

# NEW ENVIRONMENTAL NORMS FOR THERMAL POWER STATIONS IN INDIA

# INDIA AIMING EMISSION REDUCTION IN POWER SECTOR

In continuing efforts to safeguard the environment and reduce emissions from power sector, India has made the following commitments in COP 21:

- ▶ India intends to reduce the emissions intensity of its GDP by 33 to 35 % by 2030 from 2005 level.
- ▶ To achieve about **40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources** by 2030 with the help of transfer of technology and low cost international finance.
- ▶ Introducing new, more efficient and cleaner technologies in thermal power generation.

Further, to reduce emissions from Thermal Power Stations, Ministry of Environment, Forest and Climate Change has also issued new environmental norms in December 2015 regarding Suspended Particulate matter (SPM), SO<sub>x</sub>, NO<sub>x</sub>, Mercury. Norms for specific water consumption by Thermal Power Stations have also been notified to conserve water.

The present installed capacity of coal based thermal power plants is 1,85,172 MW as on 31.03.2016 and 72,355 MW is under construction which is likely to be affected by the new norms.

# EXISTING EMISSION NORMS FOR TPS

Emission parameter	Limiting Values
Suspended Particulate Matter (SPM)	<p>Less than 210 MW (1989) : 350 mg/Nm<sup>3</sup> 210 MW or more(1989) : 150 mg/Nm<sup>3</sup></p> <p>The above limits were further reduced to 100 mg/Nm<sup>3</sup> in 2003 under Corporate Social Responsibilities.</p> <p>Limit of 50 mg/Nm<sup>3</sup> is being specified on case to case basis depending on the area</p>
NO <sub>x</sub>	None for coal based stations
SO <sub>x</sub>	<p>None, stack provided for dispersion &lt;500 MW - 220 m ≥500 MW - 275 m FGD space provision for units size 500 MW and above.</p>

# NEW EMISSION NORMS NOTIFIED ON 07.12.2015

Emission parameter	TPPs (units) installed before 31 <sup>st</sup> December, 2003	TPPs (units) installed after 31 <sup>st</sup> December 2003 and upto 31 <sup>st</sup> December 2016	TPPs (units) to be installed from 1 <sup>st</sup> January 2017
Particulate Matter	100 mg/Nm <sup>3</sup>	50 mg/Nm <sup>3</sup>	30 mg/Nm <sup>3</sup>
Sulphur Dioxide (SO <sub>2</sub> )	600 mg/Nm <sup>3</sup> for units less than 500MW capacity  200 mg/Nm <sup>3</sup> for units 500MW and above capacity	600 mg/Nm <sup>3</sup> for units less than 500MW capacity  200 mg/Nm <sup>3</sup> for units 500MW and above capacity	100 mg/Nm <sup>3</sup>
Oxides of Nitrogen (NO <sub>x</sub> )	600 mg/Nm <sup>3</sup>	300 mg/Nm <sup>3</sup>	100 mg/Nm <sup>3</sup>

To be complied within 2 years by existing stations and w.e.f 01.01.2017 for plants under construction

## NEW WATER NORMS NOTIFIED ON 07.12.2015

Sl No.	MoEF&CC WATER NORMS FOR THERMAL POWER PLANTS
1.	All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption of 3.5 m <sup>3</sup> /MWh within 2 years of notification.
2	All existing CT based plants shall reduce specific water consumption up-to maximum of 3.5 m <sup>3</sup> /MWh within a period of 2 years of notification.
3.	New plants to be installed after 1 <sup>st</sup> January 2017 shall have to meet specific water consumption of 2.5 m <sup>3</sup> /MWh and achieve zero water discharge.

## INSTALLED CAPACITY (MW) AS ON 31-03-2016

Type	Capacity	Share (%)
Hydro	42783.42	14.35%
Thermal	210675.04	70.68%
Coal	185172.88	62.13%
Gas	24508.63	8.22%
Diesel	993.53	0.34%
Nuclear	5780.00	1.94%
Renewable	38821.52	13.02%
Total	298059.97	100.00%

**THERMAL GENERATION > 80% of total generation**

## UNIT WISE BREAK UP OF INSTALLED CAPACITY (MW)

UNIT CAPACITY MW	BEFORE 31.03.2003 (MW)	NO OF UNITS	01.01.2004 ONWARDS (MW)	NO OF UNITS	TOTAL MW
60-110 MW	6875	77	258	4	7133
111-250 MW	39277	198	17211	81	56488
251-499 MW	0	0	12690	43	12690
500 MW	13500	27	27500	55	41000
>500 MW	0	0	61640	96	61640
TOTAL	59652	302	119299	279	178951

\* UNITS BELOW 60 MW NOT INDICATED IN ABOVE TABLE

# MAJOR TECHNICAL ISSUES FOR THERMAL PLANTS

## SUSPENDED PARTICULATE MATTER (SPM)

- ▶ Retro-fitting of additional fields in ESP/ replacement of ESP etc. required to achieve the proposed norms in existing plants.
- ▶ There may be space constraints in modification in ESP area in the existing plants. A capacity of around 60 GW (302 Units) may have such space problems while retrofitting equipment to meet revised environmental norms.

## SULPHUR DIOXIDE (SO<sub>x</sub>)

- ▶ FGD system would need to be installed to meet the amended norms regarding SO<sub>x</sub> control for all categories of existing plants as well as plants under construction.
- ▶ Units of less than 500 MW size and some older 500 MW units face layout problems for installation of FGD system due to non-availability of space. A capacity of around 90 GW (430 units) is facing problem due to non-availability of space for FGD.
- ▶ A capacity of around 90 GW (151 units) of existing plants and 72 GW (73 units) of plants under construction would require installation of FGD plant.



# MAJOR TECHNICAL ISSUES FOR THERMAL PLANTS

## OXIDES OF NITROGEN (NO<sub>x</sub>)

- ▶ The proposed standards of 600 mg/Nm<sup>3</sup> (302 existing units) would require modification of the combustion process using low NO<sub>x</sub> burners
- ▶ The proposed standards of 300 mg/Nm<sup>3</sup> and 100 mg/Nm<sup>3</sup> would require installation of de-nitrification systems like Selective Catalytic Reduction(SCR) systems.
- ▶ Lay -out issues for installation of DeNO<sub>x</sub> system in the existing units.
- ▶ The globally available SCR system for NO<sub>x</sub> control are not proven for Indian coal having high ash contents.
- ▶ A pilot project for demo at 500 MW unit with SCR system would have to be installed to ascertain its efficacy in removal of NO<sub>x</sub> emissions with domestic coal having high as content of the order of 40%.
- ▶ A capacity of around 120 GW (279 units) of existing plants and 72 GW (73 units) of under construction plants may require installation of SCR systems to meet new norms.

**THANK YOU**