सत्यमेव जयते	**ADVICE ON FGD TECHNOLOGY SELECTION FOR DIFFERENT UNITS SIZE (FROM 01st NOVEMBER ONWARDS)**	केविप्रा CEA

BRIEF REVIEW OF THE NEW MoEF&CC ENVIRONMENTAL RULES

MoEF&CC notification dated 7th December-2015 amended the existing norms related to emission of SPM and introduced new norms for emission of SO_2, NO_x and Mercury form Thermal Power Plants (TPPs). It also specified modified limits for specific water consumption by TPPs and insisted to convert existing once through based condenser cooling system to recirculation type. Different limits are specified based on capacity of power plant and year of installation. A summary of new regulations on air emission is given below:

NEW REGULATIONS ON EMISSION

Date of installation	PM	SO_2	NOx	Mercury (Hg)
Before 31-12-2003	100mg/Nm^3	600 mg/Nm^3 for <500MW 200 mg/Nm^3 for > = 500 MW	600 mg/Nm^3	0.03 mg/ Nm^3 For>= 500 MW
After 01-01-2004 & Up to 31-12-2016	50 mg/Nm^3	600 mg/Nm^3 for < 500 MW 200 mg/ Nm^3 for >= 500 MW	450* mg/ Nm^3	0.03 mg/Nm^3
On or after 01-01-2017	30mg/Nm^3	100 mg/Nm^3	100 mg/ Nm^3	0.03 mg/ Nm^3

** NOx norm of 300 mg/Nm^3 was revised to 450 mg/Nm^3 by MoEF&CC vide Gazette Notification dated 19th October, 2020.*

SUMMARY OF NEW REGULATIONS ON WATER USE

Sl. No.	New requirement
1.	All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption up to maximum of 3.5 m^3/MWh within a period of two years from the date of publication of notification.
2	All existing CT- based plants reduce specific water consumption up to maximum of 3.5.m^3/ MWh within a period of two years from the date of publication of notification.

3	Specific water consumption shall not exceed maximum of 3.0 m^3/MWh** for new plants installed after the 1st January 2017 and these plants shall also achieve zero waste water discharge.
4	Seawater based plants are exempted form conversion of once through to cooling Tower based system.**

Stack Height post FGD installation:**

Sl. No.	Industry	Parameter	Standards	Remarks
1	Thermal Power plants with Flue gas Desulphurization (FGD)	Stack Height/Limit in Meters	Power Generation capacity: 100MW and above H= 6.902 (Q X 0.277) $^{0.555}$ Or 100 m Whichever is more	
			Less than 100 MW H= 6.902 (Q X 0.277) $^{0.555}$ or 30 m Whichever is more Q= Emission rate of SO_2 in Kg/hr* H= Physical stack height in meter *Total of the all units connected to stack Note: These standards shall apply to coal/lignite based Thermal Power Plant.	

- All monitored values for SO_2 and NO_x shall be corrected to 6% Oxygen, on dry basis.

*** As per amendment notification issued by MOEF&CC dated 28th June 2018 for stack height post FGD and water Consumption.*

TECHNOLOGY SELECTION

There are various technologies which are in use for De-SOx treatment of flue gases from thermal power plants. At the time of introduction of FGD technologies in India, when FGD technology was in nascent stage for Indian power sector, only a few technologies for De-SOx were advised. However with the exposure and practical experience of technology developers over the years, some new FGD technologies have been introduced, and many more may be introduced in future.

Following factors shall be considered before finalization of FGD technology:

1. SO_2 removal efficiency
2. Units size
3. Balance Plant life
4. Geographical location of Thermal Power plant
5. Production of secondary pollution by FGD technology like SPM, CO_2 (Greenhouse Gases) etc.
6. Byproduct Handling / Sale
7. Water consumption

It is advised that before deciding on which technology is to be selected for FGD installation, the utilities may conduct their own techno-economic feasibility study as well as "Life Cycle Cost Based Analysis" on available FGD Technologies in the market, considering the above mentioned parameters. It is also advised that while finalizing the technology for FGD implementation, environmental friendliness such as direct and indirect GHG emissions and water consumption etc. may also be considered.

The techno-economic "Life Cycle Cost Based Analysis" along with the feasibility/viability study of employing a technology for control of SO_2 emissions may include but not limited to the following parameters:

a) Average PLF of the Unit
b) Required efficiency of the FGD system
c) Balance operating life
d) CAPEX & OPEX (Including Reagent Consumption if any)
e) Byproduct handling / Sale (if any)
f) Water Consumption

Geographical factors of Plants:

While choosing FGD technologies for Thermal power plants, Geographical location of the plant is a critical factor i.e. Plant located on sea coast may prefer for Sea based FGD technologies and similarly, distance & availability of reagent should also be looked into. Other plant specific requirements may be considered for Life cycle costing keeping OPEX in consideration.

The above mentioned factors needs to further evaluated before finalization of technology for a thermal power plant since every plant have specific requirements which needs to be evaluated on case to case basis such as:

a. Coal Quality, sulphur content
b. Unit size and no. of units
c. Space availability at plant
d. Availability of reagent and purity level of reagent
e. Disposal / Sale of by product
f. Balance plant Life
g. Auxiliary Power Consumption
h. Life cycle costing
i. Availability of water
j. Efficiency of FGD system
k. Consideration of New stack/Modification of stack.
l. PLF of plant
m. Tariff Impact