,GERMA NY	28-10-94
	URAN CCPP				672		
	P&ED, Pudu.						
26	KARAIKAL CCPP	PUDUCHERR Y	Natural Gas				
				GT-1	32.5	BHEL	2/7/1999
	KARAIKAL CCPP				32.5		
	PRAGATI						
27	PRAGATI CCGT-III	DELHI	Natural Gas				
				GT-1	250	BHEL	24-10-10
				GT-2	250	BHEL	17-02-11
				ST-3	250	BHEL	29-02-12
				GT-4	250	BHEL	27-06-12
				GT-5	250	BHEL	7/5/2013
				ST-6	250	BHEL	26-02-14

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
	PRAGATI CCGT-III				1500		
28	PRAGATI CCPP	DELHI	Natural Gas				
				GT-1	104.6	GE/BHEL	15-03-02
				GT-2	104.6	GE/BHEL	9/11/2002
				ST-3	121.2	GE/BHEL	31-01-03
	PRAGATI CCPP				330.4	GE/BHEL	
	RRVUNL						
29	DHOLPUR CCPP	RAJASTHAN	Natural Gas				
				GT-1	110	BHEL	29-03-07
				GT-2	110	BHEL	16-06-07
				ST-3	110	BHEL	27-12-07
	DHOLPUR CCPP				330		
30	RAMGARH CCPP	RAJASTHAN	Natural Gas				
				GT-1	3	Import by HAL BHEL	15-11-94
				GT-2	35.5	Import by HAL BHEL	12/1/1996
				GT-3	37.5	Import by HAL BHEL	7/8/2002
				ST-4	37.8	Import by HAL BHEL	31-03-03
				GT-5	110	BHEL	20-03-13
				ST-6	50	BHEL	1/5/2014
	RAMGARH CCPP				273.8		
	TNGDCL						
31	BASIN BRIDGE GT (Liq.)	TAMIL NADU	Naptha				
				GT-1	30	SUMITOMO AND ABB	12/2/1996
				GT-2	30	SUMITOMO AND ABB	25-02-96
				GT-3	30	BHEL	1/4/1998

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-4	30	BHEL	1/4/1998
	BASIN BRIDGE GT (Liq.)				120		
32	KOVIKALPAL CCPP	TAMIL NADU	Natural Gas				
				GT-1	69.65	GE/BHEL	5/2/2001
				ST-2	38.23	GE/BHEL	5/2/2001
	KOVIKALPAL CCPP				107.88		
33	KUTTALAM CCPP	TAMIL NADU	Natural Gas				
				GT-1	63	GE/BHEL	27-11-03
				ST-2	37	GE/BHEL	24-03-04
	KUTTALAM CCPP				100		
34	VALUTHUR CCPP	TAMIL NADU	Natural Gas				
				GT-1	60	ANSALDO ENERGIA	24-12-02
				ST-2	34	ANSALDO ENERGIA	6/5/2008
				GT-3	59.8	BGR ENERGY SYSTEMS	13-03-03
				ST-4	32.4	BGR ENERGY SYSTEMS	31-08-08
	VALUTHUR CCPP				186.2		
	TSECL						
35	BARAMURA GT	TRIPURA	Natural Gas				
				GT-4	37.5	BHEL	27-11-02
				GT-5	21		3/8/2010
	BARAMURA GT				58.5		
36	ROKHIA GT	TRIPURA	Natural Gas				
				GT-1	8	BHEL	21-03-90
				GT-2	8	BHEL	26-11-90
				GT-3	8	BHEL	16-07-95

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-4	8	BHEL	15-12-95
				GT-5	8	BHEL	2/3/1997
				GT-6	8	BHEL	1/9/1997
				GT-7	21	BHEL	11/7/2002
				GT-8	21	BHEL	31-03-06
				GT-9	21	BHEL	31-08-13
	ROKHIA GT				111		
	WBPDC						
37	HALDIA GT (Liq.)	WEST BENGAL	High Speed Diesel				
				GT-1	20	John Brown, UK	4/10/1979
				GT-2	20	John Brown UK	12/12/1979
	HALDIA GT (Liq.)				40		
38	KASBA GT (Liq.)	WEST BENGAL	Naptha				
				GT-1	20	John Brown, UK	1/4/1991
				GT-2	20	John Brown UK	1/4/1991
	KASBA GT (Liq.)				40		
	PRIVATE UTILITY						
	TATA PCL						
39	TROMBAY CCPP	MAHARASH TRA	Natural Gas				
				GT-1	120	SIEMENS, GERMANY	29-07-93
				ST-2	60	SIEMENS, GERMANY	9/12/1994
	TROMBAY CCPP				180		
	IPP						
	ABAN POWR						
40	KARUPPUR CCPP	TAMIL NADU	Natural Gas				
				GT-1	70	GE	18-02-05
				ST-2	49.8	SIEMENS	15-07-05

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
	KARUPPUR CCPP				119.8		
	APGPCL						
41	VIJESWARAM CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	33	GE/BHEL	1/4/2012
				GT-2	33	GE/BHEL	2/3/1991
				ST-3	34	GE/BHEL	1/4/1998
				GT-4	112	BHEL/BHEL	1/4/1997
				ST-5	60	GE/BHEL	1/4/1998
	VIJESWARAM CCPP				272		
	BSES(C)						
42	COCHIN CCPP (Liq.)	KERALA	Naptha				
				GT-1	45	GE	6/6/1999
				GT-2	45	GE	6/6/1999
				ST-3	39	BHEL	6/6/1999
				GT-4	45	GE	6/6/1999
	COCHIN CCPP (Liq.)				174		
	BSES(P)						
43	PEDDAPURAM CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	142	ANSALDO ENERGIA	26-01-02
				ST-2	78	ANSALDO ENERGIA	12/9/2002
	PEDDAPURAM CCPP				220		
	CIPL						
44	PEGUTHAN CCPP	GUJARAT	Natural Gas				
				GT-1	135	SIEMENS GERMANY	1/4/1998
				GT-2	135	SIEMENS GERMANY	1/4/1998

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-3	135	SIEMENS GERMANY	14-02-98
				ST-4	250	SIEMENS GERMANY	13-10-98
	PEGUTHAN CCPP				655		
	ESSAR						
45	ESSAR CCPP	GUJARAT	Natural Gas				
				GT-1	110	GE/BHEL GE	10/8/1995
				GT-2	110	GE/BHEL	10/8/1995
				GT-3	185	GE/BHEL	10/8/1995
				GT-4	110	GE/BHEL	10/8/1995
	ESSAR CCPP				515		
	GAUTAMI						
46	GAUTAMI CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	145	ALSTOM	3/5/2009
				GT-2	145	ALSTOM	3/5/2009
				ST-3	174	ALSTOM	3/5/2009
	GAUTAMI CCPP				464		
	GIPCL						
47	BARODA CCPP	GUJARAT	Natural Gas				
				GT-5	106	BHEL	26-08-97
				ST-6	54	BHEL	18-11-97
	BARODA CCPP				160		
	GMR ENERG						
48	GMR Energy Ltd - Kakinada	ANDHRA PRADESH					
				GT-1	42.5	HDEC	8/5/2001
				GT-2	42.5	HDEC	8/5/2001
				GT-3	42.5	HDEC	8/5/2001
				GT-4	42.5	HDEC	8/5/2001

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				ST-5	50	ABB	8/5/2001
	GMR Energy Ltd - Kakinada				220		
	GREL						
49	GREL CCPP (Rajahmundry)	ANDHRA PRADESH	Natural Gas				
				GT-1	240	Others	12/9/2015
				ST-2	144	Others	12/9/2015
				GT-3	240	Others	5/10/2015
				ST-4	144	Others	5/10/2015
	GREL CCPP (Rajahmundry)				768		
	APEPDCL						
50	JEGURUPADU CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	52.8	ALSTOM	4/7/1996
				GT-2	52.8	ALSTOM	26-10-96
				GT-3	52.8	ALSTOM	11/12/1996
				ST-4	77	ALSTOM	1/4/1998
				ST-5	140	ALSTOM	9/10/2005
				ST-6	80	ALSTOM	11/11/2005
	JEGURUPADU CCPP				455.4		
	GVKP&IL						
	KONA						
51	KONASEEMA CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	140	SIEMENS	1/5/2009
				GT-2	140	SIEMENS	1/5/2009
				ST-3	165	SIEMENS	30-06-10
	KONASEEMA CCPP				445		
	KONDAPALI						
52	KONDAPALLI EXTN CCPP.	ANDHRA PRADESH	Natural Gas				

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
				GT-1	233	GE	5/12/2009
				ST-2	133	GE	19-07-10
	KONDAPALLI EXTN CCPP.				366		
53	KONDAPALLI CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	112	GE	22-06-00
				GT-2	112	GE	22-06-00
				ST-3	126	GE	22-06-00
	KONDAPALLI CCPP				350		
54	KONDAPALLI ST-3 CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	371	BHEL/GE	7/8/2015
				GT-2	371	BHEL/GE	5/9/2015
	KONDAPALLI ST-3 CCPP				742		
	NDPL						
55	RITHALA CCPP	DELHI	Natural Gas				
				GT-1	35.75	BHEL	9/12/2010
				GT-2	35.75	BHEL	4/10/2010
				ST-3	36.5	BHEL	4/9/2011
	RITHALA CCPP				108		
	PENNA						
56	VALANTARVY CCPP	TAMIL NADU	Natural Gas				
				GT-1	38		30-09-04
				ST-2	14.8		30-11-04
	VALANTARVY CCPP				52.8		
	PPNPGCL						
57	P.NALLUR CCPP	TAMIL NADU	Natural Gas				
				GT-1	330.5		22-02-01

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
	P.NALLUR CCPP				330.5		
	RELIANCE						
58	GOA CCPP (Liq.)	GOA	Naptha				
				GT-1	48	GE/BHEL	14-08-99
	GOA CCPP (Liq.)				48		
	SPGL						
59	GODAVARI CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	47	SIEMENS	9/1/1997
				GT-2	47	SIEMENS	1/4/1998
				GT-3	47	SIEMENS	1/4/1998
				ST-4	67	PARSONS	31-03-98
	GODAVARI CCPP				208		
	TOR. POW. (SUGEN)						
60	SUGEN CCPP	GUJARAT	Natural Gas				
				GT-1	382.5	SIEMENS	4/2/2009
				GT-2	382.5	SIEMENS	7/5/2009
				GT-3	382.5	SIEMENS	8/6/2009
	SUGEN CCPP				1147.5		
	TOR. POW. (UNOSUGEN)						
61	DGEN MEGA CCPP	GUJARAT					
				GT-1	400	Others	12/1/2014
				ST-2	400	Others	23-04-14
				ST-3	400	Others	9/3/2014
	DGEN MEGA CCPP				1200		
62	UNOSUGEN CCPP	GUJARAT					
				GT-1	382.5	Others	20-01-13
	UNOSUGEN CCPP				382.5		

Sl. No	Sector/ Organization/ Station	Location	Type of fuel used	Unit Detail	Capacity (MW)	Make	Date of Synchronization
	VEMAGIRI						
63	VEMAGIRI CCPP	ANDHRA PRADESH	Natural Gas				
				GT-1	233	CEC,USA	13-01-06
				ST-2	137	ALSTOM	8/6/2006
	VEMAGIRI CCPP				370		
	TOTAL ALL INDIA				24364.13		

Annexure- 9.3

GAS SUPPLY/CONSUMPTION IN THE COUNTRY FOR THE YEAR 2015-16

S. No	Name of Power Station	Installed Capacity (MW)	Generation (MUs)	Gas Requirement at 90% PLF (MMSCMD)	Gas Allotted (MMSCMD)	GAS SUPPLIED/CONSUMED (MMSCMD)
(A) CENTRAL SECTOR						
1	NTPC, FARIDABAD CCPP	431.59	1100.66	2.1	2.99	0.65
2	NTPC, ANTA CCPP	419.33	941.95	2.0	2.88	0.60
3	NTPC, AURAIYA CCPP	663.36	1511.33	3.2	4.41	0.94
4	NTPC, DADRI CCPP	829.78	3000	4.0	5.01	1.70
	Sub Total (NR)	2344.06	6553.94	11.3	15.30	3.88
5	NTPC, GANDHAR(JHANORE) CCPP	657.39	1120.00	3.2	1.23	0.60
6	NTPC, KAWAS CCPP	656.2	1212.40	3.1	4.62	0.71
7	RATNAGIRI (RGPPL-DHABHOL)	1967	1247.43	9.4	9.86	0.65
	Sub Total (WR)	3280.59	3579.83	15.8	15.71	1.95
8	KATHALGURI (NEEPCO)	291	1759.17	1.4	1.4	1.34
9	MONARCHAK (NEEPCO)	65.4	88.46	0.3	0.5	0.08
10	AGARTALA GT+ST (NEEPCO)	109.5	854.39	0.5	0.75	0.70
11	TRIPURA CCPP (ONGC)	726.6	3480.74	3.5	2.65	1.91
	Sub Total (NER)	1192.5	6182.76	5.7	5.3	4.03
	Total (CS)	6817.15	16316.52	32.8	36.31	9.87
(B) STATE SECTOR						
12	I.P.CCPP	270	467.09	1.3	1.80	0.34
13	PRAGATI CCGT-III	1500	1911.00	7.2	2.49	1.03
14	PRAGATI CCPP	330.4	1502.65	1.6	2.25	0.84
15	DHOLPUR CCPP	330	660.62	1.6	1.60	0.24
16	RAMGARH (RRVUNL,Jaisalmer)	273.8	1508.07	4.1	1.45	1.50
	Sub Total (NR)	2704.2	6049.42	15.8	9.59	3.94
17	PIPAVAV CCPP	702	25.80	3.4	0.21	0.03
18	DHUVARAN CCPP(GSECL)	594.72	416.93	2.9	1.07	0.23
19	HAZIRA CCPP(GSEG)	156.1	144.53	0.7	0.81	0.11

S. No	Name of Power Station	Installed Capacity	Generation (MUs)	Gas Requirement	Gas Allotted	GAS SUPPLIED/CONSUMED
20	HAZIRA CCPP EXT	351	0.00	1.7	0.00	0.00
21	UTRAN CCPP(GSECL)	518	1271.97	2.5	2.56	0.63
22	URAN CCPP (MAHAGENCO)	672	2912.00	3.2	4.90	1.95
	Sub Total (WR)	2993.82	4771.23	14.4	9.55	2.94
23	KARAIKAL CCPP (PPCL)	32.5	227.01	0.2	0.18	0.17
24	KOVIKALPAL (THIRUMAKOTTAI)	107	401.22	0.5	0.45	0.28
25	KUTTALAM (TANGEDCO)	100	563.67	0.5	0.45	0.33
26	VALUTHUR CCPP(Ramanand)	186.2	721.19	0.9	0.69	0.40
	Sub Total (SR)	425.7	1913.08	2.0	1.77	1.17
27	LAKWA GT (ASEB, Maibella)	157.2	940.00	0.8	0.95	0.78
28	NAMRUP CCPP + ST (APGCL)	119	489.00	0.6	0.66	0.65
29	BARAMURA GT (TSECL)	58.5	234.00	0.3	0.60	0.29
30	ROKHIA GT (TSECL)	111	480.00	0.5	0.30	0.58
	Sub Total (NER)	445.7	2143.00	2.1	2.51	2.31
	Total (SS)	6569.42	14876.73	34.3	23.42	10.37
(C) PVT SECTOR						
31	TROMBAY CCPP (TPC)	180	1179.72	0.9	2.50	0.74
	Sub Total (WR)	180	1179.72	0.9	2.50	0.74
(D) PVT IPP SECTOR						
32	RITHALA CCPP (NDPL)	108	0.00	0.5	0.40	0.00
	Sub Total (NR)	108	0.0	0.5	0.40	0.00
33	BARODA CCPP (GIPCL)	160	235.48	0.8	0.86	0.14
34	ESSAR CCPP **	300	0.00	1.4	1.17	0.00
35	PAGUTHAN CCPP (GPEC)	655	898.34	3.1	2.15	0.51
36	SUGEN CCPP (TORRENT)	1147.5	3612.10	5.5	4.96	1.76
37	UNOSUGEN CCPP	382.5	859.07	1.8	0.22	0.42
38	DGEN Mega CCPP	1200	2731.00	5.8	1.14	1.32
	Sub Total (WR)	3845	8335.99	18.5	10.50	4.15
39	GAUTAMI CCPP	464	35.49	2.2	3.82	0.02
40	GMR - KAKINADA (Tanirvavi)	220	0.00	1.1	0.88	0.00
41	GMR-Rajahmundry Energy Ltd.	768	536.91	3.7	0.75	0.28

S. No	Name of Power Station	Installed Capacity	Generation (MUs)	Gas Requirement	Gas Allotted	GAS SUPPLIED/CONSUMED
42	GODAVARI (SPECTRUM)	208	562.30	1.0	1.43	0.32
43	JEGURUPADU CCPP (GVK)	455.4	695.08	2.2	3.86	0.42
44	KONASEEMA CCPP	445	0.00	2.1	3.96	0.00
45	KONDAPALLI EXTN CCPP.	366	295.43	1.8	4.05	0.07
46	KONDAPALLI ST-3 CCPP (LANCO)	742	1561.72	3.6		0.53
47	KONDAPALLI CCPP (LANCO)	350	487.60	1.7	2.32	0.39
48	PEDDAPURAM (BSES)	220	0.00	1.1	1.09	0.00
49	VEMAGIRI CCPP	370	592.70	1.8	3.66	0.33
50	VIJESWARAN CCPP	272	699.65	1.3	0.00	0.45
51	PENNA CEMENT INDUSTRIES	30	N/A	0.1	0.12	0.00
52	RVK ENERGY	28	N/A	0.1	0.13	0.00
53	SILK ROAD SUGAR	35	N/A	0.2	0.10	0.00
54	LVS POWER	55	N/A	0.3	0.22	0.00
55	KARUPPUR CCPP (ABAN)	119.8	704.26	0.6	0.50	0.32
56	P.NALLUR CCPP (PPN)	330.5	149.00	1.6	1.58	0.00
57	VALANTARVY CCPP	52.8	170.70	0.3	0.38	0.12
	Sub Total (SR)	5531.5	6490.84	26.6	28.85	3.13
58	DLF ASSAM GT	24.5	0.00	0.1	0.10	0.00
	Sub Total (NER)	24.5	0	0.1	0.1	0.00
	Total (PVT IPP S)=D	9509	14826.83	45.6	39.85	7.28
	Total(PVT)=C+D	9689	16006.55	46.5	42.35	8.02
	GRAND TOTAL=A+B+C+D	23075.57	47199.80	113.6	102.08	28.26

*APM:Administerd price mechanism,RLNG:Regasified liquefied natural gas,LT:Long term

N/R=Not reported any loss

\$ Installed Capacity is as on last day of the month

* Normative gas requirement at 90 % PLF taking GCV of gas=9000k.Cal/SCM (except for Ramgarh CCGT for which GCV is 4150 kCal/SCM), station

heat rate - 2900 k.Cal/kWh for open cycle and 2000 k.Cal/kWh for combined cycle.

+ Including R-LNG

** Out of total 515 MW capacity, 300 MW electricity is being supplied to grid & balance 215 MW is used as captive generation.

P = Supply through Pipe Line I=Isolated

MU -- Million Unit, KL-- Kilo Litre, KL=1.35*MT

MMSCMD - Million Standard Cubic Metres/day=MMSCM Data/(NO.OF DAYS IN A MONTH)

HSD -- High Speed Diesel

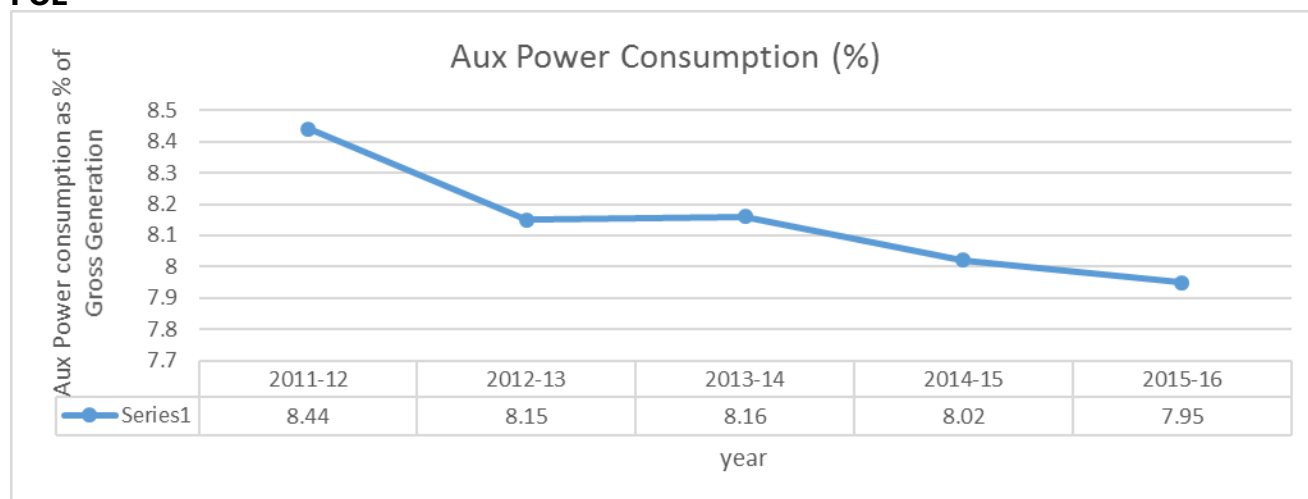
SECTION -11

AUXILIARY POWER CONSUMPTION IN THERMAL POWER STATIONS

- 11.1** Auxiliary power consumption by the thermal stations comprises the power consumption by all the unit auxiliaries as well as the common station auxiliaries' requirement such as CW system, Water treatment, Coal and ash handling, Compressors, station lighting, air conditioning etc. The All India average auxiliary power consumption by the thermal stations during 2015-16 decreased to 7.95% from 8.02% during 2014-15

The auxiliary power consumption by thermal power stations as percentage of gross generation from 2011-12 onwards is shown below:

11.2 REGION-WISE AUXILIARY POWER CONSUMPTION AS % OF GROSS GENERATION



CONSUMPTION

The region-wise auxiliary power consumption as percentage of gross generation from 2011-12 onwards is shown below:-

REGION	% AGE AUXILIARY POWER CONSUMPTION				
	2011-12	2012-13	2013-14	2014-15	2015-16
NORTHERN	8.52	8.44	8.35	8.02	8.53
WESTERN	8.72	8.12	7.84	8.03	7.63
SOUTHERN	8.17	7.66	8.12	7.76	7.89

EASTERN	8.16	8.38	8.57	8.3	8.11
NORTH EASTERN	0	0	0	0	0
ALL-INDIA	8.44	8.15	8.16	8.02	7.95

11.3 SECTOR-WISE AUXILIARY POWER CONSUMPTION

The Sector-wise auxiliary power consumption as percentage of gross generation from 2011-12 onwards is shown below: -

REGION	% AGE AUXILIARY POWER CONSUMPTION				
	2011-12	2012-13	2013-14	2014-15	2015-16
CENTRAL SECTOR	6.75	7.23	7.4	7.02	7.16
STATE SECTOR	9.62	8.95	9.23	8.95	9.28
PVT UTILITY	7.62	7.4	8.09	8.05	8.05
PRIVATE IPPS	10.16	8.55	7.82	8.15	7.51
ALL INDIA	8.44	8.15	8.16	8.02	7.95

11.4 STATIONWISE AUXILIARY POWER CONSUMPTION

11.4.1 The auxiliary power consumption of a Station depends on various factors like type of equipment provided, fuel quality, site specific conditions and operating practices/operating efficiency. The choice of milling systems, fans and Boiler Feed Pump significantly affects the auxiliary power consumption. Fuel quality affects auxiliary power consumption in fuel handling, ash disposal system and also in main plant equipment. Some Stations have site specific requirements like Cooling water taken from very long distances affecting the auxiliary power consumption. Plant operation at low load factors also considerably affects the Auxiliary power consumption.

11.4.2 While it is not possible to account for all of the above factors for comparing auxiliary power consumption of the Stations, a categorization of Stations has been made based on two major factors affecting auxiliary power consumption so as to have meaningful comparisons amongst Stations. These are

- Boiler Type – Circulating Fluidized Bed Combustion vs. Conventional Pulverized coal fired boilers.
- Type of Boiler Feed Pump – Motor driven Vs Turbine driven BFP

11.4.3 The CFBC boilers have significantly higher Auxiliary power consumption due to their higher fan power. Similarly, units with TBFP have significantly lower auxiliary power consumption. Thus Stations with significant capacity (more than 50 %) in TBFP units have been considered as a separate category. The details of overall auxiliary power consumption in these categories of Stations are as under: -

Type of Station	Auxiliary Power Consumption (%)			
	2012-13	2013-14	2014-15	2015-16
Stations with Circulating Fluidized Bed Combustion Boilers	13.48	13.64	12.50	12.31
Stations with PC Boilers and >50 % capacity with TBFPs	7.14	6.88	6.78	6.62
Stations with PC Boilers and >50 % capacity with MBFPs	8.89	9.26	9.12	9.60
Overall	8.15	8.16	8.02	7.95

Details of Station wise auxiliary power consumption in each of the above categories from 2011-12 onwards are given at the Annex. 11.1.

11.5 STATION AUXILIARY POWER CONSUMPTION Vs. NATIONAL AVERAGE APC

Table of APC lower than national average.

STATION'S NAME	CAPACITY	Utility	Sector	APC _2015-16
Stations with CFBC Boiler (All India Average APC - 12.31%)				
NEYVELI TPS-II EXP	500	NLC	Central	7.44
KUTCH LIG. TPS	290	GSECL	State	10.88
SURAT LIG. TPS	500	GIPCL	Private	11.65
JALIPA KAPURDI TPP	1080	RWPL (JSW)	Private	11.3
Stations with Motor Driven BFP (All India Average APC - 9.52 %)				
BHILAI TPS	500	NSPCL	Central	7.3
NEYVELI TPS-II EXP	500	NLC	Central	7.44
MEJIA TPS	2340	DVC	Central	8.2
NEYVELI (EXT) TPS	420	NLC	Central	8.2
NEYVELI TPS-II	1470	NLC	Central	9.03
UNCHAHAR TPS	1050	NTPC Ltd.	Central	9.06
METTUR TPS	1440	TNGDCL	State	7.65
DSPM TPS	500	CSPGCL	State	7.8
KORBA-WEST TPS	1340	CSPGCL	State	8.07
TUTICORIN TPS	1050	TNGDCL	State	8.21
UKAI TPS	1350	GSECL	State	8.22
SANJAY GANDHI TPS	1340	MPPGCL	State	8.25
YAMUNA NAGAR TPS	600	HPGCL	State	8.51

STATION'S NAME	CAPACITY	Utility	Sector	APC _2015-16
GH TPS (LEH.MOH.)	920	PSPCL	State	8.75
RAICHUR TPS	1720	KPCL	State	8.76
SANTALDIH TPS	980	WBPDC	State	8.76
WANAKBORI TPS	1470	GSECL	State	8.9
ROPAR TPS	1260	PSPCL	State	9.05
KHAPARKHEDA TPS	1340	MAHAGENCO	State	9.08
Dr. N.TATA RAO TPS	1760	APGENCO	State	9.1
HARDUAGANJ TPS	665	UPRVUNL	State	9.36
TORANGALLU TPS(SBU-I)	260	JSWEL	Private	7.12
TORANGALLU TPS(SBU-II)	600	JSWEL	Private	7.48
MUNDRA UMTTP	4000	CGPL	Private	7.76
KAMALANGA TPS	1050	GMR ENERG	Private	7.89
BUDGE BUDGE TPS	750	CESC	Private	8.05
BINA TPS	500	JPPVL	Private	8.15
MAHADEV PRASAD STPP	540	ADHUNIK	Private	8.34
UTRAULA TPS	90	BEPL	Private	8.64
NEYVELI TPS(Z)	250	ST-CMSECP	Private	8.8
ROSA TPP Ph-I	1200	RPSCCL	Private	8.87
PATHADI TPP	600	LANCO	Private	8.88
JSW RATNAGIRI TPP	1200	JSWEL	Private	8.91
BUTIBORI TPP	600	VIP	Private	8.95
TITAGARH TPS	240	CESC	Private	8.97
DAHANU TPS	500	RIL (DAHANU)	Private	9.02
HALDIA TPP	600	HEL	Private	9.16
SABARMATI (D-F STATIONS)	362	TOR. POW. (UNOSUGEN)	Private	9.28
JOJOBBERA TPS	360	TATA PCL	Private	9.43
GMR WARORA TPS	600	#N/A	Private	9.44
BARKHERA TPS	90	BEPL	Private	9.46

STATION'S NAME	CAPACITY	Utility	Sector	APC _2015-16
Stations with Turbine Driven BFP (All India Average APC - 6.62 %)				
BARH II	1320	NTPC Ltd.	Central	5.17
SIPAT STPS	2980	NTPC Ltd.	Central	5.39
SIMHADRI	2000	NTPC Ltd.	Central	5.56
DURGAPUR STEEL TPS	1000	DVC	Central	5.87
KORBA STPS	2600	NTPC Ltd.	Central	6.04
KODARMA TPP	1000	DVC	Central	6.12
RAMAGUNDEM STPS	2600	NTPC Ltd.	Central	6.12
TALCHER STPS	3000	NTPC Ltd.	Central	6.14
DADRI (NCTPP)	1820	NTPC Ltd.	Central	6.38
INDIRA GANDHI STPP	1500	APCPL	Central	6.54
VINDHYACHAL STPS	4760	NTPC Ltd.	Central	6.61
KAKATIYA TPS	1100	TSGENCO	State	5.69
BELLARY TPS	1000	KPCL	State	6
NORTH CHENNAI TPS	1830	TNGDCL	State	6.31
MAITHON RB TPP	1050	MPL	Private	5.02
KAWAI TPS	1320	APL	Private	5.26
AVANTHA BHANDAR	600	KWPCL	Private	5.3
TIRORA TPS	3300	APL	Private	5.56
RAJPURA TPP	1400	NPL	Private	5.71
UDUPI TPP	1200	UPCL	Private	5.79
TAMNAR TPP	1800	JPL	Private	6.14
SASAN UMTTP	3960	SPL	Private	6.29
MAHATMA GANDHI TPS	1320	JhPL(HR)	Private	6.33
SALAYA TPP	1200	EPGL	Private	6.36
TROMBAY TPS	1400	TATA PCL	Private	6.5
BARADARHA TPS	1200	DBPCL	Private	6.57
All India Average APC - 7.95 %				

**STATIONWISE AUXILIARY POWER CONSUMPTION IN THERMAL POWER STATIONS
FROM 2011-12 TO 2015-16**

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
STATIONS with CFBC Boiler					
I. CENTRAL SECTOR					
BARSINGSAR LIGNITE	250	11.38	16.16	11.28	\$
NEYVELI TPS-II EXP	500	-	-	-	7.44
II. STATE SECTOR					
AKRIMOTA LIG TPS	250	18.06	16.62	15.43	15.31
GIRAL TPS	250	16.1	23.72	21.36	20.28
KUTCH LIG. TPS	290	13.4	13.21	12.75	10.88
IV. PRIVATE IPPS					
JALIPA KAPURDI TPP	1080	12.85	11.81	10.81	11.3
SURAT LIG. TPS	500	13.42	13.01	14.51	11.65
IV. ALL INDIA	3120	13.48	13.64	12.5	12.31
PC Stations with Motor Driven BFP					
I. CENTRAL SECTOR					
BADARPUR TPS	705	8.45	9.15	10.2	9.85
BHILAI TPS	500	9.93	9.06	8.61	7.3
BOKARO `B` TPS	630	10	12.45	16	12.12
CHANDRAPURA(DVC) TPS	890	9.6	10.09	9.81	9.67
DURGAPUR TPS	340	10.63	10.72	11.14	12.74
MEJIA TPS	2340	8.8	9.29	8.63	8.2

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
MUZAFFARPUR TPS	220	-	20.05	11.01	13.99
NEYVELI (EXT) TPS	420	7.89	8.46	8.2	8.2
NEYVELI TPS- I	600	19.19	19.15	19.46	\$
NEYVELI TPS-II	1470	8.04	8.79	6.17	9.03
TALCHER (OLD) TPS	460	9.61	10.47	10.39	10.55
TANDA TPS	440	11.81	11.88	11.43	11.64
UNCHAHAH TPS	1050	8.24	8.85	8.79	9.06
II. STATE SECTOR					
AMARKANTAK EXT TPS	210	9.36	9.4	9.28	9.64
BAKRESWAR TPS	1050	8.87	10.23	9.63	10.31
BANDEL TPS	450	15.41	17.17	26.12	\$
CHHABRA TPP	1000	10.63	11.62	10.66	14.17
D.P.L. TPS	880	9.64	12.23	13.53	10.73
Dr. N.TATA RAO TPS	1760	7.43	7.52	8.43	9.1
DSPM TPS	500	7.79	7.8	7.75	7.8
GANDHI NAGAR TPS	870	9.44	10.12	9.17	9.64
GH TPS (LEH.MOH.)	920	7.89	7.97	7.14	8.75
GND TPS(BHATINDA)	440	10.89	11.12	11.13	11.26
HARDUAGANJ TPS	665	13.6	11.3	9.02	9.36
IB VALLEY TPS	420	10.58	10.6	10.29	10.72
KHAPARKHEDA TPS	1340	8.5	8.42	7.35	9.08
KOLAGHAT TPS	1260	8.86	11.21	10.41	11.17
KORADI TPS	1700	\$	14.04	12.68	9.53
KORBA-II	200	12.55	14.71	15.42	14.51
KORBA-III	240	11.69	11.63	12.37	10.94
KORBA-WEST TPS	1340	8.25	7.74	8.4	8.07

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
KOTA TPS	1240	9.46	9.85	10.05	10.36
KOTHAGUDEM TPS	720	9.08	11.01	10.4	12.73
METTUR TPS	1440	8.27	8.29	5.38	7.65
NASIK TPS	630	9.84	11.57	11.2	10.94
OBRA TPS	1278	10.4	11.3	8.56	12.45
PANIPAT TPS	1360	10.23	10.32	10.94	\$
PANKI TPS	210	13.73	13.75	13.03	\$
PARAS TPS	500	10.24	10.58	11.93	10.95
PARICHHA TPS	1140	6.49	10.79	7.32	10.86
PARLI TPS	1130	12.19	9.52	11.26	12.17
RAICHUR TPS	1720	9.19	10.18	9.07	8.76
RAJGHAT TPS	135	13.03	14.83	14.42	\$
RAMAGUNDEM - B TPS	62.5	8.37	8.42	9.71	9.76
RAYALASEEMA TPS	1050	9.53	10.77	13.34	10.63
ROPAR TPS	1260	7.96	7.02	8.8	9.05
SAGARDIGHI TPS	600	9.6	12.57	11.53	13.35
SANJAY GANDHI TPS	1340	7.43	7.57	8.69	8.25
SANTALDIH TPS	980	10.09	9.9	9.25	8.76
SATPURA TPS	1330	11.03	11.22	10.17	10.06
SIKKA REP. TPS	740	11.74	12.33	11.37	11.06
SURATGARH TPS	1500	8.46	9.06	9.32	10.43
TENUGHAT TPS	420	9.85	7.73	11.92	12.04
TUTICORIN TPS	1050	7.06	8.07	8.16	8.21
UKAI TPS	1350	8.34	7.56	6.66	8.22
WANAKBORI TPS	1470	8.81	9.19	8.76	8.9
YAMUNA NAGAR TPS	600	9.25	9.03	8.84	8.51

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
III. PVT UTILITY					
BUDGE BUDGE TPS	750	8.25	8.27	8.21	8.05
DAHANU TPS	500	8.8	9.02	8.85	9.02
SABARMATI (C STATION)	60	9.34	10.37	10.04	10.65
SABARMATI (D-F STATIONS)	362	9.4	9.71	9.09	9.28
SOUTHERN REPL. TPS	135	8.64	8.64	8.51	9.89
TITAGARH TPS	240	8.05	8.24	8.43	8.97
IV. PRIVATE IPPS					
AMARAVATI TPS	1350	-	17.51	13.91	9.9
BALCO TPS	600	-	-	-	9.64
BANDAKHAR TPP 111	300	-	-	-	\$
BARKHERA TPS	90	10.46	10.58	9.96	9.46
BELA TPS 104	270	-	-	-	\$
BINA TPS	500	10.64	9.73	8.15	8.15
BUTIBORI TPP	600	-	-	10.54	8.95
CHAKABURA TPP	30	-	-	11.73	11.95
DHARIWAL TPP	600	-	-	17.38	10.29
GEPL TPP Ph-I 99	120	9.18	16.34	\$	\$
GMR WARORA TPS	600	-	9.49	9.25	9.44
HALDIA TPP	600	-	-	-	9.16
JOJOBERA TPS	360	9.9	10.78	9.54	9.43
JSW RATNAGIRI TPP	1200	10.03	9.76	9.06	8.91
KAMALANGA TPS	1050	-	-	8.35	7.89
KASAIPALLI TPP	270	\$	11.16	11.76	11.82
KATGHORA TPP	35	27.46	\$	\$	\$
KHAMBARKHERA TPS	90	11.58	10.71	10.06	9.8

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
KUNDARKI TPS	90	10.92	12.35	9.66	10.02
MAHADEV PRASAD STPP	540	11.01	8.29	8.17	8.34
MAQSOODPUR TPS	90	11.67	10.44	8.61	9.72
MUNDRA UMTTP	4000	7.35	7.49	7.23	7.76
NASIK (P) TPS	270	\$	\$	\$	\$
NEYVELI TPS(Z)	250	7.85	7.85	8.28	8.8
NIWARI TPP 96	45	-	*	19.37	\$
OP JINDAL TPS	1000	8.79	9.48	9.14	9.84
PATHADI TPP	600	10.25	10.07	9.43	8.88
RATIJA TPS	50	-	17.85	19.13	\$
ROSA TPP Ph-I	1200	9.02	6.41	8.65	8.87
SALORA TPP	135	-	-	12.79	\$
SIMHAPURI TPS	600	-	10.47	10.02	10.47
SVPL TPP	63	19.06	\$	\$	\$
THAMMINAPATNAM TPS	300	-	12.91	10.7	10.61
TORANGALLU TPS(SBU-I)	260	7.19	6.91	6.94	7.12
TORANGALLU TPS(SBU-II)	600	7.9	7.87	7.25	7.48
TUTICORIN (P) TPP	300	-	12.35	12.38	12.34
UTRAULA TPS	90	11.03	10.68	9.78	8.64
WARDHA WARORA TPP	540	10.73	10.57	10.74	11
IV. ALL India MBFP Stations	75796.5	8.89	9.26	9.12	9.49
PC Stations with Turbine Driven BFP					
I. CENTRAL SECTOR					
BARH II	1320	-	-	6.4	5.17
DADRI (NCTPP)	1820	6.35	6.62	6.43	6.38
DURGAPUR STEEL TPS	1000	*	6.21	6.85	5.87

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
FARAKKA STPS	2100	6.93	6.5	6.61	7.06
INDIRA GANDHI STPP	1500	6.68	6.58	6.23	6.54
KAHALGAON TPS	2340	7.79	7.9	7.24	6.99
KODARMA TPP	1000	-	6.9	8.01	6.12
KORBA STPS	2600	6.26	6.29	6.14	6.04
MAUDA TPS	1000	-	11.35	8.86	7.64
RAGHUNATHPUR TPP	1200	-	-	-	\$
RAMAGUNDEM STPS	2600	6.02	6.03	5.85	6.12
RIHAND STPS	3000	6.59	6.69	6.83	6.66
SIMHADRI	2000	5.9	5.76	5.48	5.56
SINGRAULI STPS	2000	7.12	7.25	7.28	7.32
SIPAT STPS	2980	6.22	6.04	5.33	5.39
TALCHER STPS	3000	6.54	6.5	5.85	6.14
TUTICORIN (JV) TPP	1000	-	-	-	8.59
VALLUR TPP	1500	-	7.33	7.52	7.54
VINDHYACHAL STPS	4760	6.27	6.31	6.35	6.61
II. STATE SECTOR					
ANPARA TPS	1630	8.84	8.49	8.65	8.31
BELLARY TPS	1000	7.42	6.23	6.36	6
BHUSAWAL TPS	1420	9.81	11.29	9.17	7.11
CHANDRAPUR(MAHARASHTRA) STPS	2340	9.39	9.83	8.97	8.41
DAMODARAM SANJEEVAIAH TPS	1600	-	-	-	8.52
KAKATIYA TPS	1100	5.81	6.27	6.43	5.69
KALISINDH TPS	1200	-	-	8.48	9.28
KOTHAGUDEM TPS (NEW)	1000	6.77	5.97	6.32	7.96

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
MARWA TPS	500	-	-	-	\$
NORTH CHENNAI TPS	1830	9.12	9.42	7.4	6.31
RAJIV GANDHI TPS	1200	5.87	5.78	5.95	6.63
SHREE SINGAJI TPP	1200	-	-	7.2	7.14
III. PVT UTILITY					
TROMBAY TPS	1400	4.86	6.11	6.08	6.5
IV. PRIVATE IPPS					
AKALTARA TPS	1200	-	-	7.93	7.2
ANPARA C TPS	1200	7.41	7.53	7.13	7.37
ANUPPUR TPP	600	-	-	-	7.98
AVANTHA BHANDAR	600	-	-	*	5.3
BARADARHA TPS	1200	-	-	-	6.57
DERANG TPP	1200	-	-	7.74	\$
ITPCL TPP	600	-	-	-	\$
KAWAI TPS	1320	-	6.08	5.9	5.26
LALITPUR TPS	660	-	-	-	\$
MAHAN TPP	600	-	*	10.24	-
MAHATMA GANDHI TPS	1320	12.61	6.17	5.96	6.33
MAITHON RB TPP	1050	5.88	5.48	5.07	5.02
MUNDRA TPS	4620	8.69	7.34	7.89	7.48
MUTHIARA TPP	1200	-	-	-	8.2
NIGRI TPP	1320	-	-	*	6.93
PRAYAGRAJ TPP	660	-	-	-	\$
RAIKHEDA TPP	685	-	-	-	11.87
RAJPURA TPP	1400	-	8.8	12.28	5.71
SALAYA TPP	1200	-	6.6	5.83	6.36

STATION'S NAME	CAPACITY	Auxiliary power consumption (%)			
		2012-13	2013-14	2014-15	2015-16
SASAN UMTTP	3960	-	-	6.99	6.29
STERLITE TPP	2400	10.96	8.53	7.59	8.1
TALWANDI SABO TPP	1980	-	-	11.89	7.87
TAMNAR TPP	1800	-	*	8.3	6.14
TIRORA TPS	3300	9.86	5.91	5.91	5.56
UDUPI TPP	1200	6.53	6.37	6.15	5.79
VIZAG TPP	520	-	-	-	8.9
IV. ALL India TBFP Stations	93435	7.14	6.88	6.78	6.62
ALL INDIA TOTAL		8.15	8.16	8.02	7.95

* Station data is not available.

\$ % not computed but APC account in overall APC.

- Station did not exist in that years.

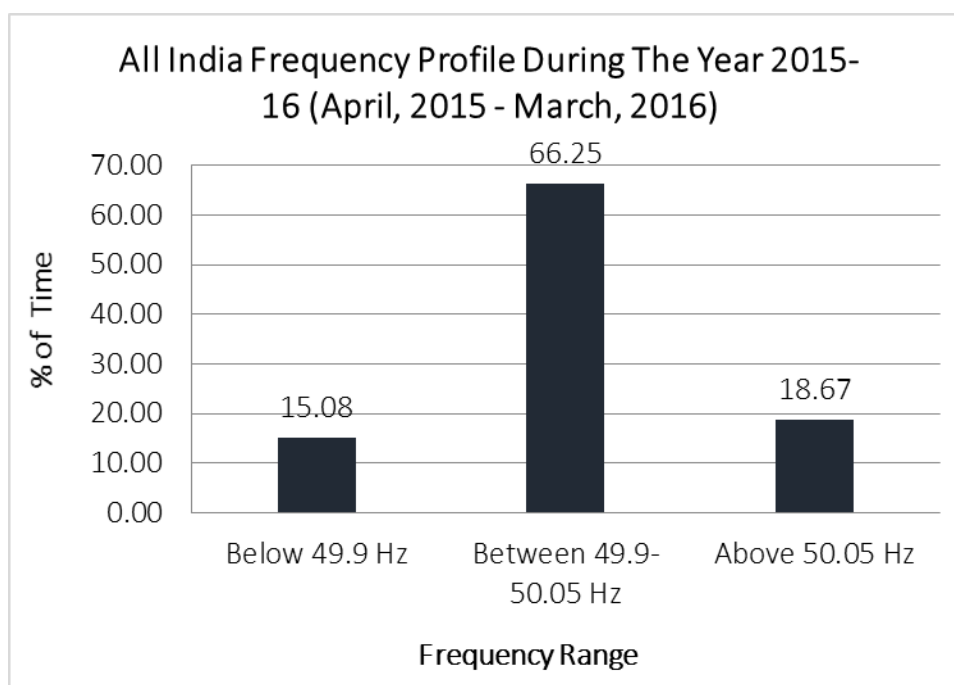
SECTION-12

STATION OPERATION UNDER DISTURBED GRID CONDITIONS

- 12.2** Indian Electricity Grid Code (IEGC) specifies operating band for frequency of grid as 49.90 Hz to 50.05 Hz. The percentage of time during which the power systems of the country operated below 49.9 Hz, between 49.9 to 50.05 Hz (IEGC Band) and above 50.05 Hz and the maximum and minimum frequencies of the grid during April, 2015 to March, 2016 is given in the following table:

% of Time when Frequency was			Max. Frequency (Hz)	Min. Frequency (Hz)
Below 49.9 Hz	Between 49.9-50.05 Hz	Above 50.05 Hz		
15.08	66.25	18.67	50.55	49.19

Note: Operating Frequency range as per IEGC (2nd amendment) Regulations, 2014 is 49.90 Hz to 50.05 Hz w.e.f. from 17.02.2014.



- 12.3** The monthly frequency profile for the different regions during the year 2015-16 and 2014-15 are shown in Annex-12.1 and Annexure-12.2 respectively.

Annexure-12.1**ALL INDIA FREQUENCY PROFILE (MONTHLY) DURING 2015-16**

Month	% of Time when Frequency was				
	Below 49.9 Hz	Between 49.9-50.05 Hz	Above 50.05 Hz	Max. Freq	Min. Freq
April	16.65	60.11	23.24	50.55	49.50
May	18.07	64.13	17.80	50.55	49.19
June	10.34	64.44	25.22	50.53	49.56
July	11.97	70.12	17.91	50.33	49.56
August	17.42	69.46	13.12	50.27	49.55
September	32.00	57.88	10.12	50.33	49.36
October	15.32	68.33	16.35	50.33	49.62
November	12.58	66.22	21.20	50.28	49.64
December	17.42	64.87	17.71	50.32	49.58
January	11.45	68.63	19.92	50.39	49.70
February	6.91	71.30	21.79	50.39	49.71
March	10.79	69.50	19.71	50.35	49.68
Average	15.08	66.25	18.67	50.39	49.55

Annexure-12.2**ALL INDIA FREQUENCY PROFILE (MONTHLY) DURING 2014-15**

Month	% of Time when Frequency was				
	Below 49.9 Hz	Between 49.9-50.05 Hz	Above 50.05 Hz	Max. Freq	Min. Freq
April	36.04	50.50	13.46	50.53	49.49
May	26.88	51.54	21.58	50.56	49.41
June	40.66	43.94	15.40	50.65	49.32
July	38.11	49.02	12.87	50.36	49.42
August	41.22	47.84	10.94	50.34	49.36
September	31.18	54.59	14.23	50.29	49.35
October	27.19	52.38	20.43	50.49	49.53
November	16.98	54.17	28.85	50.42	49.58
December	25.96	48.23	25.81	50.58	49.54
January	20.06	54.24	25.70	50.56	49.55
February	14.17	61.39	24.44	50.55	49.58
March	18.22	58.86	22.92	50.54	49.52
Average	28.06	52.23	19.72	50.49	49.47

12.3 The Clause 11 of the Central Electricity Authority (Grid Standard) Regulations, 2010. Effective from 26.06.2010 has Categorized the Grid Incidents and Grid Disturbance based on severity of tripping as follows: -

(A) Categorization of grid incidents in increasing order of severity, -

Category GI-1 - Tripping of one or more power system elements of the grid like a generator, transmission line, transformer, shunt reactor, series capacitor and Static VAR Compensator, which requires re-scheduling of generation or load, without total loss of supply at a sub-station or loss of integrity of the grid at 220 kV (132 kV in the case of North-Eastern Region);

Category GI-2 - Tripping of one or more power system elements of the grid like a generator, transmission line, transformer, shunt reactor, series capacitor and Static VAR Compensator, which requires re-scheduling of generation or load, without total loss of supply at a

sub-station or loss of integrity of the grid at 400 kV and above (220 kV and above in the case of North-Eastern Region).

(B) Categorization of grid disturbance in increasing order of severity, -

Category GD-1 - When less than ten percent of the antecedent generation or load in a regional grid is lost;

Category GD-2 - When ten percent to less than twenty percent of the antecedent generation or load in a regional grid is lost;

Category GD-3 - When twenty percent to less than thirty percent of the antecedent generation or load in a regional grid is lost;

Category GD-4 - When thirty percent to less than forty percent of the antecedent generation or load in a regional grid is lost;

Category GD-5 - When forty percent or more of the antecedent generation or load in a regional grid is lost.

Explanation: For the purpose of categorization of grid disturbances percentage loss of generation or load, whichever is higher shall be considered.

During the year 2016-17, there was no major grid disturbance in category GD-5 in any region except in North-Eastern region where the Grid Disturbance of this category occurred in the month of April 2016. The detail of the grid disturbance in North-Eastern Region is given below:

Date and Time of Occurrence: 16.04.2016 at 1200 hrs

Date and Time of restoration: Given in table below

Areas affected: All states in North Eastern Region

Total Generation Loss in NER: 1125 MW

Total Load affected in NER: 1384 MW

Detail of Restoration:

Time	LINES	Remarks
1225	132kV RC Nagar-Agartala-I	Power extended to Tripura
1230	400KV Bongaigaon-New Binaguri-IV	
1250	220kV BTPS –Salakati-II	Power extended to Assam
1251	400KV Bongaigaon-New Binaguri-I	
1300	400 KV D/C Misa-Balipara-I	
1316	400 KV D/C Balipara-Bongaigaon-I	

Time	LINES	Remarks
1321	132kV S/C Kumarghat-R.C.Nagar	
1328	220 KV S/C Balipara-Tezpur	
1333	220 KV D/C Misa-Dimapur-II	
1335	220kV BTPS –Salakati-I	
1345	132kV Dimapur-Dimapur-II	
1333	400 KV D/C Balipara-Bongaigaon-II	
1335	132 KV Balipara - Depota	
1337	132 KV S/C Aizwal-Kumarghat	Power extended to Mizoram
1337	132 KV S/C Aizwal - Zemabawk	
1339	220 KV D/C Misa-Samaguri-I	
1340	132 KV S/C Dimapur - Imphal	
1340	220 KV D/C Misa-Kopili - I	
1340	220 KV D/C Misa-Samaguri-II	
1342	132kV Surajmaninagar-Palatana-I	Power extended to Palatana
1344	132 KV S/C Khandong - Kopili -I	
1345	132kV Dimapur-Dimapur-II	Power extended to Nagaland
1346	132 KV S/C Loktak - Imphal-II	
1348	132 KV S/C Imphal - Imphal-I	Power extended to Manipur
1349	132 KV S/C Khandong - Kopili - II	
1351	132 KV S/C Khandong - Khliehriat-I	
1353	132 KV S/C Badarpur - Khliehriat	
1355	132KV S/C Badarpur - Badarpur	Power extended to South Assam
1358	400 KV D/C Misa-Balipara-II	
1406	400 KV D/C Misa- Mariani old	
1407	400KV D/C Balipara-BNC-II	
1411	132 KV Balipara - khupi	Power extended to AP
1413	132 KV S/C Khliehriat-Khliehriat-I	Power extended to Meghalaya
1418	400KV Bongaigaon-BTPS-II	Power extended to NTPC
1421	132 KV S/C Khandong - Khliehriat-II	

Time	LINES	Remarks
1423	132KV S/C Badarpur - Jiribam	
1423	132KV S/C Khandong - Haflong	
1424	132KV S/C Badarpur-Kolasib	
1424	220 KV D/C Misa-Kopili - II	
1424	220 KV Misa-Kopili-III.	
1430	132KV D/C Doyang - Dimapur-I	
1430	132KV BNC-Pavoi-II	
1432	132KV S/C Kolasib-Aizwal	
1432	132KV Silchar-Badarpur-I	
1433	132 KV S/C Jiribam - Aizwal	
1434	400KV D/C Balipara-BNC-III	
1441	132kv S/C Badarpur-Kumarghat	
1441	132KV Silchar-Imphal-I	
1443	132KV S/C Jiribam - Loktak-II	
1444	132KV Silchar-Srikona-I	
1449	400KV D/C BNC-Ranganadi-II	
1456	132KV BNC-Pavoi-I	
1458	132KV Silchar-P.K.Bari-I	
1459	132KV Silchar-Srikona-II	
1500	132KV S/C Ranganadi-Ziro	
1501	132 KV S/C Khliehriat-Khliehriat-I	
1501	132KV Silchar-Badarpur-II	
1501	400KV Bongaigaon-BTPS-I	
1502	132 KV S/C Imphal - Imphal-II	
1502	132KV Silchar-Pachgram	
1504	132KV Silchar-Durlavchhera	
1507	132KV Silchar-Imphal-II	
1510	220 KV D/C Misa-Dimapur-I	
1510	132KV Silchar-P.K.Bari-II	

Time	LINES	Remarks
1511	132 KV S/C Khliehriat-Khliehriat-II	
1515	132KV D/C Doyang - Dimapur-II	
1517	132KV S/C Nirjuli-Ranganadi	
1518	400KV Bongaigaon-Azara	
1530	132KV D/C RC Nagar-Agartala-II	
1532	132kV Surajmaninagar-Palatana-II	
1534	132KV S/C Gohpur - Nirjuli	
1534	400kV Silchar-Azara	
1540	132 KV S/C Jiribam-Haflong	
1545	400KV Bongaigaon-Bynihat	
1549	132KV D/C RC Nagar-Agartala-I	
1606	400 KV D/C Misa- Mariani(new)	
1615	400 KV D/C Kathalguri-Mariani(new)	
1640	400KV Bongaigaon-New Binaguri-III	
1700	400kV Silchar-Palltana-I	

Description of incident –

1. NER Grid was in synchronism with ER Grid through 220 kV Birpara - Salakati I & II , 400 kV Bongaigaon - New Siliguri I, II, III & IV lines and was connected with NR Grid through +/- 800 kV HVDC Biswanath Chariali - Agra Pole I.
2. At around 12:00:35.739 Hrs, 400kV Bongaigaon - BgTPP line I tripped with the following relay indication
Bongaigaon : DP, B-E, Zone II, Fault Current =11.1 kA.

BgTPP: DP, B-E. Zone I
3. At 12:01:03.001 Hrs, 400 kV Bongaigaon - Balipara line IV tripped on DP, B-E, Zone II, and fault cleared from Balipara (fault cleared in 325 msec from DR output).
4. At 12:03:07.272 Hrs, 400 kV Bongaigaon - New Siliguri III line tripped on DP, Zone-IV at Bongaigaon.

5. 400 kV Bongaigaon - BgTPP line II tripped from both ends at 12:03:30.091 Hrs and 400 kV Bongaigaon - Azara line tripped at 12:03:30.464 Hrs on DP, B-E, Zone II at Azara.
6. 400/220 kV, 315 MVA ICT at Bongaigaon tripped on Back Up Over Current Protection on HV Side at around 12:03:36.784 Hrs. 220 kV Salakati - BTPS I & II also tripped at the same time at BTPS.
7. 400 kV Bongaigaon - New Siliguri I line tripped at 12:03:36.827 Hrs and 400 kV Bongaigaon - New Siliguri II line tripped at 12:03:37.964 Hrs from Bongaigaon on over voltage.
8. Due to these tripping, NER grid separated from ER grid.
9. At 12:03:40.960 Hrs AGTPP along with part of Tripura system separated from isolated NER grid (from PMU).
10. Sarusajai bus blacked out at 12:03:43.360 Hrs and at 12:03:45 Hrs +/- HVDC BNC Agra Pole I blocked. Subsequently major part NER grid collapsed due to load generation mismatch.
11. 220kV Salakati S/S remained connected with Birpara and Gelephu S/S. AGBPP, LTPS and NTPS stations survived with generation of 150 MW, 90 MW and 60 MW respectively with upper Assam load due to successful operation of Islanding scheme at around 12:05 Hrs (information taken from SLDC). The island was synchronized with main grid at Misa at 1406 hrs. Tripura system initially survived along with AGTPP generation with demand of around 60 MW. Subsequently this island collapsed at due to load generation mismatch.

Root Cause Analysis:

The disturbance of Category-V on 16th April'16 was primarily caused by fault due to lightning strike on 400 kV Bongaigaon – BgTPP (NTPC) I line, which could not be cleared by 400 kV Bongaigaon (PG) end of the line, resulting in tripping of several 400 kV lines at Bongaigaon (PG) from remote ends at 400 kV Binaguri, since as per R-X diagram the fault was lying in the 4th quadrant outside the reach of Distance relay. The empowered committee for analysis of this disturbance noted that there was no differential protection installed on 400 kV Bongaigaon – BgTPP lines although they were short lines of around 3 kms each. Also, the time setting of Zone-II relays at New - Siliguri end of 400 kV Bongaigaon – NewSiliguri Q/C lines were not as per recommendations of V.Ramakrishna Task Force report. Although there are 400 MW of UFR installed in NER Grid, the UFR operation was not sufficient as observed from PMU plots, even though frequency was below 49.2 Hz for several seconds.

Station heat rate of Select Coal/Lignite Stations

Operating Station heat rate for the year 2015-16 reported by select coal/lignite Stations are furnished as follows: -

S.NO	Name of Station	Installed Capacity (MW)	Design Station Heat Rate (kcal/kWh)	2015-16		%Deviation wrt Design Heat Rate
				Generation (MU)	Operating Heat Rate (Kcal/Kwh)	
NORTHERN REGION						
1	Anpara TPS	1630	2347.67	11995.52	2287.58	-2.56
2	Aravali	1500	2261.24	5798.19	2387.45	5.58
3	BARSINGSAR	250	2438.09	1285.57	2563.48	5.14
4	CHHABRA	1000	2335.38	4472.1	2701.27	15.67
5	GNDTPS, Bhatinda	455	2363.38	918.30	2860.65	21.04
6	HARDUAGANJ	665	2330.55	3786.4	2464.00	5.73
7	Hisar	1200	2241.00	4660.58	2381.82	6.28
8	Jalipa Kapurdi(JSW)	1080	2530.50	7211.53	2600.64	2.77
9	Jhajjar	1320	2143.84	4952.18	2226.45	3.85
10	KALISINDH STPS	600	2222.48	5921.00	2602.15	17.08
11	Kota TPS	1240	2337.66	7769.54	2522.15	7.89
12	Lehra Mohabat	920	2222.36	3134.83	2681.71	20.67
13	Nabha	1400	2084.55	7703.26	2244.26	7.66
14	Obra	1278	2472.61	3959.90	2621.57	6.02
15	Panipat	1360	2333.33	1704.9	2494.13	6.89
16	PANKI TPS(Units 3 & 4)	210	2381.50	536.00	3073.93	29.08
17	PARICHA TPP	1140	2323.52	6767.6	2543.35	9.46
18	Ropar(Guru Gobind Singh SuperTP)	1260	2253.27	3959.00	2847.16	26.36
19	Suratgarh S.T.P.S	1500	2299.92	5953.3	2585.08	12.40
20	YAMUNA NAGAR (DCRTPP)	600	2200.46	4056.69	2337.71	6.24
	NORTHERN TOTAL	20615.8	2296.56	96502.71	2484.09	8.17
Western Region						
1	PARLI (TOTAL)	630	2322.08	450.50	2865.33	23.39
2	Akrimota TPS	250	2361.16	1427.39	2714.41	14.96
3	AMARKANTAK	450	2335.39	1785.71	2461.62	5.41
4	AMRAVATI TPS	1350	2368.83	6179.60	2366.12	-0.11
5	Bhilai NSPCL	500	2246.29	3549.64	2437.58	8.52
6	BHUSAWAL	420	2366.59	1728.03	2723.43	15.08
7	CHANDRAPUR (MAHARASHTRA)	2340	2277.93	12164.95	2701.72	18.60
8	DAHANU TPS	500	2204.13	3824.84	2302.43	4.46
9	Dhariwal	500	2214.97	369.15	2538.18	14.59
10	Gandhinagar	870	2335.95	2731.90	2541.00	8.78

S.NO	Name of Station	Installed Capacity (MW)	Design Station Heat Rate (kcal/kWh)	2015-16		%Deviation wrt Design Heat Rate
				Generation (MU)	Operating Heat Rate (Kcal/Kwh)	
11	GMR Warora	600	2238.74	4006.8	2322.81	3.76
12	Kasaipalli	270	2410.69	1906.26	2550.80	5.81
13	KHAPERKHEDA TPS	1340	2241.23	8157.5	2539.91	13.33
14	KORADI TPS	620	2400.12	1846.35	2690.79	12.11
15	Korba East	440	2496.44	2249.99	3178.61	27.33
16	KORBA EAST(DSPM)	500	2248.99	3985.5	2520.06	12.05
17	KORBA WEST HASDEO	840	2398.00	5780.00	2655.27	10.73
18	KUTCH LIGNITE TPS	290	3061.06	1621.4	3041.75	-0.63
19	LANCO AMARKANTAK	600	2229.51	2984.7	2347.50	5.29
20	NASIK TPS	630	2366.59	4327.8	2707.05	14.39
21	PARAS (Extn.)	500	2265.65	3512.4	2443.36	7.84
22	Pathadi	600	2229.51	2990.00	2344.48	5.16
23	Raigarh	1000	2247.95	5169.31	2383.87	6.05
24	RATNAGIRI(JSW)	1200	2150.59	8392.81	2337.33	8.68
25	Salaya	1200	2313.95	4985.8	2369.12	2.38
26	Sanjay Gandhi - Birsinghpur	1340	2421.75	7052.8	2644.05	9.18
27	SATPURA TOTAL	1330	2486.45	5510.13	2816.16	13.26
28	Shree Singaji	1200	2728.47	4250.5	2505.83	-8.16
29	SIKKA	240	2288.72	1177.58	3192.35	39.48
30	Surat Lignite	500	2429.92	3083.78	2415.32	-0.60
31	Tamnar	2400	2235.51	4405.5	2358.11	5.48
32	TORRENT(Sabarmati)	422	2504.59	2411.00	2493.63	-0.44
33	Trombay	250	2192.06	1883.33	2299.76	4.91
34	Ukai	1350	2406.68	5555.01	2633.04	9.41
35	Wanakbori	1470	2343.72	5682.93	2652.35	13.17
	WESTERN TOTAL	28942	2341.28	137429.98	2544.08	8.66
Southern Region						
1	Bellary	1700	2131.89	6109.26	2481.32	16.39
2	ENNORE	340	2587.43	442.31	4149.97	60.39
3	KAKATIYA	500	2159.14	3204.53	2490.89	15.36
4	K'GUEDEM(V&VI),	1000	2209.41	6635.81	2291.37	3.71
5	KOTHAGUNDEM TPS (Units 1 to 8)	720	2502.16	4430.19	2932.33	17.19
6	METTUR	1440	2138.73	9903.23	2489.99	16.42
7	N.TATA RAO / VIJAYWADA TPS	1760	2269.25	12066.23	2438.19	7.44
8	Neyveli (TAQA)	250	2598.20	1476.8	2768.88	6.57
9	NEYVELI -II	1470	2589.58	10583.14	2862.69	10.55
10	NEYVELI TPS I	600	2739.29	3160.61	4118.39	50.35
11	NEYVELI TPS-I-Expansion	420	2476.43	3269.5	2691.09	8.67
12	NORTH CHENNAI TPS	630	2348.05	4448.87	2459.60	4.75

S.NO	Name of Station	Installed Capacity (MW)	Design Station Heat Rate (kcal/kWh)	2015-16		%Deviation wrt Design Heat Rate
				Generation (MU)	Operating Heat Rate (Kcal/Kwh)	
13	RAICHUR TPS	1720	2283.04	11423.48	2495.51	9.31
14	Ramagundam 'B'	62.5	2658.20	399.47	2402.54	-9.62
15	RAYALSEEMA	1050	2221.29	7292.5	2303.36	3.69
16	SIMHAPURI	600	2392.82	4122.9	2700.82	12.87
17	TORANGALLU - I	260	2253.25	2184.70	2263.11	0.44
18	TORANGALLU - II	600	2151.14	4571.46	2253.39	4.75
19	TUTICORIN TPS	1050	2343.94	7082.47	2563.01	9.35
	SOUTHERN TOTAL	16172.5	2317.88	102833.58	2579.56	11.29
EASTERN REGION						
1	Bokaro B	630	2492.44	1859.85	2661.61	6.79
2	Budge Budge	750	2250.84	5793.35	2313.23	2.77
3	Chandrapura (DVC)	890	2295.63	5078.7	2710.66	18.08
4	DPL	555.83	2227.54	1983.4	2984.74	33.99
5	DURGAPUR (DVC)	350	2395.59	904.28	2725.44	13.77
6	DURGAPUR STEEL TPS	1000	2291.42	4440.5	2452.74	7.04
7	Haldia	600	2218.84	3633.3	2429.73	9.50
8	IB Valley TPS	420	2350.37	3117.32	2426.64	3.24
9	JOJOBBERA IMP TPS	360	2321.57	3037.30	2511.67	8.19
10	Kamalanga	1050	2211.06	6234.81	2333.11	5.52
11	Koderma	1000	2291.10	3326.80	2481.58	8.31
12	MAITHON RIGHT BANK	1050	2216.40	7206.2	2345.01	5.80
13	Mejia (DVC)	2340	2265.36	11985.21	2375.48	4.86
15	SANTALDIH	500	2239.87	3702.00	2549.48	13.82
16	Southern Replacement	135	2797.66	531.27	3007.29	7.49
17	TENUGHAT	420	2340.43	2636.7	2749.69	17.49
18	Titagarh	240	2715.12	663.83	2925.05	7.73
	EASTERN TOTAL	12290.83	2294.13	66122.15	2476.98	7.97