Pollution Control Implementation Division – II

Thermal Power Plants

1. Environmental Regulations

A: Coal Based Thermal Power Plants

(i). Standards for discharge of liquid effluents

S. No.	Source	Pollutants	Concentration
(i)	Condenser cooling water (once through cooling system)	pH	6.5-8.5
		Temperature	More than 10°C than the intake water temperature
		Free available Chlorine	0.5 mg/l
(ii)	Boiler blow down	Suspended solids	100 mg/l
		Oil and grease	20 mg/l
		Copper (total)	1.0 mg/l
		Iron (total)	1.0 mg/l
(iii)	Cooling tower blow down	Free available Chlorine	0.5 mg/l
		Zinc	1.0 mg/l
		Chromium	0.2 mg/l
		Phosphate	5.0 mg/l
		Other corrosion inhibiting materials	Limit to be established on case by case basis
(iv)	Ash pond effluent	pH	6.5-8.5
		SS	100 mg/l
		Oil & grease	20 mg/l
			No limits for heavy metals are given at present

Temperature Limit for discharge of Condenser Cooling Water from Thermal Power plant

(a). New thermal power plants commissioned after June 1, 1999.

New thermal power plants, which will be using water from rivers/lakes/reservoirs, shall install cooling towers irrespective of location and capacity. Thermal power plants which will use sea water for cooling purposes, the condition below will apply.

(b). New projects in coastal areas using sea water

The thermal power plants using sea water should adopt suitable system to reduce water temperature at the final discharge point so that the resultant rise in the temperature of receiving water does not

Rise in temperature of condenser cooling water from inlet to the outlet of condenser shall not be more than 10^{O} C.

(c). Guidelines for discharge point:

1. The discharge point shall preferably by located at the bottom of the water body at mid-stream for proper dispersion of thermal discharge.
2. In case of discharge of cooling water into sea, proper marine outfall shall be designed to achieve the prescribed standards. The point of discharge may be selected in consultation with concerned State Authorities/NIO.
3. No cooling water discharge shall be permitted in estuaries or near ecologically sensitive areas such as mangroves, coral reefs/spawning and breeding grounds of aquatic flora and fauna.

(ii). Standards for Water Consumption vide Notification No. S.O. 3305(E) dated 07.12.2015

1. All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption up to maximum of 3.5m3/MWh by 07/12/2017.
2. All existing CT-based plants reduce specific water consumption up to maximum of 3.5m3/MWh by 07/12/2017.
3. New plants to be installed after 1st January,2017 shall have to meet specific water consumption up to maximum of 2.5 m3/MWh and achieve zero waste water discharged.

(iii). (a). Existing Emission Standards

Power generation capacity (MW)	Particulate matter emission
Less than 210 MW	350 mg/Nm^3
210 MW or more	150 mg/Nm^3

Note:

Depending upon the requirement of local situations, which may warrant stricter standards as in case of protected areas the State Pollution Control Board and other implementing agencies within the provisions of the EPA, 1980 may prescribe limit of 150 mg/Nm^3 irrespective of the generation capacity of the plant.

Andhra Pradesh Pollution Control Board and Delhi Pollution Control Committees have stipulated stringent standards of 115 and 50 mg/Nm^3 respectively for control of particulate matter emission.

(iii). (b). New Emission Standards vide Notification No. S.O. 3305(E) dated 07.12.2015

Parameter	Standards
TPPs (units) installed before 31st December, 2003*	
Particulate Matter	100 mg/Nm^3
Sulphur Dioxide (SO_2)	600 mg/Nm^3 (Units Smaller than 500MW capacity units)
	200 mg/Nm^3 (for units having capacity of 500MW and above)

Oxides of Nitrogen (NOx)	600 mg/Nm^3
Mercury (Hg)	0.03 mg/Nm^3(for units having capacity of 500MW and above)
TPPs (units) installed after 1st January,2003, up to 31st December, 2016*	
Particulate Matter	50 mg/Nm^3
Sulphur Dioxide (SO_2)	600 mg/Nm^3 (Units Smaller than 500MW capacity units)
	200 mg/Nm^3 (for units having capacity of 500MW and above)
Oxides of Nitrogen (NOx)	300 mg/Nm^3
Mercury (Hg)	0.03 mg/Nm^3
TPPs (units) to be installed from 1st January, 2017**	
Particulate Matter	30 mg/Nm^3
Sulphur Dioxide (SO2)	100 mg/Nm^3
Oxides of Nitrogen (NOx)	100 mg/Nm^3
Mercury (Hg)	0.03 mg/Nm^3

*TPPs (units) shall meet the limits within two years from date of publication of this notification.

**Includes all the TPPs (units) which have been accorded environmental clearance and are under construction".

(iv). Stack Height Requirement

In order to proper dispersion of SO_2 emissions from thermal power plants, stack height criteria have been adopted in the country. However, for larger capacities of boilers (500 m and above), space provision for installing FGD system has been recommended;

Power generation capacity	Stack height (metre)
Less than 200/210 MW	**H = 14(Q) 0.3** where Q is emission rate of SO_2 in kg/hr, H = Stack height in metre
200/210 MW or less than 500 MW	220
500 MW and above	275

Note:

The power plants sanctioned by CEA earlier to July 1, 1994 may not be required to increase existing stack height as per regulation notified, vide Government of India notification no. GSR 742(E) dated August 30, 1990 subject to following conditions:

- The ambient sulphur dioxide and NOx concentrations around the power plant is less than 1/3th prescribed ambient air quality standard for SO_2 and NOx for the concerned area.
- For (1) the power plant shall install adequate number of air quality monitoring stations in and around the power stations. The stations should be selected in consultation with the CPCB/SPCB.

(Vide office Memorandum No B-34011/1/01/PCI-II dated January 10, 1996)

(v). Use of beneficiated coal

In order to minimize flyash generation, it was recommended to use beneficiated coal in the power plants. The Ministry of Environment & Forests, Govt. of India has promulgated Gazette Notification (G.S.R. 02(E) dated January 02, 2014) on use of beneficiated/blended coal containing ash not more than 34 percent, on quarterly average basis in the following power plants:

- a stand-alone thermal power plant (of any capacity), or a captive thermal power plant of installed capacity of 100 MW or above, located beyond 1000 kilometres from the pit-head or, in an urban area or an ecologically sensitive area or a critically polluted industrial area, irrespective of its distance from the pit-head, except a pit-head power plant, with immediate effect;
- a stand-alone thermal power plant (of any capacity), or a captive thermal power plant of installed capacity of 100 MW or above, located between 750 – 1000 kilometres from the pit-head, with effect from the 1st day of January, 2015;
- a stand-alone thermal power plant (of any capacity), or a captive thermal power plant of installed capacity of 100 MW or above, located between 500-749 kilometres from the pit-head, with effect from the 5th day of June, 2016:

The power plants using Circulating Fluidised Bed Combustion or Atmosphere Fluidised Bed Combustion or Pressurized Fluidised Bed Combustion or Integrated Gasification Combined Cycle technologies or any other clean technologies as may be notified by the Central Government in the Official Gazette are exempted to use beneficiated coal irrespective of their locations.

(vi). Utilisation of Flyash

Ministry of Environment, Forest & Climate Change (MoEF&CC) issued various notifications for better way of utilization of Fly Ash to reduce the requirement of thousands of acres of land for its disposal. First notification by MoEF&CC regarding this was issued on 14th September, 1999 and amendments were made in 2003, 2009 and 2016 vide Notifications dated 27th August, 2003, 3rd November, 2009 and 27th January, 2016 respectively.

Amendments Vide Notification No. S.O 804 (E) dated 3rd November 2009

Vide Notification No. S.O 804 (E) dated 3rd November 2009, timeline for achieving the target of 100% Fly Ash Utilization was the specified for all Coal/Lignite based Thermal Power Stations in the country in a progressive manner. The prescribed targets for the Thermal Power Stations based on their date of commissioning are as follows:

The Thermal Power Stations in operation before the date of 3rd November, 2009 Notification are to

achieve the target of Fly Ash utilization in successive 5 years as: 50% in 1st year; 60% in 2nd; 75% in 3rd; 90% in 4th and 100% in 5th year from the issue of this notification. The new Thermal Power Stations coming into operation after the MoEF's notification (i.e. 3rd November, 2009) are to achieve the target of Fly Ash utilization as: 50% in the 1st year, 70% in 2nd, 90% in 3rd and 100% in 4th year from their date of commissioning.

The criteria (as given below) of minimum Fly Ash content for building materials to qualify as "Fly Ash based products" category were notified.

Sl. No.	Building Materials or Products	Minimum % of Fly Ash by weight
1.	Fly Ash bricks, blocks, tiles, etc. made with Fly Ash, lime, gypsum, sand, stone dust, cement, etc. (without clay).	50% of total raw material.
2.	Paving blocks, paving tiles, checker tiles, mosaic tiles, roofing sheets, pre-cast elements, etc. wherein cement is used as binder.	Usage of PPC (IS-1489: Part 1) or PPC (IS-455) or 15 % of OPC (IS-269/8112/12269) content.
3.	Cement.	15% of total raw materials.
4.	Clay based building materials such as bricks, blocks, tiles, etc.	25% of total raw materials.
5.	Concrete, mortar and plaster.	Usage of PPC (IS-1489: Part 1) or PPC (IS-455) or 15 % of OPC (IS-269/8112/12269) content.

Amendments Vide Notification No. S.O 254(E) dated 27th January 2016

Vide Notification No. S.O 254(E) dated 27th January 2016, for promoting the utilization of Fly Ash, all construction agencies of Central / State / Local Government and private or public sector engaged in the construction of buildings within a radius of 300 km from Coal/Lignite based Thermal Power Stations shall use only Fly Ash based products in every construction project.

For promoting the utilization of Fly Ash, cost of transportation of ash for road construction projects or for manufacturing of ash based products or use as soil conditioner in agriculture activity within a radius of 100 km from a Coal/Lignite based Thermal Power Station shall be borne by such Coal/Lignite based Thermal Power Station and the cost of transportation beyond the radius of 100 km and up to 300 km shall be shared equally between the user and the Coal/Lignite based Thermal Power Station.

Every Coal/Lignite based Thermal Power Station (including Captive/Co-generating Stations) shall, within 3 Months from the date of notification, upload on their website the details of stock of each type of Ash available with them and thereafter shall update the stock position at least once a Month.

B. Gas/ Naphtha based Thermal Power Plants

(i) Emission standards for NOx

(a) For existing units 150 ppm (v/v) at 15% excess oxygen

(b) For new units with effect from 01.06.1999.

Generation capacity of gas turbine	Limit for NOx emission (v/v), at 15% excess oxygen)
(a) 400 MW and above	(i) 50 ppm for the units burning natural gas.
	(ii) 100 ppm for the units burning naphtha
(b) Less than 400 MW but up to 100MW	(i) 75 ppm for the units burning natural gas
	(ii) 100 ppm for the units burning naphtha
(c) Less than 100 MW	100 ppm for units burning natural gas or naphtha as fuel
(d) For the plants burning gas in a conventional boiler.	100 ppm

(ii) Stack height

H in m should be calculated using the formula:

H= 14 Q 0.3,

where Q is the emission of SO_2 in kg/hr, subject to a minimum of 30 metres.

(iii) Liquid waste discharge limit

Parameter	Maximum limit of concentration (in mg/l except for pH and temperature)
pH	6.5 – 8.5
Temperature	As applicable for other thermal power plants
Free available	0.5
chlorine	100
Suspended solids	20
Oil & grease	1
Copper (total)	1
Iron (total)	1
Zinc	0.2
Chromium (total)	5
Phosphate	

C: Liquid fuel based Thermal Power Plants

(i) Emission Standards for Diesel Engines (Engine Rating More Than 0.8 Mw (800 Kw) for Power Plant, Generator Set applications and other requirements

Parameter	Area Category	Total engine rating of the	Generator sets commissioning date

		plant (includes existing as well as new generator sets)	**Before 1/7/2003**	**Between 1/7/2003 and 1/7/2005**	**On or after 1/7/2005**
NOx (as NO_2) (at 15% O_2), dry basis, in ppm	A	Up to 75MW	1100	970	710
	B	Up to 150MW			
	A	More than 75MW	1100	710	360
	B	More than 150MW			
NMHC (as C) (at 15% O_2), mg/Nm^3	Both A and B		150	100	
PM (at 15% O_2), mg/Nm^3 Diesel Fuels - HSD & LDO	Both A and B		75	75	
PM (at 15% O_2), mg/Nm^3 Furnace Oils - LSHS & FO	Both A and B		150	100	
CO (at 15% O_2), mg/Nm^3	Both A and B		150	150	
Sulphur content in fuel	A		<2%		
	B		<4%		
Fuel specification	For A only	Up to 5MW	Only Diesel Fuels (HSD, LDO) shall be used.		
Stack height (for generator sets commissioned after 1/7/2003)	Stack height shall be maximum of the following, in meter: I. 14 Q 03, Q = Total SO2 emission from the plant in kg/hr II. Minimum 6 m above the building where generator set is installed. III. 30 Meters				

Note: 1. Acronyms used

MW: Mega (10^6) Watt, FO: Furnace Oil, NO_X: Oxides of Nitrogen HSD: High Speed Diesel, NO_2: Nitrogen Dioxide, LDO : Light Diesel Oil, O_2 : Oxygen , LSHS : Low Sulphur Heavy Stock, NMHC : Non- Methane Hydrocarbon kPa : Kilo Pascal, C : Carbon, mm : Milli (10^{-3}) metre, PM : Particulate Matter kg/hr : Kilo (10^3) gram per hour, CO : Carbon Monoxide, mg/Nm^3 : Milli (10^{-3}) gram per Normal metre cubic, SO_2 : Sulphur Dioxide , ppmv : part per million (10^6) by volume

2. Area categories A and B are defined as follows

Category A: Areas within the municipal limits of towns/cities having population more than 10 lakhs and also up to 5 km beyond the municipal limits of such towns/cities.

Category B: Areas not covered by category A.

3. The standards shall be regulated by the State Pollution Control Boards or Pollution Control Committees, as the case may be.

4. Individual units with engine ratings less than or equal to 800 KW are not covered by this notification.

5. Only following liquid fuels viz. High Speed Diesel, Light Diesel Oil, Low Sulphur Heavy Stock and Furnace Oil or liquid fuels with equivalent specifications shall be used in these power plants and generator sets.

6. For expansion project, stack height of new generator sets shall be as per total Sulphur Dioxide emission (including existing as well as additional load).

7. For multi engine plants, flues shall be grouped in cluster to get better plume rise and dispersion. Provision for any future expansion should be made in planning stage itself.

8. Particulate Matter, Non-Methane Hydrocarbon and percent moisture (dry basis). Carbon Monoxide results -are to be normalized to 25 0 C, 1.01 Kilo Pascal (760 mm of mercury) pressure and zero

9. Measurement shall be performed at steady load conditions of more than 85% of the rated load.

10. Continuous monitoring of Oxides of Nitrogen shall be done by the plants whose total engine capacity is more than 50 Mega Waft. However, minimum once in six-month monitoring for other parameters shall be adopted by the plants.

11. Following methods may be adopted for the measurement of emission parameters, -

Sl. No.	**Emission Parameters**	**Measurement Methods**
1	Particulates	Gravimetric
2	SO2	Barium Perchlorate- Thorin indicator method
3	NOx	Chemiluminescence, Non Dispersive Infra-Red, Non Dispersive Ultra-violet (for continuous measurement),Phenol disulphonic method
4	CO	Non Dispersive Infra-Red
5	O_2	Paramagnetic, Electrochemical sensor
6	NMHC	Gas Chromatograph - Flame ionisation Detector

2.0 LIST OF THERMAL POWER PLANTS IN INDIA (as on June 30, 2016)

Sl. No.	**Name**	**State**	**Capacity (MW)**
1.	Ramagundem, NTPC	Andhra Pradesh	2600
2.	Vijaywada, APPGCL	-do-	1760
3.	Rayalseema ,APPGCL	-do-	1050

4.	Simhadri, NTPC	-do-	2000
5.	Simhapuri	-do-	450
6.	Thamminapatnam, Meenakshi Energy Pvt. Ltd.	-do-	300
7.	Damodaran Sanjeeviah	-do-	800
8.	Vizag TPP, Hinduja	-do-	520
9.	Kahalgaon, NTPC	Bihar	2340
10.	Muzaffarpur, NTPC	-do-	220
11.	Barh, NTPC	-do-	1320
12.	Nabi Nagar	-do-	250
13.	Korba, NTPC	Chhattisgarh	2600
14.	Korba, EAST CSPGCL	-do-	940
15.	Korba, WEST CSPGCL	-do-	1340
16.	Marwa , CSPGCL	-do-	500
17.	Sipat, NTPC	-do-	2980
18.	Jindal Power	-do-	1000
19.	Tamnar, Jindal Power	-do-	2400
20.	Lanco Amarkantak	-do-	600
21.	Kasaipalli, ACB	-do-	270
22.	D B Power	-do-	1200
23.	Avantha Bandar, KWPCL	-do-	600
24.	Akaltara, Mahanadi Power	-do-	1200
25.	Baradaraha	-do-	600
26.	Salora	-do-	135
27.	Uchpinda, RKM Power	-do-	700
28.	Raikheda, GMR	-do-	1370
29.	Maruti Clean Coal & Power Ltd	-do-	300
30.	SV Power Pvt Ltd, Hardibazar ACB	-do-	60
31.	SCPL Ratija	-do-	50
32.	ACBIL Chakabura	-do-	60
33.	Badarpur,NTPC	Delhi	705
34.	Rajghat, IPPGCL	-do-	67.5
35.	Gandhinagar, GSPCL	Gujarat	870
36.	Ukai, GSPCL	-do-	1350
37.	Wanakbori, GSPCL	-do-	1470
38.	Sabarmati, AEC	-do-	422
39.	Sikka, GSPCL	-do-	740
40.	Kutch Lignite, GSPCL	-do-	290

41.	Surat Lignite	-do-	500
42.	Adani, Mundra	-do-	4620
43.	Mundra, Tata Power, Coastal	-do-	4150
44.	ESSAR Power, Hazira	-do-	270
45.	Akrimota, GMDC	-do-	250
46.	Panipat, HPGCL	Haryana	1368
47.	Rajeev Gandhi, Hissar	-do-	1200
48.	Indira Gandhi, Jhajhar	-do-	1500
49.	Mahatma Gandhi,CLP Jhajhar	-do-	1320
50.	Yamunanagar, HPGCL	-do-	600
51.	Bokaro, B, DVC	Jharkhand	338
52.	Tenughat,	-do-	420
53.	Patratu, JhSEB	-do-	770
54.	Chandrapura, DVC	-do-	890
55.	Koderma,	-do-	1000
56.	Mathon,DVC	-do-	1050
57.	Mahadeo Prasad STPP, Adhunik Power	-do-	540
58.	JOJOBERA T.P.CO.	-do-	547.5
59.	Bokaro A Expn	-do-	500
60.	Raichur, KPCL	Karnataka	1720
61.	Bellari, KPCL	-do-	1700
62.	Torangullu-1 & 2 JSW	-do-	860
63.	Udipi, Adani	-do-	1200
64.	Amarkantak, MPPGCL	Madhya Pradesh	210
65.	Birsingpur, MPPGCL	-do-	1340
66.	Satpura, MPPGCL	-do-	1330
67.	Vindhyachal, NTPC	-do-	4760
68.	Sasan, RPL	-do-	3960
69.	Mahan, Essar Power	-do-	1200
70.	Bina, J P Power	-do-	500
71.	SHREE SINGAJI MPPGCL	-do-	1200
72.	Nigrie, J P Associates	-do-	660
73.	Seioni	-do-	600
74.	Annupur	-do-	600
75.	Trombay, Tata Power	Maharashtra	750
76.	Khaperkheda, Mahagenco	-do-	1340
77.	Nasik, Mahagenco	-do-	630

78.	Koradi ,Mahagenco	-do-	620
79.	Bhusawal, Mahagenco	-do-	1420
80.	Chandrapur, Mahagenco	-do-	2340
81.	Paras, Mahagenco	-do-	500
82.	Parli, Mahagenco	-do-	1130
83.	Dahanu,REL	-do-	500
84.	Sai Wardha, Warora	-do-	540
85.	JSW Ratnagiri, Nandiwade	-do-	1200
86.	Salaya,ESSAR	-do-	600
87.	Mihan, Abhijeet	-do-	246
88.	Mouda, NTPC	-do-	1000
89.	Bela, Purti Grpoup	-do-	270
90.	Amarawati, IndiaBulls Power	-do-	1350
91.	Nashik, Indiabulls Realtech	-do-	270
92.	EMCO Warora, GMR	-do-	600
93.	Butibori, Vidarbha Ind. Power	-do-	600
94.	Tirora, Adani Power	-do-	3300
95.	Dhariwal, Dhariwal Infrast. Ltd	-do-	600
96.	GEPL TPP Gupta Energy Pvt. Ltd	-do-	120
97.	Sesa Sterlite, Jharsuguda	Odhisha	2400
98.	Kamalanga, GMR	-do-	1050
99.	Talcher,Kaniha,NTPC	-do-	3000
100.	Talcher, NTPC	-do-	460
101.	IB Valley, Jharsuguda	-do-	420
102.	Derang , JIPL	-do-	1800
103.	Ind Bharath	-do-	350
104.	Bhatinda, PPCL	Punjab	460
105.	Ropar PPCL	-do-	1260
106.	Lehra Mohabbat,PPCL	-do-	920
107.	Rajpura	-do-	1400
108.	Talwandi sabo	-do-	1980
109.	Goindwal Sahib	-do-	540
110.	Kota, RRVUNL	Rajasthan	1240
111.	Suratgarh, RRVUNL	-do-	1500
112.	Chhabra, RRVUNL	-do-	1000
113.	Barsing sagar lignite, NLC	-do-	250
114.	Giral	-do-	250
115.	Jalippa-Kapurdi, Raj West Power	-do-	1080

116.	Kalisindh TPP, RRVUNL	-do-	1200
117.	Kawai, Adani power	-do-	1320
118.	Ennore, Tangedco	Tamilnadu	340
119.	Tuticorin , Tangedco	-do-	1050
120.	North-Chennai, Tangedco	-do-	1830
121.	Mettur, Tangedco	-do-	840
122.	Mettur Extn. Tangedco	-do-	600
123.	Neyveli Lignite, NLC	-do-	2490
124.	Vallur, NTPC	-do-	1500
125.	TAQA Neyveli (ST-CMS)	-do-	250
126.	Mutiara, Coastal Energy	-do-	1200
127.	Ind Bharath Thermal Power Ltd, Tuticorin	-do-	300
128.	Rammagundam B, TSGENCO	Telangana	62.5
129.	Kothagudem, TSGENCO	-do-	1720
130.	Kakatiya. TSGENCO	-do-	1100
131.	Singrauli, NTPC	Uttar Pradesh	2000
132.	Anpara, UPVUNL	-do-	2630
133.	NCTPS, Dadri, NTPC	-do-	1820
134.	Rihand, NTPC	-do-	3000
135.	Unchahar, NTPC	-do-	1050
136.	Tanda, NTPC	-do-	440
137.	Paricha, UPVUNL	-do-	1140
138.	Obra A&B, UPVUNL	-do-	1288
139.	Harduaganj, UPVUNL	-do-	665
140.	Panki, UPVUNL	-do-	210
141.	Rosa, RPL	-do-	1200
142.	Barkhera, Piliphit, Bajaj Energy	-do-	90
143.	Khambarkhera, Lakhimpur, Bajaj Energy	-do-	90
144.	Kundakki, Bajaj Energy	-do-	90
145.	Utraula, Balarampur, Bajaj Energy	-do-	90
146.	Maqsoodpur, Shahjahnpur, Bajaj Energy	-do-	90
147.	Anpara C, Lanco power	-do-	1200
148.	Lalitpur, Bajaj Energy	-do-	660
149.	Anpara D	-do-	500
150.	Farakka, NTPC	West Bengal	2100

151.	Budge-Budge, CESCL	-do-	750
152.	Mezia, DVC	-do-	2340
153.	Southern, CESCL	-do-	135
154.	Barkeshwar, WBPDCL	-do-	1050
155.	Durgapur, DVC	-do-	350
156.	Titagarh, CESCL	-do-	240
157.	Santaldih, WBPDCL	-do-	980
158.	Sagardighi, WBPDCL	-do-	600
159.	Durgapur Projects Ltd.	-do-	690
160.	Kolaghat, WBPDCL	-do-	1260
161.	Bandel, WBPDCL	-do-	450
162.	Rughunathpur, DVC	-do-	1200
163.	Haldia, Coastal Energen	-do-	600

3. Fly ash Utilisation

(i) State wise status of coal consumption & fly ash utilisation during year 2015-2016

The state wise status of Fly Ash Generation & Utilization for year 2015 – 2016 on the basis of data received by the 115 Coal/Lignite based Thermal Power Stations is given in the table below:

Sl. No.	Name of State	No. of TPP's	Installed Capacity (MW)	Coal Consumed (MT)	Fly Ash Generation (MT)	Fly Ash Utilization (MT)	Percentage Utilization %
1.	Andhra Pradesh	04	7410	38.1748	12.2644	9.8536	80.34
2.	Bihar	03	3820	15.7945	6.3445	2.1750	34.28
3.	Chhattisgarh	12	12290	43.0630	17.7412	5.7226	32.25
4.	Delhi	01	705	1.71	0.5120	0.6679	130.45
5.	Gujarat	11	14932	38.8597	6.4856	6.2851	96.91
6.	Haryana	05	5988	23.8097	5.1998	5.7468	110.52
7.	Jharkhand	06	4365.5	16.1176	6.7107	6.1373	91.45
8.	Karnataka	03	3760	9.75	1.8687	1.0843	58.02
9.	Madhya Pradesh	07	14000	61.5077	17.4533	4.6570	26.68

10.	Maharashtra	15	16470	59.6207	19.0410	12.9816	68.18
11.	Orissa	05	7330	33.7217	12.7150	6.1038	48.00
12.	Punjab	04	4620	7.9076	2.7175	2.3122	85.04
13.	Rajasthan	07	7590	27.4533	7.1902	6.6011	91.81
14.	Tamilnadu	07	6650	39.4013	5.7413	6.4212	111.84
15.	Telangana	02	2820	6.6313	2.4005	0.8664	36.09
16.	Uttar Pradesh	14	12658	54.7443	19.4478	9.3163	47.90
17.	West Bengal	09	8375	30.5953	12.1290	10.4801	86.40
	Total	**115**	**133843.50 MW**	**508.8627 MT**	**158.8403 MT**	**97.4365 MT**	**61.34%**

(ii) Fly ash utilisation of captive power plants during year 2015-16

Sl. No.	Name	State	Capacity (MW)	Total Ash Gen. (MT)	Total Ash Utilization (MT)	% Ash Utilization in 2015-16
1	Nava Bharat Energy India Ltd	A.P	150	0.4585	0.4585	100%
2	Jindal Steel & Power, Dongamahua	C.G	576	1.6	1.6093	101%
3	Jindal Steel & Power, Patarpali	C.G	110	0.5495	0.5495	100%
4	Ultratech Cement Ltd, Rawan	C.G	80	0.1088	0.1118	103%
5	Indian Rayon, Aditya Birla	Gujarat	34.5	0.469	0.469	100%
6	Tata Steel Ltd, West Bokaro Division	Jharkhand	20	0.137	0.137	100%
7	JK Cements, Muddapur	Karnataka	50	0.03392	0.03392	100%
8	Mysore Paper Mills Ltd	Karnataka	41	0.03095	0.03095	100%
9	Vasavdatta Cement, Birla Shakti	Karnataka	79.2	0.1521	0.1521	100%
10	Grasim Industries Ltd, Ujjain	M.P	95	0.1724	0.1724	100%
11	Bilt Graphic Paper Products Ltd	Maharashtra	60	0.0564	0.0564	100%
12	Finolex Pipes	Maharashtra	43	0.00566	0.00566	100%
13	Hindalco Industries Ltd, Hirakud	Orissa	467.5	0.897	0.512	57%
14	NALCO CPP, Angul	Orissa	1200	2.2001	1.4634	67%

15	NALCO, Damanjodi	Orissa	74	0.6036	0.5956	99%
16	JK Cements, Chittorgarh	Rajasthan	47	0.04703	0.04703	100%
17	Shriram fertilizers & Chemicals	Rajasthan	125.3	0.2614	0.2544	97%
18	Hindalco Industries Ltd, Renusagar	U.P	820	1.786	1.0356	58%
19	IFFCO Ltd, Allahabad	U.P	30.5	0.975	0.984	101%
	Overall		**4103 MW**	**10.54436 MT**	**8.67856 MT**	**82%**

4.0 Reports/guidelines

4.1 Protocol for sampling, analysis of coal and reporting of compliance in respect of implementation of the Gazette notification on use & supply of beneficiated coal in thermal power plants

This protocol presents the protocol for sampling, analysis of coal and reporting of compliance on quarterly basis with respect to ash content in coal to be supplied and used by the thermal power plants covered under the provisions of the Gazette notification GSR 02 (E) dated January 02, 2014 on supply and use of beneficiated coal in thermal power plants. The objective is to ensure compliance of the quality of coal with respect to ash content, supplied and used by thermal power plants. The data generated shall help in evaluation of compliance level of the notification.

4.2 Guidelines for loading, unloading and nuisance free transportation of all types of flyash, including bottom ash etc. generated by thermal power stations

As per the 2009 Notification on flyash utilisation, transportation of flyash should be in an **environmentally sound manner.** Flyash is categorised as high volume low effect waste under Hazardous Waste (Management & Handling) Rules, 2008 (S.O. 2265(E) dated September 24, 2008) and thus excluded from the category of Hazardous waste. The guidelines for transportation of flyash were prepared for minimising fugitive emissions during loading, unloading and making nuisance free transportation of all types of flyash, including bottom ash etc. generated by thermal power stations.