

No. 23/22/2018-R&R
Government of India
Ministry of Power

Shram Shakti Bhawan, Rafi Marg,
New Delhi, 18th October, 2018

To

1. Chairman/CMDs for all PSUs under administrative control of Ministry of Power.
2. CMDs/MDs of DISCOMs/GENCOs/TRANSCO of all State Governments.
3. DG, Association of Power Producers, New Delhi.

Subject: Regarding New Environmental Norms for coal based Thermal Power Plants (TPPs).

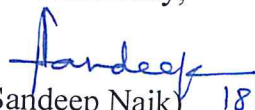
Sir/Madam,

I am directed to forward herewith a copy of CEA's letter no. 7/X/VIP/GM/2018/1517-20 dated 26.09.2018 on the aforementioned subject.

2. It is requested to provide your comments, if any, to this Ministry urgently latest by 26.10.2018. The comments may also be emailed at sandeep.naik68@gov.in and debranjan.chattopadhyay@nic.in.

Yours faithfully,

Encl: As above


(Sandeep Naik) 18/10/18
Director
Tel: 2371 5250

Copy to: PPS to Secretary (Power), PPS to AS(R&R), PS to Chief Engineer(R&R),
PS to Director (R&R)

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
ग्रिड प्रबंधन प्रभाग
Grid Management Division

Subject: Recommendations regarding Incentives to thermal power plants for early installation of pollution control equipment.

As per phasing plan submitted by CEA, installation of pollution control equipment in the thermal power plants has been planned from 2018 to 2022. It is felt that incentivizing installation of pollution control equipment will motivate the power generators to complete the installation on time or even earlier and will help in reduction in environment pollution. However, power generators had raised their concern that early installation of pollution control equipment is disadvantageous to them as it leads to increase in variable cost which results in their lower ranking in merit order dispatch (MOD). A meeting was held on 23.01.2018 & 11.07.2018 under the chairmanship of Member (Thermal), CEA with the RPCs and concerned divisions of CEA to discuss incentives which may be given to thermal power plants (TPPs) for early installation of pollution control equipment in existing as well as under construction TPPs. Based on the decision taken at this meeting, issue of incentivizing thermal power plants for early installation of pollution control equipment was also discussed within RPCs as well.

Keeping in view the discussions held at the above meetings, the following measures are recommended to incentivize early installation of pollution control equipment by the TPPs:

- a. The variable cost of TPPs installing FGD and other pollution control equipment as per the timelines in the notice of CPCB would continue to remain same as that before installation of pollution control equipment for the purpose of Merit Order Dispatch (MOD), i.e. the increased Variable Cost because of installation of pollution control equipment would not be considered, in preparation of stack for merit order dispatch. However, payment to the TPP for the energy scheduled would be based on actual variable cost.
- b. For already compliant plant, incremental O&M charges due to pollution control equipment would be deducted from the variable charges of such plant for the purpose of deciding its location in the merit order. The normative impact of FGD on variable charges of electricity

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tariff (ex-bus) in a broad manner at current price level has been worked out and the same is indicated below:

Wet lime stone based FGD	Pit head station	Load centre station
Sub critical power plant units (with motor driven boiler feed pumps)	Paise 4.31 /kWh	Paise 6.68 /kWh
Super critical power plant units (with turbine driven boiler feed pumps)	Paise 3.74 /kWh	Paise 5.77 /kWh

Sea water based FGD (costal plants)

Sub critical power plant units (with motor driven boiler feed pumps)	Paise 3.17 /kWh
Super critical power plant units (with turbine driven boiler feed pumps)	Paise 2.71 /kWh

(Assumptions considered in the evaluation of normative impact of FGD implementation in variable charges are enclosed at Annexure – 1)

The above mentioned incremental O&M charges would also be worked out by each compliant TPP and submitted to the appropriate Electricity Regulatory Commission (ERC) & RPC within a period of one month. The incremental O&M charges arrived at by the plant or the normative incremental charges worked out above, whichever is less, would be deducted from the notified/adopted variable charges for the purpose of deciding the location of TPP in the merit order list. The TPP would not be eligible for the above benefit of reduced variable charges if it fails to submit the aforesaid calculations within the prescribed period.

After determination of incremental O&M charges by the ERC, such charges would be used for the above purpose.

- c. The TPP, which does not complete installation of Pollution Control Equipment as per the schedule given in the notice of CPCB, may be taken to the bottom of MOD until it installs FGD and other pollution control equipment and becomes compliant to new environmental norms.
- d. Meeting NO_x norms of 300 mg/Nm³ (before 01.01.2017) and 100 mg/Nm³ (w.e.f. 01.01.2017) requires installation of Selective Non-Catalytic Reduction /Selective Catalytic Reduction systems, for which pilot studies have been undertaken for their suitability to

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local conditions. Till issues related to NOx norms get settled, uniform value of NOx of 450 mg/Nm³ may be considered for assessing compliance by the TPPs.

- e. The priority to the environmental norms compliant TPPs may be continued until December 2022 and beyond until all the TPPs are compliant to new environmental norms.
- f. Soft loans may be provided to Central/ State Generating Stations from NCEF for installation of pollution control equipment. This is going to help State utilities in particular.
- g. Excise duty/ GST may be waived/reduced for pollution control equipment like FGD etc.

Ministry of Power may like to consider the above recommendations for implementation through Forum of Regulators/Ministry of Finance with a view to incentivizing early installation of FGD/ other pollution control equipment by the thermal power stations.

In this connection, it may be worth mentioning that a case regarding implementation of new environmental norms is pending before the Hon'ble Supreme Court in the form of Appeal No. WP (C) No. 13029/1985 (M C Mehta v. Union of India).

This issue with the approval of the Member (GO&D), CEA.


(Vikram Singh)

Director

Joint Secretary (Thermal), Ministry of Power

No. 7/X/VIP/GM/2018

Date: 26.09.2018

Normative impact of FGD installation & operation (pollution control measure) on variable charges of electricity tariff of Thermal Power Plants

Normative impact of FGD installation & operation on variable charges of electricity tariff has been estimated considering wet limestone FGD and sea water FGD which are two most commonly used type of FGDs for control of SO_x emission from thermal power plants.

The inputs/ assumptions considered in the evaluation of normative impact of FGD implementation in variable charges are as below:

Sl. No.	Description	Normative value
i)	Normative gross unit heat rate:	: 2450 kcal/kWh for sub-critical units (with motor driven BFPs- MDBFPs)
		: 2250 kcal/kWh for super-critical units (with turbine driven BFPs- TDBFPs)
ii)	Normative auxiliary power consumption	: 9% for sub-critical units
		: 5.75% for super-critical units
iii)	Normative specific oil consumption	: 0.5 ml/kWh
iv)	GCV of coal	: 3800 kcal/kg
v)	Sulphur content of coal	: 0.4%
vi)	Landed cost of coal	: Rs. 2000 per ton or pit head station
		: Rs. 4000 per ton for load centre station and coastal location
vii)	GCV of oil	: 10000 kcal/l
viii)	Landed cost of oil	: Rs. 40000 per kl
ix)	SO ₂ removal efficiency of FGD system	: 90%
x)	Normative auxiliary power consumption of FGD	: 1.5% for wet limestone FGD
		: 1% for sea water FGD
xi)	Sulphur to SO ₂ conversion factor	: 0.95
xii)	Stoichiometric ratio for limestone consumption	: 1.05
xiii)	Purity of limestone	: 85%
xiv)	Landed cost of limestone	: Rs. 2000 per ton

For the inputs/ assumptions as above, the normative impact of FGD implementation on variable charges of electricity tariff at Ex Bus of the power plant at current level works out as below:

A. Wet limestone FGD:

	<u>Pit head station</u>	<u>Load centre station</u>
Sub- critical power plant units (with MDBFPs) :	Paise 4.31/kWh	Paise 6.68/kWh
Super- critical power plant units (with TDBFPs):	Paise 3.74/kWh	Paise 5.77/kWh

Notes:

- i) Impact of limestone cost: The above impact has been evaluated considering landed cost of limestone as Rs. 2000 per ton. The impact of energy charge shall increase (or decrease) by

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about paise 0.45/kWh for every Rs. 500 per ton increase (or decrease) in landed cost of limestone cost w.r.t. Rs. 2000 per ton.

- ii) Impact of sulphur content in coal: The above impact has been evaluated considering sulphur content of coal as 0.4%. The impact of energy charge shall increase (or decrease) by about paise 0.45/kWh for every 0.1% point increase (or decrease) in sulphur content of coal w.r.t. 0.4%.
- iii) Impact of TDBFPs/ MDBFPs: The above impact has been evaluated considering sub- critical units with MDBFPs and super- critical units with TDBFPs.
- iv) In case of load centre location, if a sub- critical unit is provided with TDBFPs (or a super- critical unit is provided with MDBFPs), the impact of energy charge shall reduce (or increase) by about paise 0.16/kWh from that indicated above.
- v) In case of pit head location, if a sub- critical unit is provided with TDBFPs (or a super- critical unit is provided with MDBFPs), the impact of energy charge shall reduce (or increase) by about paise 0.09/kWh from that indicated above.

B. Sea water FGD:

In this case, the normative impact of FGD implementation on variable charges of electricity tariff at Ex Bus of the power plant at current level works out as below:

Sub- critical power plant units (with MDBFPs)	:	Paise 3.17/kWh
Super- critical power plant units (with TDBFPs)	:	Paise 2.71/kWh

Note:

- i) Impact of TDBFPs/ MDBFPs: The above impact has been evaluated considering sub- critical units with MDBFPs and super- critical units with TDBFPs.
- (ii) In case of coastal location, if a sub- critical unit is provided with TDBFPs (or a super- critical unit is provided with MDBFPs), the impact of energy charge shall reduce (or increase) by about paise 0.10/kWh from that indicated above.

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