CENTRAL ELECTRICITY REGULATORY COMMISSION
NEW DELHI

Petition No. 67/MP/2020
and
Petition No.515/MP/2020

Coram:

Shri P. K. Pujari, Chairperson
Shri I. S. Jha, Member
Shri A. K. Goyal, Member
Shri Pravas Kumar Singh, Member

Date of Order : 30.07.2021

Petition No. 67/MP/2020

In the matter of:

Petition under Section 79 of the Electricity Act, 2003 read with Regulation 29 of the Central Electricity Regulatory Commission (Terms and Condition of Tariff) Regulations, 2019 for approval of ACE on installation of various Emission Control Systems at Sipat Super Thermal Power Station Stage-I (3x660 MW) in compliance of Ministry of Environment and Forests and Climate Change, Government of India Notification dated 7.12.2015.

And in the matter of:

NTPC Ltd.,
NTPC Bhawan,
Core-7, Scope Complex,
7, Institutional Area, Lodhi Road,
New Delhi-110003. **…. Petitioner**

Vs

1. Madhya Pradesh Power Management Company Ltd. (MPPMCL),
   Shakti Bhawan,
   Vidyut Nagar, Jabalpur-482008.

2. Maharashtra State Electricity Distribution Company Ltd. (MSEDCL),
   Prakashgad, Bandra (East),
   Mumbai-400051.

3. Chattisgarh State Power Distribution Company Ltd. (CSPDCL),
   P.O. Sundar Nagar,
   Danganiya,
   Raipur-492013.

4. Gujarat Urja Vikas Nigam Ltd. (GUVNL),
Vidyut Bhawan, Race Course,
Vadodara-390007.

5. Electricity Department, Government of Goa,
Vidyut Bhawan,
Panaji, Goa.

6. Electricity Department,
Administration of Daman & Diu,
Daman-396210.

7. Electricity Department,
Administration of Dadra & Nagar Haveli,
Silvassa. **…..Respondents**

Petition No. 515/MP/2020

In the matter of:

Petition under Section 79 of the Electricity Act, 2003 read with Regulation 29 of the Central Electricity Regulatory Commission (Terms and Condition of Tariff) Regulations, 2019 for approval of ACE on account of installation of various Emission Control Systems at Solapur Super Thermal Power Station (2X660 MW) in compliance with the Ministry of Environment, Forest and Climate Change, Government of India Notification dated 7.12.2015.

And in the matter of:

NTPC Ltd.,
NTPC Bhawan,
Core-7, Scope Complex,
7, Institutional Area, Lodhi Road,
New Delhi-110003. **…. Petitioner**

Vs

1. Madhya Pradesh Power Management Company Ltd. (MPPMCL),
Shakti Bhawan,
Vidyut Nagar, Jabalpur-482008.

2. Maharashtra State Electricity Distribution Company Ltd. (MSEDCL),
Prakashgad, Bandra (East),
Mumbai-400051.

3. Chattisgarh State Power Distribution Company Ltd. (CSPDCL),
P.O. Sundar Nagar,
Danganiya,
Raipur-492013.

4. Electricity Department, Government of Goa,
Vidyut Bhawan, Panaji, Goa.

5. Electricity Department,
Administration of Daman & Diu,
Daman-396210.

6. Electricity Department,
Administration of Dadra & Nagar Haveli,
Silvassa. **…..Respondents**

For Petitioner : Shri Venkatesh, Advocate, NTPC
Shri Ashutoudh K. Srivastava, Advocate, NTPC
Shri Abhiprav Singh, Advocate, NTPC
Shri Abhishek Nangia, Advocate, NTPC
Shri Anant Singh, Advocate, NTPC
Shri A. S. Pandey, NTPC
Shri Siddhart Joshi, NTPC
Shri V. K. Garg, NTPC
Shei Parimal Piyush, NTPC
Shri Ishpaul Uppal, NTPC

For Respondent : Shri Ravi Sharma, Advocate, MPPMCL
(Petition No. 515/MP/2020)
Shri Ravin Dubey, Advocate, MPPMCL
(Petition No. 67/MP/2020)
Shri Anurag Naik, MPPMCL

ORDER

NTPC Ltd., (hereinafter referred to as 'the Petitioner' or 'NTPC'), has filed the above-mentioned two petitions under Section 79 of the Electricity Act, 2003 (in short, “the 2003 Act”) read with Regulation 29 of the Central Electricity Regulatory Commission (Terms and Condition of Tariff) Regulations, 2019 (hereinafter referred to as “the 2019 Tariff Regulations”) for approval of Additional Capital Expenditure (ACE) on account of installation of various Emission Control Systems (ECS) in compliance with the Environment (Protection) Amendment Rules, 2015 dated 7.12.2015 (hereinafter referred to as "the MoEFCC Notification") notified by Ministry of Environment, Forest and Climate Change, Government of India (MoEFCC). The MoEFCC Notification mandates all thermal power plants (TPPs) to comply with the revised Emission Control Norms (ECNs) as specified in the MoEFCC Notification.

2. The Petitioner has made the following prayers in these petitions:

"xxx

i) Grant approval for under taking implementation of the scheme mentioned above in order to meet Revised Emission Standards.

ii) Grant liberty to approach Hon'ble Commission for approval of implementation of Revised Emission Schemes on account of mercury, specific water consumption, Particulate Matter, if required.

iii) Allow additional APC, additional water consumption, additional O&M Expenses, Cost of Reagents etc as per Regulation-76 i.e. "Power to relax" of the Tariff Regulations 2019.

iv) Allow deemed availability of the station/unit on account of shutdown for the implementation of ECS as per Regulation-76 i.e. "Power to relax" of the Tariff Regulations 2019.

v) Allow the petitioner to file hard copies of the petition along with affidavit duly notarized, once normalcy is resumed.

vi) Pass such orders as deemed fit and necessary in the facts and circumstances of the present case."

3. The present order covers both the petitions filed by the Petitioner. The prayers made by the Petitioner are identical and the relief sought is almost similar in both the petitions. Moreover, the issues raised by the Respondents are also identical. Accordingly, a common order is being issued in these petitions. The details of the petitions covered in the instant order are as follows:

(i) Petition No. 67/MP/2020 - Sipat Super Thermal Power Station Stage-I (Sipat STPSS-I) (3x660 MW)

The Petitioner has sought approval of ACE on account of installation of various ECS at Sipat STPSS-I in compliance of the MoEFCC Notification. Sipat STPSS-I was put into commercial operation on 1.8.2012. The petition was admitted on 27.2.2020 and order was reserved on 29.4.2021.

(ii) Petition No. 515/MP/2020 - Solapur Super Thermal Power Station (Solapur STPS) (2X660 MW)

The Petitioner has sought approval of ACE on account of installation of various ECS at Solapur STPS in compliance of the MoEFCC Notification. Solapur STPS-I and II

were put into commercial operation on 25.9.2017 and 31.3.2019 respectively. The petition was admitted on 21.8.2020 and order was reserved on 29.4.2021.

4. Background

(a) In exercise of the powers conferred by Sections 6 and 25 of the Environment (Protection) Act, 1986, MoEFCC vide Notification No. S.O. 3305(E) dated 7.12.2015 has amended the Environment (Protection) Rules, 1986, revising and introducing the standards for emission of environmental pollutants to be followed by all existing and new thermal power plants (TPPs). As per the MoEFCC Notification, all TPPs were required to comply with the revised emission control norms within a period of two years from the date of MoEFCC Notification dated 7.12.2015. The deadline for compliance with the revised norms has been subsequently modified to 2022. The amended norms prescribed by the MoEFCC Notification dated 7.12.2015 are as follows:

"

Sr. No.	***Industry***	***Parameter***	***Standards***
1	***2***	***3***	***4***
"5A."	***Thermal Power Plant (Water consumption limit)***	***Water consumption***	*I. All plants with Once Through Cooling (OTC) shall install Cooling Tower (CT) and achieve specific water consumption upto maximum of 3.5m^3/MWh within a period of two years from the date of publication of this notification.* ***II.*** *All existing CT-based plants reduce specific water consumption upto maximum of 3.5m^3/MWh within a period of two years from the date of publication of this notification.* ***III.*** *New plants to be installed after 1st January, 2017 shall have to meet specific water consumption upto maximum of 2.5 m^3/MWh and achieve zero waste water discharged";*
"25."	***Thermal Power Plant***	***TPPs (units) installed before 31st December, 2003****	
		Particulate Matter	*100 mg/Nm^3*
		Sulphur Dioxide (SO_2)	*600 mg/Nm^3 (Units Smaller than 500 MW 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 500 MW and above)*

		TPPs (units) installed after 1st January, 2003 and up to 31st December, 2016*	
		Particulate Matter	*50 mg/Nm3*
		Sulphur Dioxide (SO2)	*600 mg/Nm3 (Units Smaller than 500 MWcapacity units)* *200 mg/Nm3 (for units having capacity of500 MW and above)*
		Oxides of Nitrogen (NOx)	*300 mg/Nm3*
		Mercury (Hg)	*0.03 mg/Nm3*
		TPPs (units) to be installed from 1st January, 2017	
		Particulate Matter	*30 mg/Nm3*
		Sulphur Dioxide (SO2)	*100 mg/Nm3*
		Oxides of Nitrogen (NOx)	*100 mg/Nm3*
		Mercury (Hg)	*0.03 mg/Nm3*

**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 underconstruction".*

(b) As per the MoEFCC Notification, water consumption norms for TPPs with Once Through Cooling (OTC), existing CT-based TPPs and TPPs commissioned after 1.1.2017 were specified. Further, norms for particulate matter, sulphur dioxide (SO_2), oxides of nitrogen (NOx) and mercury (Hg) for TPPs commissioned before 31.12.2003, TPPs commissioned during 1.1.2003 and 31.12.2016 and TPPs commissioned after 1.1.2017 were also specified. Subsequently, MoEFCC relaxed the norms of NOx for TPPs installed during the period from 1.1.2004 to 31.12.2016 from 300 mg/Nm^3 that was stipulated through the MoEFCC Notification of 7.12.2015 to 450 mg/Nm^3 vide Notification G.S.R. 662(E) dated 19.10.2020.

(c) For implementation of ECNs notified by the MoEFCC, the Central Electricity Authority (CEA) was entrusted with planning and coordination. CEA along with Regional Power Committees formulated a phasing plan up to 2024 which was subsequently reduced by 2022 as per revised action plan of Ministry of Power. Further, Hon'ble Supreme Court of India issued direction to complete the installation of ECS in highly polluted and densely populated area by December, 2021 and other stations latest by December, 2022.

(d) The Ministry of Power issued directions to the Commission under Section 107 of the 2003 Act vide letter dated 30.5.2018 to consider the additional cost implication due to the installation of ECS as a pass through in tariff.

(e) As compliance of the MoEFCC Notification requires capital expenditure, the Petitioner filed Petition No. 98/MP/2017 for in-principle approval of the capital cost required for installation of ECS and other facilities in Singrauli STPS and Sipat STPSS-I. The Commission vide order dated 20.7.2018 in Petition No. 98/MP/2017 held that ACE (additional capital expenditure) for implementation of ECS as per the MoEFCC Notification is admissible under "change in law". The Commission further observed that it would require TPPs to identify suitable technology depending upon location of plant and existing level of emission and accordingly, directed the CEA to prepare guidelines regarding suitable technology, operation parameters, norms and other technical inputs. The relevant portions of the order dated 20.7.2018 is extracted hereunder:

> *"46. …..In all these situations, additional capital expenditure on change in law or compliance with any existing law" is allowed. Therefore, additional capital expenditure on implementation of the ECS in terms of the Notification dated 7.12.2015 shall be admissible after due prudence check, under Regulation 14 of the 2014 Tariff Regulations.*
>
> *47. The compliance of the revised norms specified under the MOEFCC Notification by these generating stations would require identification of suitable technology depending upon location of plant and existing level of emission from such plant. Moreover, the scope of work would also differ from plant to plant, depending upon the type of technology to be adopted……..."*
>
> *"48. Therefore, a mechanism needs to be devised for addressing the issues like identification of suitable technology for each plant for implementation of ECS, its impact on operational parameters and on tariff, and the recovery of additional capital and operational cost. The Commission in this regard directs the CEA to prepare guidelines specifying;*
>
> *(a) Suitable technology with model specification for each plant, with regard to implementation of new norms;*
>
> *(b) Operational parameters of the thermal power plants such as auxiliary consumption, O&M expenses, Station Heat Rate etc., consequent to the implementation of ECS.*
>
> *(c) Norms of consumption of water, limestone, ammonia etc., required for operation of the plants after implementation of ECS.*
>
> (d) *Any other detailed technical inputs.*"

(f) On the basis of directions of the Commission in order dated 20.7.2018 in Petition No. 98/MP/2017, the CEA vide its letter dated 20.2.2019 recommended various technologies for implementation of the MoEFCC Notification.

(g) However, prior to recommendations dated 20.2.2019 of the CEA, the Petitioner had identified technologies such as wet limestone based FGD system suitable for its various generating stations to comply with the revised environmental control norms specified by the MoEFCC. These technologies are in line with the technologies identified by the CEA vide letter dated 20.2.2019. Accordingly, the Petitioner has filed the instant petitions for approval of ACE for implementation of ECS as per Regulation 29 of the 2019 Tariff Regulations.

(h) The Commission amended the 2019 Tariff Regulations vide Central Electricity Regulatory Commission (Terms and Conditions of Tariff) (First Amendment) Regulations, 2020 (hereinafter referred to as "the 2020 Amendment Regulations"), wherein separate tariff stream for ECS including determination of capital cost, financial parameters and operational parameters was specified.

(i) Further, the CEA on 7.2.2020 issued 'Advice on FGD Technology selection for different unit size'. As per the Advisory, TPPs are required to select the appropriate FGD technology based on parameters like SO_2 removal efficiency, units' size, balance plant life and the geographical location of TPPs.

(j) MoEFCC has extended the time limit, vide Notification dated 1.4.2021, for implementation of the ECS to comply with the revised ECNs through the Environment (Protection) Amendment Rules, 2021. The said Notification dated 1.4.2021 also provides for constitution of task force and environment compensation for operating TPPs beyond the specified timelines. The relevant portion of the Notification dated 1.4.2021 is reproduced hereunder:

> *"*(i) A task force shall be constituted by Central Pollution Control Board (CPCB) comprising of representative from Ministry of Environment and Forest and Climate Change, Ministry of Power, Central Electricity Authority (CEA) and CPCB to categorise thermal power plants in three categories as specified in the Table-I on the basis of their location to comply with the emission norms within the time limit as specified in column (4) of the Table-I, namely: -*

Table-I

Sl. No.	***Category***	***Location/area***	***Timelines for compliance***	
			Non retiring units	***Retiring units***
(1)	*(2)*	*(3)*	*(4)*	*(5)*
1	*Category A*	*Within 10 km radius of National Capital Region or cities having million plus population[1].*	*Up to 31st December 2022*	*Up to 31st December 2022*
2	*Category B*	*Within 10 km radius of Critically Polluted Areas[2] or Non-attainment cities[2]*	*Up to 31st December 2023*	*Up to 31st December 2025*
3	*Category C*	*Other than those included in category A and B*	*Up to 31st December 2024*	*Up to 31st December 2025*

[1] As per 2011 census of India.
[2] As defined by CPCB.

(ii) the thermal power plant declared to retire before the date as specified in column (5) of Table-I shall not be required to meet the specified norms in case such plants submit an undertaking to CPCB and CEA for exemption on ground of retirement of such plant:

Provided that such plants shall be levied environment compensation at the rate of rupees 0.20 per unit electricity generated in case their operation is continued beyond the date as specified in the Undertaking;

(iii) there shall be levied environment compensation on the non-retiring thermal power plant, after the date as specified in column (4) of Table-I, as per the rates specified in the Table-II, namely:-

Table-II

Non-Compliant operation beyond the Timeline	*Environmental Compensation (Rs. per unit electricity generated)*		
	Category A	***Category B***	***Category C***
0-180 days	*0.10*	*0.07*	*0.05*
181-365 days	*0.15*	*0.10*	*0.075*
366 days and beyond	*0.20*	*0.15*	*0.10.* ”

”

Submissions of the Petitioner

5. The gist of the submissions made by the Petitioner in the two petitions are as under:

(a) In compliance of revised ECNs specified in the MoEFCC Notification dated 7.12.2015, the Petitioner is required to install various ECS in its generating stations. The MoEFCC Notification mandates reduction in water consumption, particulate matter, SO_2, NOx and Mercury emission.

(b) Regulation 29 of the 2019 Tariff Regulations provides for allowing ACE on account of installation of ECS to meet the revised ECNs. The instant petitions are filed for approval for servicing of the expenditure to be incurred in

its generating stations to comply with revised ECNs.

(c) The Commission in order dated 20.7.2018 in Petition No. 98/MP/2017, filed by the Petitioner seeking in-principle approval for servicing the expenditure related to installation of the ECS, had made the following observations:

> *"46. . . . . In all these situations, additional capital expenditure on "change in law or compliance with any existing law" is allowed. Therefore, additional capital expenditure on implementation of the ECS in terms of the Notification dated 7.12.2015 shall be admissible after due prudence check, under Regulation 14 of the 2014 Tariff Regulations.*
>
> *47. The compliance of the revised norms specified under the MOEFCC notification by these generating stations would require identification of suitable technology depending upon location of plant and existing level of emission from such plant. Moreover, the scope of work would also differ from plant to plant, depending upon the type of technology to be adopted. The Petitioner in its prayers (b) to (h) has also prayed for the following: (i) Incremental Auxiliary Consumption for computation of tariff post commissioning of ECS. . (ii) Incremental O&M cost for installation of ECS and other associated facilities. (iii) Shutdown period required for installation and commissioning of ECS at the projects to be allowed as deemed availability for payment of capacity charges. (iv) Expenditure on water cost required for operation of ECS and other associated facilities. (v) Allow procurement cost of limestone for operation of ECS at actua/s. (vi) Expenditure on procurement cost of lime stones and other reagents like urea and ammonia etc. (vii) Permission to approach the Commission for remaining ECS.*
>
> *48. Therefore, a mechanism needs to be devised for addressing the issues like identification of suitable technology for each plant for implementation of ECS, its impact on operational parameters and on tariff, and the recovery of additional capital and operational cost. The Commission in this regard directs the CEA to prepare guidelines specifying; (a) Suitable technology with model specification for each plant, with regard to implementation of new norms; (b) Operational parameters of the thermal power plants such as auxiliary consumption, O&M expenses, Station Heat Rate etc., consequent to the implementation of ECS. (c) Norms of consumption of water, limestone, ammonia etc., required for operation of the plants after implementation of ECS. (d) Any other detailed technical inputs."*

(d) In compliance of the Commission's directions in order dated 20.7.2018 in Petition No.98/MP/2017, CEA in its recommendations vide letter dated 20.2.2019 has specified norms for four types of technologies in case of SO_2 reduction, namely Wet Lime based Flue Gas Desulpherisation (FGD), Lime Spray Drier/ Semi-dry FGD, Dry Sorbent Injection based FGD and Furnace Injection in CFBC Boilers. The Wet Limestone based FGD System is the most appropriate technology for FGD and it meets the norms specified in the MoEFCC Notification and it adheres to the CEA's recommendations.

(e) Taking into consideration the operating parameters recommended by CEA in its letter dated 20.2.2019, the Petitioner initially proposed to implement only (a) Wet Limestone based Flue Gas Desulpherisation (FGD) system for SO_2 reduction and (b) Combustion Modification and SNCR for NOx control. The norms specified for water consumption, particulate matter and Mercury emission are already being met by the instant generating stations/ units and, therefore, there is no proposal to install any ECS for the same. Therefore, liberty may be granted to approach the Commission as and when the work(s) pertaining to the same (water consumption, particulate matter and Mercury emission) are required in future. The Petitioner has considered the normative parameters for working out indicative tariff based on the capital cost.

(f) The Wet Limestone based FGD technology is a wet scrubbing process and it uses limestone or lime as a reagent. It is the most frequently selected FGD system for SO_2 reduction from coal-fired utility boilers. It removes SO_2 by scrubbing the flue gas with limestone slurry. Flue gas is treated in an absorber by passing the flue gas stream through a limestone or lime slurry spray where the gas flows upwards through the absorber counter current to the spray liquor flowing downward through the absorber. It is envisaged that it would reduce the SO_2 to less than 200 mg/Nm^3 from the current levels of 1000 mg/Nm^3 and thereby comply with revised ECNs of the MoEFCC Notification.

(g) The shut-down period required for installation of the Wet Limestone based FGD system is approximately 30 to 45 days.

(h) For meeting revised ECNs w.r.t. NOx, CEA has specified the norms based on DeNOx combustion modification system as well as Selective Catalytic Reduction (SCR)/ Selective Non-Catalytic Reduction (SNCR) technology. There are two kinds of technologies for NOx control (a) Primary control technologies wherein the amount of NOx produced in the combustion/ furnace zone is reduced by modifying fuel burners and (b) secondary control technologies, which reduce the NOx present in the flue gas by injection of reagent (ammonia [NH_3] or urea) in flue gas path where it reacts with NOx to reduce it to N_2 and water.

(i) In De-NOx Combustion Modification (CM) System, the normal burners

installed in the unit boilers are to be replaced by Low-NOx Burners (LNB). A LNB limits NOx formation by regulating the temperature profiles of the fuel combustion by controlling the aerodynamic distribution and mixing of the fuel and air, thereby yielding reduced oxygen in the primary flame zone, which limits the flame temperature, which in turn limits thermal NOx formation. Due to the change in temperature profile of the furnace and heat transfer pattern, LNB retrofits lead to higher economizer inlet temperatures and increase in un-burnt carbon. This increases heat loss of boiler. Accordingly, the unit heat rate is anticipated to increase by around 0.8% on account of De-NOx LNB retrofit.

(j) De-NOx SNCR process involves injecting nitrogen-containing chemicals into the upper furnace or convective pass of a boiler within a specific temperature window without the use of a catalyst. There are different chemicals that can be used that selectively react with NOx in the presence of oxygen to form molecular nitrogen and water. The two such most common chemicals are ammonia and urea. SNCR system to be installed is proposed to be based on urea. This system requires low capital cost, has moderate NOx removal efficiency, involves non-toxic chemical and requires typically low energy injection. Further, due to formation of water particles during NOx reduction, it increases the wet loss of boilers leading to deterioration of Unit Heat Rate by about 0.5%. SNCR demonstration pilot tests are being conducted at NTPC stations and implementation of SNCR shall be taken up based on the reports of SNCR pilot tests.

(k) Shut-down period required for installation of Combustion Modification System and SNCR are approximately 45 to 60 days and 15 days respectively.

(l) De-NOx SCR process involves injecting nitrogen-containing chemicals into the upper furnace or convective pass of a boiler within a specific temperature window with the use of a catalyst**.** SCR process chemically reduces NOx molecule into molecular nitrogen and water vapor. A nitrogen-based reagent such as ammonia or urea is injected into the furnace. SCR proposed to be installed is based on ammonia. The hot flue gas and reagent diffuse through the catalyst which is composed of active metals or ceramics with a highly porous structure. The reagent reacts selectively with NOx within in the presence of the catalyst and oxygen. The use of a catalyst results in two

primary advantages of SCR, i.e. higher NOx control efficiency and reactions within a broader temperature range. This system requires high capital cost, has high NOx removal efficiency and involves toxic chemical. Due to formation of water particles during NOx reduction, it increases the wet loss of boilers leading to deterioration of Unit Heat Rate by about 0.1%.

(m) With the implementation of Combustion Modification System, NOx is anticipated to come down to below 400 mg/Nm^3 and with installation of SNCR, it is envisaged that the level of NOx shall come down to below 300 mg/Nm^3.

(n) With the installation of revised ECS, there would be requirement of additional manpower for operation and maintenance of these systems, spares pertaining to these systems etc. on sustained basis. Accordingly, the Petitioner would incur additional O&M Expenses on account of implementation of ECS. In case of thermal generating stations, the norms of O&M Expenses in the 2019 Tariff Regulations have been fixed (in lakh/MW) based on actual O&M Expenses of different stations in the last five years. As FGD and other ECS were not installed, the expenditure on account of them was not considered while framing the norms. Further, the actual O&M Expenses data on account of the FGD system and other ECS system is not available. Therefore, as has been provided in case of new hydro generating stations, a norm in relation to percentage (%) of capital cost may be considered. In case of large hydro generating stations, O&M Expenses @3.5% of capital cost has been provided in the 2019 Tariff Regulations. Since proportion of plant and machinery is more in FGD/ other ECS system, norms for additional O&M Expenses @4% of capital cost may be considered.

(o) Units may have to be taken under shutdown for about 45 days for implementation of the ECS in compliance of the MoEFCC Notification and stabilization of the same may take some more time. During the period of shut down of unit, there would be loss of availability of the station and would lead to under-recovery of Annual Fixed Charges (AFC) on account of implementation of ECS. Accordingly, the shutdown period of unit for implementation of ECS in compliance of the MoEFCC Notification may be treated as deemed availability as under Regulation 76 of the 2019 Tariff Regulations.

(p) The Commission may allow additional GSHR (gross station heat rate) over and above the normative GSHR for the station due to implementation of ECS.

(q) The Petitioner will file a separate supplementary tariff petition in terms of Regulations 29(4) of the 2019 Tariff Regulations based on actual and projected expenditure, as the case may be, and normative operating parameters/ norms as specified in the 2019 Tariff Regulations and subsequent notification for reagent consumption, etc.

Submissions of the Respondents

6. Madhya Pradesh Power Management Company Limited (MPPMCL), Respondent No.1 has filed its reply to the petition vide affidavits dated 24.2.2020 and 18.3.2020 in Petition No.67/MP/2020 and affidavit dated 3.11.2020 in Petition No.515/MP/2020. The Petitioner has filed its rejoinder to the said two replies vide affidavit dated 23.6.2020 and 30.12.2020 respectively. Maharashtra State Electricity Distribution Company Ltd. (MSEDCL), Respondent No.2, has filed separate replies to Petition No.67/MP/2020 and Petition No.515/MP/2020 vide affidavits dated 4.11.2020 and the Petitioner has filed its rejoinder vide affidavits dated 9.12.2020 and 30.12.2010 respectively. Chhattisgarh State Power Distribution Company Ltd. (CSPDCL), Respondent No.3, has filed its reply to the petition vide affidavit dated 22.10.2020 and the Petitioner has filed its rejoinder vide affidavit dated 9.12.2020.

7. Taking into consideration the objections raised by the Respondents in their reply and the submissions of the Respondents during the hearing on 12.3.2021, the Petitioner was directed to submit certain information which was considered relevant for the present proceedings. The Respondents were directed to file their reply and the Petitioner to file its rejoinder, if any. Accordingly, the Petitioner has filed the information sought in the Record of Proceedings dated 12.3.2021, in both the petitions vide affidavit dated 25.3.2021. In response, MPPMCL and CSPDCL have

filed their reply to the information filed by the Petitioner vide affidavits dated 20.4.2021 and 15.4.2021 respectively. The Petitioner has filed its consolidated rejoinder to the reply of MPPMCL and CSPDCL vide affidavits dated 21.6.2021.

8. The issues raised by MPPMCL, MSEDCL and CSPDCL in their reply to the petition and the issues raised by MPPMCL and CSPDCL in response to the information filed by the Petitioner in compliance with the directions in RoP dated 12.3.2021 are similar and some of them are repetitive in nature. Similarly, the clarifications given by the Petitioner to the replies filed by the Respondents to the petition and the RoP information are also similar and repetitive in nature. To avoid duplication and repetitiveness, we consider the submissions made by the Respondents and the clarifications given by the Petitioner together in the subsequent paragraphs.

9. The gist of the submissions made by MPPMCL, Respondent No.1 in its reply and to the information filed by the Petitioner as per the directions in RoP in the instant two petitions, are as follows:

(a) The Petitioner has not followed the procedure laid down under Regulation 29(2) of the 2019 Tariff Regulations. The Petitioner has bypassed the mandatory steps and procedure specified in Regulation 29 and directly filed Petition for determination of “Indicative Tariff” based on “Estimated Costs” of implementation of ECS in violation and disregard of Regulation 29 of the 2019 Tariff Regulations.

(b) The MoEFCC Notification requires compliance with various ECNs regarding water consumption, particulate matter, SO_2, NOx and Mercury (Hg) within a specified period in one go and not individually in a phased manner. However, the Petitioner has claimed implementation of ECS only for SO_2 and NOx and has sought liberty to approach the Commission for implementation of water consumption, particulate matter and Mercury (Hg) at a later date. Further, Regulation 29 of the 2019 Tariff Regulations does not provide for

fragmented implementation of ECS. Admitting the instant petitions would result in multiple petitions for each generating station leading to waste of valuable time of the Commission and unnecessary loading of avoidable filing fee of each petition on beneficiaries. Therefore, the Petitioner may be directed to file a comprehensive revised petition covering proposed ACE for all parameters of MoEFCC Notification.

(c) The Petitioner has not submitted the cost estimates recommended by CEA for additional APC (auxiliary power consumption) claimed for ECS. As additional APC will have huge inflationary impact on the generation tariff, the same may not be allowed without proper justification. The Petitioner has, without proper justification, claimed that there would be further increase in Energy Charge Rate (ECR) and per unit Fixed Charge (@85% Scheduled Generation) of the generating stations by about 5 paise/kWh due to increased APC and Station Heat Rate. Further, there is no provision in the 2019 Tariff Regulations for allowing such claim.

(d) There is no provision in the 2019 Tariff Regulations to claim GSHR due to implementation of ECS and it does not call for invocation of Regulation 76 (Power to Relax) of the 2019 Tariff Regulations. The Petitioner has not given any reference to cost estimates given by CEA for GSHR claimed for ECS and that it will have huge inflationary impact on the generation tariff.

(e) The Petitioner may be directed to submit the details of water consumption for last five years to assess the measures required to be implemented to achieve the revised ECS. There is no provision in the 2019 Tariff Regulation for allowing such claim and it does not call for invocation of Regulation 76 (Power to Relax) of the 2019 Tariff Regulations.

(f) The Petitioner has claimed additional O&M Expenses for ECS at the rate of 4% of capital cost, which is very high and arbitrary without any basis. The Commission in order dated 11.11.2019 in Petition. No. 152/MP/2019 [Maithan Power Ltd. Vs. Tata Power Delhi Distribution Ltd. & Ors.], did not consider O&M Expenses relating to FGD system and directed Maithon Power Ltd. to submit the O&M Expenses on actual basis at the time of filling the petition for determination of tariff after commissioning of the FGD system. The

Petitioner has neither given any reference to cost estimate given by CEA for size of Sipat STPS or Solapur STPS, nor any independent justification for such additional O&M Expenses claim. Further, there is no provision in the 2019 Tariff Regulations for allowing such claim and it does not call for invocation of Regulation 76.

(g) The 2019 Tariff Regulations do not provide for allowing shut down period and the claim does not call for invocation of Regulation 76. The Petitioner has not given any independent justification for such shut down period. During the shutdown period of 45-60 days, the beneficiaries and ultimate consumers will face tough times by either resorting to load shedding or arranging power from alternative sources. The Respondents and their consumers have to bear the opportunity cost and, therefore, the Petitioner should provide equivalent quantum of power to all the beneficiaries from its other generating stations at Petitioner's own cost during the period of proposed shutdown for implementation of ECS in order to claim deemed availability.

(h) The present emission levels of SOx and NOx may be taken into account and then a pragmatic view may be taken for implementing these norms. Funds from Power System Development Fund (PSDF), National Clean Energy Fund (NCEF) and the Petitioner's Corporate Social Responsibility (CSR) Fund may be used for this purpose.

(i) The MoEFCC vide its Notification dated 31.3.2021 has issued Environment (Protection) Amendment Rules, 2021 and has revised the timeline for compliance and has categorized TPPs into three categories. As per this Notification, the plants declared to retire before date specified therein shall not be required to meet the prescribed norms in case they submit such undertaking. Accordingly, the Petitioner may be directed to submit an undertaking that their plants which have completed their useful life shall remain operative beyond 31.12.2025 or else their claim for ACE may be rejected.

(j) The Commission in order dated 20.7.2018 in Petition No. 98/MP/2017 directed the Petitioner to consult CEA before approaching the Commission. This direction has been ignored by the Petitioner and till now the Petitioner has not submitted any documentary evidence to show that the Petitioner has

obtained specific advice from CEA in technology selection. The Petitioner may be directed to get all its ECS implementation projects evaluated by CEA or any other competent authority to ensure that the selection of technology and cost claimed is optimum and competitive.

(k) The Petitioner has also not filed the copy of decision by its Board with resolution and date and has merely provided the extracts from minutes of meeting of Board of Directors which is merely an interim approval to the environmental action plan. The Petitioner has neither provided the copy of recommendation of the Bid Evaluation Committee nor Certificate from the Competent Authority to the effect that the bidding and award of the work has been carried out in a fair and transparent manner as per applicable GOI/ NTPC guidelines.

(l) The Petitioner may be directed to submit the certificate from Competent Authority, which certifies that the ECS technology adopted by the NTPC is in accordance with the guidelines of CEA and is the best suited cost effective technology in terms of CEA's advisory dated 7.2.2020.

(m) FGD technology is new to India and only few countries possess the requisite know-how. Therefore, International Competitive Bidding ("ICB") might have yielded better results. The Petitioner has not explained as to why ICB was not adopted.

(n) The Petitioner has stated that the Invitation for Bids (IFB) was issued on 31.8.2018. However, as per the "Extracts from the Minutes of 471st Meeting" of Board dated 3.5.2019, the Investment Approval for implementation of FGD System in Sipat STPSS-I and Solapur STPS was accorded only on 3.5.2019 and 28.7.2019 respectively. However, the tendering/ bidding process started much prior to obtaining Investment Approval from its Board of Directors. NIT along with bid opening and closing dates show that the Petitioner had undertaken bidding process but it does not show how this bidding process was conducted. Therefore, bidding process requires stricter legal scrutiny.

(o) The Petitioner has claimed and certified that wet limestone based FGD technology is the most appropriate technology and that it is as per the CEA

Advisory dated 7.2.2020. The Petitioner has neither submitted any cost-benefit study of the available technology as regards the remaining useful life of the plant nor has obtained project/ unit specific recommendations from CEA as directed by the Commission. Therefore, the Petitioner may be directed to get the ECS implementation project for Sipat STPSS-I and Solapur STPS evaluated by CEA or any other competent authority for ascertaining that the selection of technology is most appropriate for the two generating stations and the claimed cost of installation is optimum and competitive.

(p) The implementation of ECS was taken up by the Petitioner in phased manner in different lots and the capital cost of proposed ECS in case of Solapur STPS is ₹86 lakh per MW (total supplementary tariff 32.55 paise/kWh) and for Mauda STPS-II, it is ₹72 lakh per MW (total supplementary tariff 27.41 paise/kWh) which were taken up in Lot-I. The same for Sipat STPS is ₹52 lakh per MW (total supplementary tariff 21.65 paise/kWh) which was taken up in Lot-VI. The Lot-I is expensive when compared to Lot-VI, which is most recent and most economical. The Petitioner has compromised on the cost aspect in the guise of urgency and timeline and the beneficiaries have to bear the financial impact, whereas the deadline has been relaxed by MoEFCC.

(q) The cost estimate for implementation of WFGD in three units of Sipat STPSS-I is ₹ 911.37 crore. The estimated capital cost of implementation of ECS in Sipat STPSS-I should be less than ₹ 732.60 crore as per CEA recommended cost. The cost estimate indicated by the Petitioner is about ₹ 178.77 crore more than the CEA recommended cost, i.e. by about 24.4%. Similarly, in case of Solapur STPS, the cost estimated for implementation of WFGD is ₹ 626 crore and it should be less than ₹ 488 crore as per CEA recommended cost. The capital cost estimated by the Petitioner is about ₹ 138 crore which is higher by 28%.

10. The gist of the submissions made by MSEDCL, Respondent No.2, in its reply to the instant two petitions are as follows:

(a) As per Regulation 29 of the 2019 Tariff Regulations, the Petitioner intending to implement ECS in compliance of the revised ECNs in terms of the MoEFCC Notification and the consequent ACE, is required to share the

proposal with the beneficiaries and only then it can file a petition for undertaking such ACE. The Petitioner has submitted that revised ECS must be mandatorily implemented within a stipulated timeframe and, therefore, the Petitioner proceeded for tendering and awarding the FGD systems in a phased manner through a transparent competitive bidding process and placed the NoA (Notification of Award) on 24.5.2019 and 31.7.2018. The Petitioner has neither informed nor consulted the beneficiaries in this regard who are the affected parties and will be burdened through supplementary tariff specified by the Commission through the 2020 Amendments Regulations. The Petitioner has shared the details with the beneficiaries only on the directives of the Commission and, therefore, MSEDCL has requested not to consider the unilateral proposal of the Petitioner.

(b) The Petitioner's claim of APC may be decided in accordance with the 2020 Amendment Regulations wherein the norms for APC on account of ECS of thermal generating stations have been specified. Accordingly, the Petitioner's claim may be decided after prudence check.

(c) Regulation 29(3) of the 2019 Tariff Regulations provides that the Commission may grant approval for ACE after due consideration of the reasonableness of the cost estimates, financing plan, schedule of completion, IDC, use of efficient technology, cost-benefit analysis and such other factors as may be considered relevant. The Commission has already considered these parameters in the 2020 Amendment Regulations. Therefore, additional GSHR may be approved only after prudence check of all such parameters.

(d) The Petitioner's claim of additional water consumption may be decided in accordance with the 2020 Amendment Regulations, wherein the norms for additional water consumption on account of emission control system of thermal generating stations have been specified.

(e) The Petitioner's claim for additional O&M Expenses may be decided in accordance with the 2020 Amendment Regulations, wherein norms for additional O&M Expenses on account of ECS of thermal generating stations have been specified. Regulation 35(1)(7) of the 2019 Tariff Regulations provides that O&M Expenses in case of coal or lignite thermal power stations

shall be 2% of the capital cost as on its date of operation, which shall be escalated annually @3.5% during the tariff period ending on 31.3.2024. Accordingly, MSEDCL has submitted that the O&M Expenses need to be considered on lower side considering the systems installed are new and the existing O&M facilities can be utilized for same and hence, the cost can further be brought down.

(f) The Petitioner's claim of cost of reagent may be decided in accordance with the 2020 Amendment Regulations, which specifies the norms for cost of reagent on account of ECS of thermal generating stations.

(g) CGPL in its Petition No. 168/MP/2019 has estimated that installation of FGD package would lead to outage for about 22 days for each unit and the Commission vide order dated 22.6.2020 in Petition No.168/MP/2019 in this regard observed that the beneficiaries and the petitioner shall plan the inter-connection of FGD system with main plant by synchronizing it with annual overhaul. Therefore, the Commission may direct the Petitioner to align the work of installation of ECS with the annual maintenance of its generating stations so that the additional burden on DISCOMs can be avoided.

11. The gist of the submissions made by CSPDCL, Respondent No.3, in its reply to Petition No.67/MP/2020 and to the information filed by the Petitioner in compliance of RoP, in case of the instant two petitions, are as follows:

(a) The Petitioner has not followed the procedure laid down under Regulation 29(2) of the 2019 Tariff Regulations.

(b) There is no provision in the Tariff Regulations for allowing increase in GSHR for determination of supplementary tariff, therefore, it should not be allowed.

(c) The claim of the Petitioner for additional O&M Expenses @4% of the capital cost of the ECS equipment is not maintainable. The Commission has already specified O&M Expenses @2% of the admitted capital expenditure (excluding IDC and IEDC) as on date of operation of ECS. Further, the

Admitted Capital Expenditure has to be capital *e*xpenditure towards ECS equipment only and not the capital expenditure of entire power plant.

(d) There is no provision in the 2020 Amendment regulations for allowing "shutdown" period as deemed availability.

(e) The Petitioner should approach Government of India and explore possibilities for utilizing NCEEF fund for installation of ECS equipment in their power stations.

(f) The Petitioner has considered limestone consumption of 0.0173 kg/kWh i.e. an absolute figure and no calculation has been provided. The same should be in conformity with the formula specified by the Commission in the 2020 Amendment Regulations.

(g) The Petitioner on its own moved for selection of technology for FGD without conducting any cost benefit analysis, payback period etc. The Petitioner has not consulted CEA as directed in order dated 20.7.2018 in Petition No.98/MP/2017. Hence, the Petitioner may be directed to get all its ECS implementation projects evaluated by CEA or any other competent authority to ensure that the selection of technology and cost claimed is optimum and competitive. The Petitioner has not submitted any documentary evidence to show that it has obtained specific advice/ support from CEA. It is an afterthought that the technology selected is in consonance with CEA Advisory dated 7.2.2020.

(h) There is a wide variation in the price discovered in Lot-I and Lot-IV and it requires prudence check by the Commission.

(i) The Petitioner has not submitted the certificate from the competent authority to the effect that the ECS technology selected is best suited cost effective technology in terms of CEA's advisory. Instead, the Petitioner has placed on record "Copy of extracts of the Minutes of Meetings dated 01.07.2019". The Petitioner should state that the ECS technology adopted is at par with the guidelines of CEA and is the best suited cost effective technology.

(j) The Petitioner has claimed that the Commission vide its order dated 20.7.2018 in Petition No.98/MP/2017 has granted in principle approval to the Petitioner for installation of ECS, which is not correct. The Commission in order dated 20.7.2018 had observed that in the absence of provisions for in-principle approval of capital cost in the 2014 Tariff Regulations, prayer of the Petitioner for grant of in principle approval of the capital cost and other expenditure for implementation of ECS cannot be granted.

(k) The Petitioner has not submitted the "Copy of the recommendations of the Bid Evaluation Committee, if any and approval of the competent authority to 'award the work", as directed by the Commission.

Response of the Petitioner

12. In response to the objections raised by MPPMCL, MSEDCL and CSPDCL, the gist of the clarifications given by the Petitioner are as follows:

(a) The contention of the Respondents that no in-principle approval was granted by the Commission vide order dated 20.7.2018 in Petition No.98/MP/2017, is not correct as the Commission in paragraph 46 of the order dated 20.7.2018 observed that "additional capital expenditure on "change in law or compliance with any existing law" is allowed.

(b) As regards the contention that the Petitioner has not complied with the Commission's directive in order dated 20.7.2018 in Petition No.98/MP/2017 to consult CEA, the FGD technology proposed by NTPC is one of the options specified by CEA in its Advisory dated 7.2.2020. The Tariff Regulations do not make it mandatory for the Petitioner to consult CEA for the selection of technology and it is not a pre-requisite under the MoEFCC Notification, which is the basis for installation of ECS in its TPPs. As per the CEA Advisory, the technologies mentioned therein need to be evaluated on a case to-case basis. NoA (Notification of Award) in case of Solapur STPS and Sipat STPS were issued on 31.7.2018 and 24.5.2019 respectively much before the CEA Advisory dated 7.2.2020. Nevertheless, the technology adopted by the Petitioner is in compliance with the CEA's recommendations/ guidelines dated 7.2.2020. For timely compliance of the MoEFCC Notification, the Petitioner took pro-active steps to install ECS in TPPs covered in the instant petitions. The 2019 Tariff

Regulations has listed out certain specific scenarios under which the CEA's Approval is required, e.g. Regulation 5 and Regulation 44 of the 2019 Tariff Regulations. However, in case of selection of ECS, the same has not been made subject to the concurrence of CEA.

(c) The argument of MPPMCL that the proposed technology should be approved by CEA is against the very powers vested with CEA under Section 73(b) and 73(c) of the 2003 Act, which only envisages that CEA would specify technical standards for construction of electrical plants. Further, the 2003 Act does not envisage any prior approval of CEA for taking upon any electrical installation. Moreover, the Commission in its order dated 28.4.2021 in Petition No. 335/MP/2020 & Ors. has already held that identification of WFGD (Wet Limestone based FGD) technology by the Petitioner as per the CEA guidelines meets the requirement of due diligence on the part of the Petitioner.

(d) As regards conducting cost-benefit analysis, the advantages/ disadvantages of different available technologies, along with suitability of the same for individual station/ unit size have been submitted in the additional affidavit dated 25.3.2021. As per the advisory of CEA, there is only one technology i.e. Wet Limestone based FGD technology for the unit size of 500 MW and above and accordingly the same has been selected for Sipat STPSS-I and Solapur STPS, having unit size of 660 MW each. FGD technology for individual station has been adopted/ selected on various criteria like balance life of asset (i.e. 10 years), high operating PLF of units/ stations, worldwide footprint of technology, availability of suppliers, availability of post-installation maintenance and spares, availability and possibility of common tie-up of reagent as per location(s), bidding in batches of various units at similar location to reap benefits of economy etc. along with the due prudence in view of comparative cost benefit analysis of such technologies. As per Regulation 29(3) of the 2019 Tariff Regulations, the cost benefit analysis is to be done in order to select the most cost effective FGD technology among the available technologies. For selecting a particular FGD technology, lifecycle cost benefit analysis is to be carried out and not only Capex and Opex should be considered but also plant specific requirements such as space availability, size and number of units, requirement of efficiency (of SOx removal), PLF of plant,

coal quality etc. should also be taken into consideration. CEA vide its letter dated 20.2.2019 had also recommended operating norms in respect of various ECS. Accordingly, suitability of different technologies for SOx removal is as follows:

Unit Size	Dry Sorbent Injection FGD	Ammonia FGD	Limestone FGD	Sea Water FGD
60-250MW	✓	✓	✓	✓
500 MW & above	×	×	✓	✓
Remarks/ Conclusions	Suitable for low PLF stations	Handling of hazardous chemical. Can cause large physiological damages or even deadly explosions.	Most versatile, suitable for all units and operating conditions	Can be used only where sea water is used for condenser cooling in open cycle

(e) Based on the different technologies recommended by CEA for SOx removal and the provisions of the 2020 Amendment Regulations, cost-benefit analysis of the technologies suitable for Sipat STPSS-I and Solapur STPS was carried out and after conducting detailed analysis, Sea-water based FGD is not considered as the instant stations are not located on sea coast. Dry Sorbent Injection FGD (DSIFGD) is not suitable as the unit size is greater than 250 MW and when operating at relatively higher PLF. Ammonia FGD (AFGD) is not preferable as the unit size is greater than 500 MW and there is high risk associated with handling ammonia. Therefore, WFGD is the best technology for Sipat STPSS-I and Solapur STPS.

(f) The Petitioner has considered the following parameters for carrying out the cost -benefit analysis for Sipat STPSS-I and Solapur STPS:

Particulars	**Sipat STPSS-I**			**Solapur STPS**		
	DSIFGD	**WFGD**	**AFGD**	**DSIFGD**	**WFGD**	**AFGD**
Capital Cost (` in crore)	227.70	893.69	804.32	151.80	626.32	563.69
Debt Equity Ratio	70:30	70:30	70:30	70:30	70:30	70:30
Reagent Name	Sodium Bicarbonate	Limestone	Ammonia	Sodium Bicarbonate	Limestone	Ammonia
Specific Reagent Consumption (gms/kwh)	12	10	2.75	12	10	2.75
Additional APC (%)	0.00	1.00	0.80	0.00	1.00	0.80
Estimated Cost of Reagent (`/MT)	25700	1500	50000	25700	1500	50000
Rate of Interest (%)	8.5	8.5	8.5	8.5	8.5	8.5
Balance useful Life for 90% capital cost recovery (years)	25	25	25	25	25	25

(g) Based on the above parameters, the following cost of servicing the capital expenditure and the revenue expenditure has been worked out for Sipat STPSS-I and Solapur STPS:

Particulars	Sipat STPSS-I			Solapur STPS		
	DSIFGD	WFGD	AFGD	DSIFGD	WFGD	AFGD
Supplementary Capacity Charges (annual) (` in crore) (A)	47.04	144.45	133.00	31.36	101.30	93.15
Supplementary Energy Charges (annual) (` in crore) (B)	426.26	43.32	205.42	284.17	48.52	154.20
Supplementary Charges (annual) (` in crore) (C=A+B)	**473.29**	**187.77**	**338.42**	**315.53**	**149.82**	**247.35**

(h) As regards sharing of proposal for installation of ECS with the Respondents, the Petitioner was being monitored by MoP/ MoEFCC/ CEA and the Hon'ble Supreme Court on implementation of ECS. Therefore, the Petitioner proceeded with pre-award activities for its generating stations. By the time, the 2019 Tariff Regulations were notified, the Petitioner had placed NoA or was in the process placing NoA to avoid any punitive action against the Petitioner. Thereafter, the proposal seeking approval of ACE towards implementation of ECNs was filed and shared with the Respondents with the scope of work, phasing of expenditure, schedule of completion, estimated completion cost, detailed computation of indicative impact on tariff on the beneficiaries etc. as per Regulation 29(2) of the 2019 Tariff Regulations.

(i) As regards the Respondents' contention that the Petitioner has not submitted the certificate from the competent authority to the effect that the ECS technology selected is as per recommendations of CEA and is cost-effective, there is no designated Competent Authority to issue such a certificate either as per the 2019 Tariff Regulations or the MoEFCC Notification. The implementation of ECS for coal based generating stations was approved by the BoD of the Petitioner in the 444th Meeting held on 22.3.2017. The complete extract of agenda item no. 444.2.5 on 'Environment Action Plan' for 444th Meeting has been submitted. FGD technology selected has been approved by its Board and MoM regarding the same have already been placed on record.

(j) The Respondents have contended that the power plants retiring before 31.12.2025 specified in Notification of MoEFCC dated 1.4.2021 shall not be required to meet the prescribed norms in case such power plants submit an undertaking to the effect. As per the Notification of MoEFCC dated 1.4.2021,

the Central Pollution Control Board (CPCB) shall categorise TPPs on the basis of their location to comply with the revised ECNs within the extended timelines. The said exercise has not been undertaken by CPCB till date.

(k) The Petitioner shall approach the Commission for approval of actual capital cost and determination of supplementary tariff for ECS after implementation of the same.

(l) The Petitioner has not incurred higher cost in the garb of urgency and stringent timeline as alleged by the Respondents. Also, the contention of MPPMCL as regards the discovery of price in LoT-I and LoT-VI is incorrect. The award process for LoT-VI is still underway and the capital cost pertaining to the projects covered under LoT-VI has been provided only on tentative basis, including for Sipat STPSS-I. The cost discovered in LoT-I for various stations is highly competitive and is in consonance with the cost estimate recommended by CEA. The NoA for FGD for Solapur STPS was awarded under LoT-I and the cost incurred is ₹ 36 lakh/MW, which is within the limit specified by CEA cost of ₹ 37 lakh/MW.

(m) In compliance of RoP of the hearing dated 12.3.2021, the Petitioner has submitted the complete extract of agenda item no. 444.2.5 on 'Environment Action Plan' for 444th Meeting of Board of Directors held on 22.3.2017 for implementation of ECS for coal based generating stations. In the meeting, various criteria, limitations of technologies and difficulties in implementation of FGD and DeNOx system(s) in existing plants were discussed and deliberated. The implementation of FGD has been undertaken in terms of the decisions taken in the said meeting.

(n) The Petitioner has furnished information pertaining to the entire bidding process vide affidavit dated 25.3.30221 which also included information pertaining to NIT, copy of NoA for installation of FGD and process and justification for selection of technology. In its reply to the ROP of the hearing dated 12.3.2021, the Petitioner has already shared various documents pertaining to pre-award activities, bidding and final award.

(o) ICB (International Competitive Bidding) was adopted for installation of FGD in respect of Lot-1A stations since projects/ stations selected under Lot-1A were implemented under Mega Power Project Policy of Government of India. Accordingly, these stations qualified for deemed export benefits. Under this policy, the units and its auxiliaries supplied by the international vendor for execution of projects were exempted from customs duty and excise duty so that the overall project cost could be less. However, the successful bidders in ICB in case of all the projects under LoT-1A were domestic vendors. Further, most of these domestic bidders also had technology transfer arrangement with established international vendors. Accordingly, for stations not covered under the Mega Power Project Policy, DCB (Domestic Competitive Bidding) were adopted as Customs Duty could be avoided, thus bringing down the overall cost of the FGD installation. FGD system for Solapur STPS has been awarded through ICB route and for Sipat STPSS-I through DCB route. The base cost discovered for installation of FGD at Solapur STPS is ₹ 36 lakh/MW (through ICB) and for Sipat STPSS-I is ₹ 35 lakh/MW (through DCB). Thus, both are comparable with CEA prescribed base cost. Based on the experience of ICB, response from domestic players, discovery of competitive cost etc., it was decided to utilize the competitiveness shown by these players further and subsequently the DCB was adopted for other projects in subsequent lots including SSTPS-I. The cost discovered through ICB for Solapur STPS and DCB for Sipat STPSS-I have equally proved to be effective for the purpose of determining the most efficient cost. The Commission in its order in Petition No. 152/MP/2019, MPL vs. TPDDL, has already approved the cost of FGD discovered through DCB.

Hearing dated 12.3.2021

13. The representative of the Petitioner, during the hearing on 12.3.2021, submitted that the Petitioner proposed SNCR technology for reduction of NOx emissions. However, with relaxation of the emission norms for NOx from 300 mg/Nm^3 to 450 mg/Nm^3 for plants installed between 1.1.2004 and 31.12.2016 vide MoEFCC Notification dated 19.10.2020, there is no requirement for installation of ECS for NOx control in case of the TPPs covered in the instant petitions. He further

submitted that the revised indicative tariff has been filed and shared with the beneficiaries.

14. The Petitioner has filed the instant two petitions under the 2019 Tariff Regulations for in-principle approval of the additional capital expenditure for implementation of the ECS. The Petitioner initially sought approval of additional APC (Auxiliary Power Consumption), Gross Station Heat Rate (GSHR), additional water consumption, additional O&M Expenses, cost of reagents and availability of the station/ unit on account of shutdown for implementation of ECS under Regulation 76 (Power to Relax) of the 2019 Tariff Regulations as there were no specific provisions under the 2019 Tariff Regulations. During the pendency of the proceedings, the 2020 Amendment Regulations were notified by the Commission wherein specific provisions have been made which deal with some of the prayers made by the Petitioner. The Petitioner in its rejoinders to the reply filed by the Respondents and in response to the reply filed to the queries in the Record of Proceedings (RoPs) has submitted that its prayers made in the Petition may be dealt under the 2020 Amendment Regulations. Accordingly, some of the prayers made by the Petitioner are dealt as per the provisions of the 2020 Amendment Regulations in this order.

15. The Petitioner has submitted that due to COVID-19 pandemic and the subsequent lockdown across the country and restriction on movement of the persons, the Petitioner was unable to file affidavits in support of the petition, reply to the RoPs and rejoinders as required under the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999, and requested to allow the Petitioner to file the affidavits after return of normalcy. It is observed that the Petitioner has filed the affidavits in support of the submissions made by it and accordingly the submissions made by the parties are considered in the petition.

Hearing dated 31.3.2021 and 29.4.201

16. During the hearing on 31.3.2021 and 29.4.2021, the learned counsel for the Petitioner while responding to contentions of the Respondents regarding compliance with Regulation 29 of the 2019 Tariff Regulations reiterated the submissions made in the petition and narrated the circumstances which led to the commencing the process of tendering and awarding FGD systems. The gist of the submissions made by the learned counsel for the Petitioner during the hearing are as follows:

(a) As per the MoEFCC Notification, all TPPs were required to comply with the revised ECNs within a stipulated period. As per the Resolution of the Board of Directors of the Petitioner dated 22.3.2017 and the minutes of the 444th meeting, the proposal for interim environmental action plan for implementation of revised ECS was adopted. Accordingly, the process of tendering and awarding FGD systems was initiated during the 2014-19 tariff period. The 2014 Tariff Regulations do not provide for any specific regulation to deal with capital expenditure to be incurred for complying with the new environmental norms.

(b) Petition No. 98/MP/2017 was filed for in-principle approval of the capital cost required for installation of ECS. In the order dated 20.7.2018 in Petition No. 98/MP/2017, the Commission held that the MoEFCC Notification constitutes “change in law” and that ACE incurred towards implementation of ECS for meeting the revised emission standards shall be admissible under “change in law” after prudence check by the Commission. The Commission further directed CEA to prepare guidelines to meet the revised ECNs stipulated under the MoEFCC Notification. There was no direction to CEA to recommend technology for each/ specific plant of the Petitioner. Prior to the 2019 Tariff Regulations or the order dated 20.7.2018 in Petition No. 98/MP/2017, there was no express or implied direction to NTPC that for its various individual projects, it has to seek approval for the technology selected. The Commission only observed that on basis of the guidelines/ recommendations and operational parameters determined by CEA, the Commission will approve expenditure after prudence check as per Regulation 14(3) of the 2014 Tariff Regulations.

(c) All the 47 beneficiaries of NTPC were made Respondents in the Petition No. 98/MP/2017. Tata Power Delhi Distribution Limited (TPDDL) had contended in Petition No. 98/MP/2017 that the Petitioner had to comply and incur expenditure as per prudent commercial discretion and practices and that the Commission may carry out prudence check once the expenditure has actually been incurred by NTPC. Now the Respondents cannot change their stand and contend that prior approval of the beneficiaries was required before incurring expenditure.

(d) In addition to compliance with the MoEFCC Notification, the progress of the work was also being monitored by the Hon'ble Supreme Court. The non-compliance of revised ECNs would have resulted in revocation of environment clearance, which in turn would have affected the beneficiaries and consumers.

(e) The Board of Directors of the Petitioner approved the proposal to award the contracts for the FGD package. The investment approval for each project has also been accorded by the Board of Directors.

(f) In most of the cases, the tenders were floated as early as possible owing to strict timeline for complying with the revised emission standards. Regulation 29 of the 2019 Tariff Regulations does not prohibit any generator for tendering before the approval granted under Regulation 29(3).

(g) The Hon'ble Supreme Court on the basis of affidavits of CEA and Ministry of Power in the case of MC Mehta Vs. Union of India, prescribed the timeline of December 2021 for implementation of revised ECNs for generating stations of NTPC and for this reason, the tenders were floated/ awarded and all this was done before the 2019 Tariff Regulations came into effect. A fair and transparent bidding process has been followed to discover the most competitive price.

(h) Irrespective of the useful life of the plant, the mandate of the MoEFCC Notification dated 7.12.2015 had to be implemented.

(i) Neither the MoEFCC Notification dated 7.12.2015 nor the 2014 Tariff Regulations nor the 2019 Tariff Regulations provide for selection of particular

type of technology for a power plant. CEA also does not prescribe selection of any particular type of technology for power plants. Regulation 29 of the 2019 Tariff Regulations does not mandate consulting CEA for selection of technology for installation of ECS.

(j) All possible information in compliance of Regulation 29 of the 2019 Tariff Regulations with respect to installation of ECS at various stations/ plants of the Petitioner has been shared with Respondents/ beneficiaries. The obligation of the Petitioner under Regulation 29 of the 2019 Tariff Regulations stands discharged.

Maintainability

17. MSEDCL, MPPMCL and CSPDCL have submitted that the Petitioner has not followed the procedure laid down under Regulation 29(2) of the 2019 Tariff Regulations and, hence, these petitions should be rejected as being not maintainable. MSEDCL has submitted that as per Regulation 29 of the 2019 Tariff Regulations, the Petitioner intending to implement ECS in compliance of the revised ECNs in terms of the MoEFCC Notification and the consequent capital expenditure is required to share the proposal with the beneficiaries and only then it can file a petition for undertaking such ACE. MSEDCL has submitted that the Petitioner has neither informed nor consulted the beneficiaries while the Petitioner proceeded for tendering and awarding the FGD systems and placed the Notification of Award (NoA) on 24.5.2019 and 31.7.2018. MSEDCL has submitted that the Petitioner has shared the details with the beneficiaries only on the directives of the Commission and requested not to consider the unilateral proposal of the Petitioner.

18. MPPMCL has submitted that the Petitioner has bypassed the steps and the procedure laid down in Regulation 29 of the 2019 Tariff Regulations. The Petitioner has directly filed petition for determination of “indicative tariff” based on “estimated costs” for implementation of ECS in violation and disregard of Regulation 29 of the

2019 Tariff Regulations and, hence, sought dismissal of the petition.

19. In response to the contentions of MSEDCL and MPPMCL, the Petitioner has submitted that as per the MoEFCC Notification, ECS was to be installed in TPPs in NCR (National Capital Region) by December 2019 and in other TPPs by December 2022. The deadlines have been extended by the Hon'ble Supreme Court to December 2021 in case of highly polluted and densely populated areas and to December 2022 in other stations and that the progress of work is being monitored by the Hon'ble Supreme Court. As the revised ECNs are mandatory and to be implemented within a stipulated timeframe, the Petitioner started pre-award activities such as location survey, preparation of technical specifications, floating of bid/ tender, etc. which involves lot of time. Taking into consideration that it would take 3 years from pre-award activities for installation of ECS, the Petitioner proceeded for tendering and awarding FGD systems in a phased manner through a transparent competitive bidding process and NIT was floated in Petition No. 67/MP/2020 and Petition No. 515/MP/2020 on 24.5.2019 and 31.7.2018 respectively. All these activities took place during the 2014-19 tariff period and were governed by provisions of the 2014 Tariff Regulations. By the time the 2019 Tariff Regulations were notified, the installation of ECS was at different phases of pre-award activities, NITs regarding competitive bidding etc. The instant two petitions were filed after the notification of the 2019 Tariff Regulations and the petitions were served on the beneficiaries. Further, the proposal was shared with the beneficiaries as per the directions of the Commission along with the re-computed indicative supplementary tariff in line with the provisions of the 2020 Amendment Regulations.

20. We have considered the contentions of MPPMCL, MSEDCL and CSPDCL and the clarifications given by the Petitioner. The basic contention of the

Respondents is that the Petitioner has not complied with the provisions of Regulation 29 of the 2019 Tariff Regulations and, therefore, the instant petitions are not maintainable and should be rejected. Regulation 29 of the 2019 Tariff Regulations provides as under:

> ***"29. Additional Capitalization on account of Revised Emission Standards****:*
>
> *(1) A generating company requiring to incur additional capital expenditure in the existing generating station for compliance of the revised emissions standards shall share its proposal with the beneficiaries and file a petition for undertaking such additional capitalization.*
>
> *(2) The proposal under clause (1) above shall contain details of proposed technology as specified by the Central Electricity Authority, scope of the work, phasing of expenditure, schedule of completion, estimated completion cost including foreign exchange component, if any, detailed computation of indicative impact on tariff to the beneficiaries, and any other information considered to be relevant by the generating company.*
>
> *(3) Where the generating company makes an application for approval of additional capital expenditure on account of implementation of revised emission standards, the Commission may grant approval after due consideration of the reasonableness of the cost estimates, financing plan, schedule of completion, interest during construction, use of efficient technology, cost-benefit analysis, and such other factors as may be considered relevant by the Commission.*
>
> *(4) After completion of the implementation of revised emission standards, the generating company shall file a petition for determination of tariff. Any expenditure incurred or projected to be incurred and admitted by the Commission after prudence check based on reasonableness of the cost and impact on operational parameters shall form the basis of determination of tariff."*

21. As per Regulation 29(1) of the 2019 Tariff Regulations, a generating company intending to incur ACE towards installation of revised ECS shall share its proposal with the Respondents/ beneficiaries and file a petition for undertaking ACE. The proposal should contain the details of the proposed technology as specified by CEA and other relevant information under Regulation 29(2) of the 2019 Tariff Regulations. On an application by the generating station, the Commission may approve ACE towards the implementation of ECS after prudence check as per Regulation 29(3) of the 2019 Tariff Regulations. As per Regulation 29(4) of the 2019 Tariff Regulations,

the generating station after implementation of the revised ECS shall file a petition for determination of tariff.

22. The beneficiaries have contended that the Petitioner is required under Regulation 29(1) of the 2019 Tariff Regulations to share the proposal to incur the ACE for implementation of the revised ECNs with the beneficiaries and thereafter file a petition for undertaking such ACE. However, the Petitioner has not shared the proposal along with the details, as specified in Regulation 29(1) and Regulation 29(2) of the 2019 Tariff Regulations, and as such the petition should be rejected at the outset. In response, the Petitioner has submitted that as the installation of ECS is a long drawn process and was to be implemented within a strict timeframe, which was being monitored by the Hon'ble Supreme Court, the Petitioner had initiated the pre-award activities and floated NIT during the 2014-19 tariff period. The Commission has already dealt with the concerns raised by MPPMCL in order dated 28.4.2021 in Petition No. 335/MP/2020 and batch matters. The relevant portion of the order dated 28.4.2021 is as follows:

> *"18. It is observed that the Commission in order dated 20.7.2018 in Petition No. 98/MP/2017 has already held that ACE due to "change in law or compliance with any existing law" is allowable and, therefore, ACE due to installation of ECS in compliance with the MoEFCC Notification, which is a "change in law" event shall be admissible after due prudence check under Regulation 14 of the 2014 Tariff Regulations. Taking into consideration the observations of the Commission in order dated 20.7.2018, the stringent timelines specified in the MoEFCC Notification and the fact that the compliance of the revised ECNs is being monitored by the Hon'ble Supreme Court, the Petitioner had initiated and taken substantial action for installation of ECS for meeting the revised ECNs in the right earnest during the 2014-19 tariff period. This can be seen from the following table:*

Petition No.	***Generating station/unit Capacity (MW)***	***BoD Meeting No. and date of approval of the proposal for FGD***	***Date of issue of IFB***	***BOD Meeting No. and date of approval of award of FGD***	***BOD Meeting No. and date of Investment Approval for FGD***	***Date of issue of NoA***
509/MP/2020	*VSTPS-III (2X500)*	*444th 22.3.2017*	*31.7.2017*	*463rd 8.9.2018*	*463rd 8.9.2018*	*18.9.2018*
516/MP/2020	*VSTPS-IV (2X500)*	*444th 22.3.2017*	*31.7.2017*	*463rd 8.9.2018*	*463rd 8.9.2018*	*18.9.2018*

526/MP/2020	*MSTPS-I (2X500)*	*444th 22.3.2017*	*31.7.2017*	*259th 8.9.2018*	*463rd 8.9.2018*	*18.9.2018*
512/MP/2020	*MSTPS-II (2X660)*	*444th 22.3.2017*	*30.6.2017*	*462nd 28.7.2018*	*462nd 28.7.2018*	*31.7.2018*
335/MP/2020	*VSTPS-I (6X210)*	*444th 22.3.2017*	*28.9.2018*	*473rd 1.7.2019*	*475th 10.8.2019*	*22.8.2019*
519/MP/2020	*VSTPS-II (2X500)*	*444th 22.3.2017*	*28.9.2018*	*473rd 1.7.2019*	*475th 10.8.2019*	*22.8.2019*
338/MP/2020	*KSTPS-I&II (3X200 + 3X500)*	*444th 22.3.2017*	*28.9.2018*	*473rd 1.7.2019*	*475th 10.8.2019.*	*22.8.2019*
521/MP/2020	*KSTPS-III (500)*	*444th 22.3.2017*	*28.9.2018*	*473rd 1.7.2019*	*475th 10.8.2019*	*22.8.2020*
339/MP/2020	*SSTPS-II (2X500)*	*444th 22.3.2017*	*24.4.2020*	*The bidding for FGD is under process.*		

19. The requirement of sharing the proposal for installation of ECS for meeting the revised ECNs with the beneficiaries was introduced in the 2019 Tariff Regulations, which were notified in March 2019 and is effective since 1.4.2019 i.e. much after the Petitioner had initiated action for installation of ECS for meeting the revised ECNs in compliance with the MoEFCC Notification. Therefore, the Petitioner could not have shared the proposal for installation of the ECS with the beneficiaries in the year 2017 or 2018, as the provision of sharing such proposal was mandated only in the 2019 Tariff Regulations.

20. However, the Petitioner has shared the proposal for installation of the ECS with the beneficiaries on the directions of the Commission. Further, on the request of the beneficiaries during the hearing on 12.3.2021, the Petitioner was directed to provide the relevant information to the beneficiaries. Moreover, a copy of the petition is automatically served on the beneficiaries immediately after the petition is uploaded in the e-filing portal of the Commission. Therefore, we are unable to agree with the beneficiaries that the instant petitions should be rejected and the Petitioner should be asked to file fresh petitions as per the procedure laid down in Regulation 29(1) of the 2019 Tariff Regulations. Accepting contentions of the Respondents would serve no material purpose and only delay the installation of the ECS and the Petitioner would not be able to comply with the timelines specified in the MoEFCC Notification and directions of the Hon'ble Supreme Court. Therefore, we reject the contentions of the beneficiaries on maintainability and are considering the instant nine petitions for "in-principle approval" under Regulation 11 of the 2019 Tariff Regulations."

23. Moreover, in the instant case, IFB (Invitation for Bids) in case of Sipat TPS and Solapur TPS was issued on 31.8.2018 and 30.6.2017 respectively, i.e. during the 2014-19 tariff period and prior to the notification of the 2019 Tariff Regulations. Further, NoA in case of Solapur TPS was also issued on 31.7.2018, during the 2014-19 tariff period and before the notification of the 2019 Tariff Regulations. It is observed that the process for installation of ECS was initiated during the 2014-19 tariff period and as there was no provision in the 2014 Tariff Regulations for sharing

any proposal that would lead to ACE, the Petitioner did not share the proposal for installation of ECS with the beneficiaries/ Respondents. It is also observed that the Petitioner has shared all the details with the beneficiaries/ Respondents on filing of the petitions and on the directions of the Commission.

24. In view of the above discussion, we reject the contentions of the Respondents and hold that instant petitions are maintainable.

Other issues

25. MPPMCL has contended that 90% of proposed ACE for installation of ECS has been distributed in balance useful life of the plant and it should be allowed @3.6% per year spreading the expenditure over 25 years to avoid the tariff shock on the ultimate consumers of the electricity. It is also observed that the Petitioner has claimed depreciation of ECS installed in the instant petitions over different time periods.

26. We have considered the submissions of MPPMCL. Any claim in this regard shall be considered at the time of determination of supplementary tariff for ECS as per the provisions of the 2019 Tariff Regulations.

27. MPPMCL and CSPDCL have contended that the Petitioner has adopted DCB and it has resulted in loss of opportunity for selection of cost-effective and suitable technology.

28. It is observed that the Petitioner adopted ICB in case of Solapur STPS and DCB in case of Sipat STPSS-I. The price discovered for Wet Limestone based FGD system is ₹ 36.36 lakh/MW and ₹ 35.54 lakh/MW in case of Solapur STPS and Sipat STPSS-I respectively, which is lesser than ₹ 37 lakh/MW recommended by CEA. Further, the Petitioner has submitted that the domestic suppliers have arrangements

with the international suppliers with regard to technology. Therefore, we are of the view that the technology selected by the Petitioner is cost effective and suitable for the instant projects and as such there is no merit in the contention of the Respondents.

Prayers of the Petitioner

29. We now take up the prayers made by the Petitioner in the instant two petitions. The prayers made by the Petitioner are similar in both the petitions and hence they are dealt together and they are as follows:

(a) approve implementation of the ECS in order to meet revised ECNs;

(b) grant liberty to approach Commission for approval of implementation of ECS on account of Mercury, water consumption and particulate matter in future, if required;

(c) allow additional APC;

(d) allow additional GSHR;

(e) allow additional water consumption;

(f) allow additional O&M Expenses;

(g) allow cost of reagents; and

(h) allow deemed availability on account of shutdown.

(a) Approve implementation of ECS and allow incurring ACE

30. The Petitioner has sought approval for undertaking implementation of ECS in order to meet revised ECNs and the consequent ACE. The Petitioner has proposed Wet Limestone based FGD system in both the generating stations covered in the instant petitions. The Petitioner had initially proposed Combustion Modification as the primary measure in both generating stations; SNCR as the secondary measure to control NOx emissions in case of Sipat STPSS-I; and SCR as the secondary measure to control NOx emissions for Solapur STPS. The Petitioner had considered

the capital cost of ECS discovered through competitive bidding and certain other operating parameters to arrive at the indicative supplementary tariff in the petition. The capital cost claimed towards ECS, the proposed technology for control of SO_2 and NO_x, the indicative supplementary tariff and other parameters considered by the Petitioner are different for the subject two generating stations. The claims made by the Petitioner for the generating stations covered in the instant two petitions are given hereunder.

Petition No. 67/MP/2020 - Sipat STPSS-I (3X660)

31. The details as regards Sipat STPSS-I are as under:

(a) The following capital cost, phasing of funds and operating parameters for computing the indicative supplementary tariff was initially considered:

Sl. No.	Particulars	FGD*	SCNR	De-NOx Combustion System	Remarks
1	Capital Cost (in Rs. crore)	911.37	99.00 (without tax/IDC etc.)	20.86 (without IDC etc.)	SCNR implementation shall be decided based on pilot test report.
2	Normative Specific Limestone/ Reagent Consumption (kg/kWh)	0.0173 (Limestone)	0.0015 (Urea)	Nil	
3	Additional APC	1%	0.6%	Nil	
4	Additional O&M	4% of capital cost			
5	Shutdown Period	30-45 days	15 days	45 to 60 days	
6	Increase in GSHR		9.28 kCal/kWh	18.56 kCal/kWh	0.8% increase due to De-NOx combustion. 0.4 to 0.6% increase due to SNCR.

(b) The indicative supplementary tariff impact (without considering the impact on GSHR) due to installation of schemes in order to meet Revised Emission Standards is FC (Fixed Cost): 16.23 paise/KWh, VC (Variable Cost): 6.39 paise/kWh (1st year) and FC (Fixed Cost): 21.65 paise/kWh (levelized). There would be further increase in Energy Charge Rate and per unit Fixed

Charge (@85% scheduled generation) of the station by about 5 paise/ kWh due to increased APC and Station Heat Rate.

(c) Sipat STPSS-I comprises three units of 660 MW each and their remaining useful life is about 16 years. It was commissioned on 1.8.2012.

(d) The FGD technology adopted for Sipat STPSS-I meets the criteria indicated in CEA advisory dated 7.2.2020 and it would also meet the SO_2 emission norms specified by the MoEFCC Notification.

(e) As regard NOx technology for Sipat STPSS-I, the Petitioner had initially considered combination of two technologies i.e. Combustion Modification as the primary measure and Selective Non-catalytic Reduction (SNCR)/ Selective Catalytic reduction (SCR) as the secondary measure to meet the norm of NOx emission. However, with relaxation of the emission standards for NO_x vide MoEFCC Notification dated 19.10.2020, now only Combustion Modification will be implemented as primary system of DeNOx to bring the level of NOx emission below 450 mg/Nm^3 while the secondary DeNOx system of SNCR proposed initially in the instant station is not being implemented.

(f) Primary DeNOx system of Combustion Modification for the instant station has been awarded to GE Power India Ltd. (GEPIL) through DCB Route.

(g) The Board of Directors of the Petitioner, in the 444th meeting held on 22.3.2017 gave approval for planning and tendering of ECS to comply with MoEFCC Notification dated 7.12.2015. Accordingly, Invitation for Bids (IFB) for installation of FGD system at for Sipat STPSS-I was issued on 31.8.2018 and the lowest bidder GEPIL emerged as the successful bidder. The Board of Directors of the Petitioner accorded the Investment Approval to undertake implementation of FGD system in the instant station in the 471st Meeting dated 3.5.2019. Subsequent to NoA for installation of FGD on 24.5.2019, GEPIL has started the works for installation of FGD system and at present the civil works are in progress.

(h) FGD for Sipat STPSS-I has been awarded through DCB route.

(i) The capital cost of ₹ 911.37 crore for Wet limestone based FGD system claimed for Sipat STPSS-I comprises work cost (base cost), IDC with finance charges and GST. However, the revised capital cost is envisaged as ₹ 893.69 crore based on award. Accordingly, the indicative tariff will further reduce on account of the revised capital cost. The hard cost is around ₹ 703.62 crore. Accordingly, the base cost of FGD system is ₹ 35.54 lakh/MW, which is within the base cost of ₹ 37 lakh/MW recommended by CEA

(j) The projected capital cost for De-NOx system: ₹ 119.86 crore (CM: ₹ 20.86 crore and SNCR: ₹ 99 crore) and FGD: ₹893.69 crore (as revised) for Sipat STPSS-I. However, SNCR is no more proposed to be installed, and accordingly, the tariff of ECS as proposed may further get reduced, assuming all other parameters remain same.

(k) The break-up of the capital cost claimed vide affidavit dated 25.3.2021 is as follows:

Unit	Capacity (MW)	CEA's indicative hard cost (₹ lakh per MW)	Hard cost claimed (₹ lakh per MW)	*Total IDC claimed (₹ lakh)	*Total IEDC claimed (₹ lakh)	#Total FERV claimed (₹ lakh)	*Total taxes & duties claimed (₹ lakh)	Total other costs claimed (₹ lakh)	**Total costs claimed (₹ lakh)
Sipat STPSS-I	3X660	37 (660MW)	35.54	3584.82	2490.83	_	12665.23	265.88	89369.13

**tentative, # Will be provided on actuals during determination of tariff*

(l) The bidding and award have been carried out in a fair and transparent manner as per delegation of power (DOP) of NTPC, which is in line with the Government of India guidelines.

Petition No. 515/MP/2020 - Solapur STPS (2x660 MW)

32. The details as regards Solapur STPS are as under:

(a) The Petitioner has initially considered the following capital cost and operating parameters for computing the indicative supplementary tariff for Solapur STPS:

Sl. No.	Particulars	FGD	SCR	Remarks
1	Capital Cost (in ₹ crore)	626.32	507.83	SCR implementation shall be decided based on pilot test report.

2	Normative Specific Limestone/ Reagent Consumption (kg/kWh)	0.013 (Limestone)	0.001 (Ammonia)	
3	Additional APC	1%	0.4%	
4	Additional O&M	4% of capital cost		
5	Shutdown Period	45 days	15 days	
6	Increase in GSHR		2.24 kCal/kWh	Modification. 0.1% increase due to SCR.

(b) The indicative supplementary tariff impact (without considering the impact on GSHR) due to installation of ECS in order to meet Revised Emission Standards is FC (fixed cost): 26.59 paise/kWh, VC (variable cost): 7.60 paise/kWh (1st year) and FC (fixed cost): 24.95 paise/kWh, (levelised). There would be further increase in Energy Charge Rate and per unit Fixed Charge (@85% scheduled generation) of the station by about 8 paise/kWh due to increased APC and Station Heat Rate.

(c) The Solapur STPS was commissioned on 30.3.2019 and remaining useful life of the plant as on 1.4.2020 is approximately 23.24 years. As per the 2019 Tariff Regulations, presently the generating station is not eligible for availing special allowance and, therefore, the station has not availed the benefit of special allowances and has not claimed ACE for R&M activities for life extension.

(d) The Petitioner has claimed depreciation of 90% of the capital cost of ECS (FGD/SNCR) over the balance useful life of the generating station or 5 years, whichever is higher.

(e) The FGD technology adopted for Solpaur STPS meets the criteria indicated in CEA advisory dated 7.2.2020 and would also meet the SO_2 norms specified by the MoEFCC Notification.

(f) The Board of Directors of the Petitioner, in its 444th Meeting held on 22.3.2017, gave their approval for planning and tendering of ECS to comply with the MoEFCC Notification dated 7.12.2015. In the 462nd Meeting dated 28.7.2018, the Board of Directors of the Petitioner, approved the proposal to award the contracts for the FGD package and accorded the Investment Approval to undertake implementation of FGD system. IFB for installation of FGD system was issued on 30.6.2017 and the bid opening/ closing date was

17.8.2017. GEPIL emerged as the successful bidder (L1) and was awarded the contract for installation of FGD at Solapur STPS. Accordingly, on 31.7.2018, NoA was issued to GEPIL for FGD installation. At present, the process of engineering and ordering of equipment by the GEPIL is in progress.

(g) The FGD system for Solapur STPS (2x660 MW) has been awarded through ICB route.

(h) In the MoEFCC Notification dated 7.12.2015, the revised ECNs with respect to NOx was 100 mg/Nm^3. Therefore, the technology of SCR has been adopted for the instant station as per the recommendations of CEA. Combustion Modification for De-NOx system has not been proposed for the instant station. The matter for revision of NOx emission norms for the stations/ units commissioned on or after 1.1.2017 (where SCR is envisaged) is sub-judice before the Hon'ble Supreme Court and installation of the same shall depend upon the outcome of the Apex Court judgment.

(i) As per the 2020 Amendment Regulations, the depreciation for Solapur STPS shall be recoverable over twenty five years. Accordingly, the same shall be considered while filing of petition for determination of tariff of ECS of instant station after implementation of these systems as per the provisions of the Regulation 9(3) read with Regulation 29(4) of the 2019 Tariff Regulations.

(j) Opportunity cost arising on account of shut-down of the unit(s) and any associated costs for installation of ECS has not been considered at this stage.

(k) The break-up of the capital cost claimed for FGD installation vide affidavit dated 25.3.2021, is as follows:

Particulars	(₹ in lakh
Work Cost	48000
GST (@18%)	8640
IEDC (@3%)	1699.2
Total	**58339.2**
IDC (8.75%)	4073.65
FC (0.5% of debt)	219.21
Total Cost	**62632.06**

(l) The break-up of the capital cost claimed for FGD is as follows:

Unit	Capacity (MW)	CEA's indicative hard cost (₹ lakh per MW)	Hard cost claimed (₹ lakh per MW)	*Total IDC claimed (₹ lakh)	*Total IEDC claimed (₹ lakh)	#Total FERV claimed (₹ lakh)	*Total taxes & duties claimed (₹ lakh)	*Total other cost claimed (₹ lakh)	Total cost claimed (₹ lakh)
Solapur STPS	1320	37	36.36	4073.65	1699.2	_	8640	219.21	62632.06

**** Indicative, # Shall be provided during determination of tariff based on actuals***

33. With respect to prayers of the Petitioner, the Respondents have raised issue of (a) the approvals and the bidding process, (b) the suitability and effectiveness of ECS and (c) the capital cost of the identified ECS. We deal with these concerns of the Respondents one by one.

Approvals and the bidding process

34. The revised ECNs notified by MoEFCC on 7.12.2015 specify norms for water consumption, particulate matter, SO_2, NO_x and Mercury. The Petitioner has submitted that its TPPs meet the revised ECNs with respect to particulate matters, water consumption and Mercury. Therefore, the Petitioner's BoD considered the revised ECNs pertaining to SO_2 and NO_x in its 444th meeting held on 22.3.2017 and approved the 'Proposal for interim Environmental Action Plan for meeting the New ECNs (notified by MoEFCC on 7.12.2015)'. Thereafter, the Petitioner went through various stages of selection of technology on the basis of efficiency, capital and operating costs, location of plant, reliability, availability of suppliers, supply chain and disposal, etc. The Petitioner went through the pre-award activities like detailed engineering, NIT approval and publication of IFB, etc. For Sipat STPSS-I, the bids were called under DCB and for Solapur STPS, ICB was called for on two-stage bidding basis, i.e. techno-commercial bid and price bid. The bidders were evaluated and those found qualified in the first stage (techno-commercial bid) were asked to submit price bids through e-tendering portal. Based on the price bids, the L1 bidder was considered for award of contract. IFB for installation of FGD in the generating

stations in the Petition No. 67/MP/2020 and Petition No. 515/MP/2020 were issued on 31.8.2018 and 30.6.2017 respectively. The Petitioner's BoD in its 471st and 462nd meeting accorded the investment approval and approved the award of FGD system. Accordingly, the Petitioner issued NOA to the L1 bidders in stages and the said details are tabulated as under:

Petition No.	Generating station/unit Capacity (MW)	Meeting No. and date of approval of proposal for FGD	Date of issue of IFB	Meeting No. and date of approval of award of FGD	Meeting No. and date of Investment Approval	Date of issue NoA
67/MP/2020	SSTPSS-I (3X660)	444th dated 22.3.2017	31.8.2018	471st dated 3.5.2019	471st dated 3.5.2019	24.5.2019
515/MP/2020	SSTPS-II (1320)	444th dated 22.3.2017	30.6.2017	462nd dated 28.8.2018	462nd dated 28.7.2018	31.7.2018

35. We have also perused the extracts of the various minutes of meetings of the Petitioner's Board submitted by the Petitioner in support of its contention that the whole process from identification of the suitable technology to NoA to the selection/ award of work to L1 bidders was with the approval of its Board. The Petitioner has also certified that bidding and award has been carried out in a fair and transparent manner as per Delegation of Power (DoP) of the Petitioner and it is in line with the Government of India guidelines. The Petitioner has also submitted that the Wet Limestone based FGD is the most appropriate technology to meet the ECNs (related to SO_2) specified in the MoEFCC Notification and it is in line with CEA's recommendations dated 21.2.2019. As regards Combustion Modification for controlling NO_x, the Petitioner has followed similar bid/ award process as in case of FGD system. It is observed that in case of Sipat STPSS-1 and Solapur STPS, NoA has been issued and work is under progress. IFBs were issued on 31.8.2018 and 30.6.2017 i.e. during the 2014-19 tariff period. After the issuance of MoEFCC Notification dated 7.12.2015, the developments relating to compliance of the said notification have taken place during the 2014-19 tariff period which were also being

monitored by Ministry of Power, MoEFCC, CEA and the Hon'ble Supreme Court of India. Therefore, owing to strict timeline for complying with the revised emission standards, the Petitioner has floated the tender, awarded the work and civil work has already commenced in both the generating stations. The 2019 Tariff Regulations came into force after IFBs were issued for the generating stations and requirement under Regulation 29(1), Regulation 29(2) and Regulation 29(3) of the 2019 Tariff Regulations could not be complied in strict sense owing to the strict timelines and possible punitive action for non-compliance. Having gone through the documents submitted by the Petitioner, we are of the view that the process from the stage of identification of FGD package to NoA was with the approval of the Petitioner's BoD and as per the procedure laid down under its DoP and the bidding was carried out in a fair and transparent manner.

Suitability and effectiveness of ECS

36. The Petitioner has proposed Wet Limestone based FGD systems to comply with the revised SO_2 emission norms in case of the instant two generating stations. The Petitioner has submitted that it has been used successfully around the world as it is capable of very high SO_2 removal efficiency (around 98%), operates with very low Ca/S molar ratio, is best suited for stations with high PLF and there are many technology providers leading to advantages in competitive bidding process. The Petitioner has further submitted that as per the CEA's Advisory dated 7.2.2020, TPPs should select the appropriate FGD technology based on parameters like SO_2 removal efficiency, units' size, balance plant life and the geographical location of TPPs.

37. The Petitioner had initially considered combination of two technologies i.e. Combustion Modification as the primary measure and Selective Non-catalytic Reduction (SNCR)/ Selective Catalytic reduction (SCR) as the secondary measure

to meet the norms w.r.t. NO_x emission in case of Sipat STPSS-I. However, with relaxation of the emission standards for NOx vide MoEFCC Notification dated 19.10.2020, the Petitioner has proposed installation of only Combustion Modification as primary system of De-NOx to bring the level of NOx emission below 450 mg/Nm^3 and the secondary De-NOx system of SNCR proposed initially is not being implemented.

38. It is also observed that for Solapur STPS, the Petitioner has adopted technology of SCR in view of the MoEFCC Notification dated 7.12.2015, wherein the emission norms with respect to Oxides of Nitrogen (NOx) was 100 mg/Nm^3. It is also submitted that Combustion Modification for De-NOx system has not been proposed for Solapur STPS. The Petitioner has further submitted that the matter for revision of NOx emission norms for the stations/ units commissioned on or after 1.1.2017 (where SCR is envisaged) is sub-judice before the Hon'ble Supreme Court and installation of the same shall depend upon the outcome of the Apex Court judgment.

39. We have considered the submissions of the Respondents and the Petitioner. Compliance with revised ECNs as per the MoEFCC Notification is mandatory for all the TPPs including those of the Petitioner and they were to be complied within a strict timeline, which has however, been revised from time to time. Considering the fact that the implementation of ECNs as mandated through the MoEFCC Notification is being monitored by the Hon'ble Supreme Court and the serious consequence of non-compliance of the directions issued by MoEFCC under Section 6 of the Environment Protection Act, 1986 read with Rule 3 of the Environment protection Rules, 1986, the Petitioner has initiated the process for implementation of ECS in 2017 and had issued IFBs in the years 2017 and 2018 before the issue of CEA's recommendations dated 21.2.2019 and thereafter has also issued NoA in 2018 and

2019. The Wet Limestone based FGD system proposed by the Petitioner is also in line with CEA's recommendations. The details of the capital cost of the technology proposed by the Petitioner for the reduction in SO_2 and NO_x emissions are as follows:

Petition No.	Generating station/unit Capacity (MW)	COD	Remaining use life as on 1.4.2020	CEA indicative cost per MW for FGD (₹ in lakh)	Capital cost of per MW of FGD claimed by the Petitioner (₹ in lakh)	Total capital cost of Combustion Modification System claimed by the Petitioner (₹ in crore)
67/MP/2020	Sipat STPSS-I (1980)	1.8.2012	16 years	37.00	35.54	20.86 *
515/MP/2020	Solapur STPS (1320)	30.3.2019	23.24 years	37.00	36.36	507.84 **

* estimated capital cost of De-NOx combustion system for 1980 MW is approx. ₹ 20.86 crore (without taxes etc.)

** cost of SCR

40. The suitability and selection of the technology depends on various parameters like the age, size and location of the plant/ generating station, cost and availability of the technology, cost and availability of the reagents, usage of the by-products, etc. CEA has recommended four types of technologies for control of SO_2 emissions and the Petitioner has selected Wet Limestone based FGD system for both the generating stations under the instant petitions. The Petitioner has clearly outlined the advantages of Wet Limestone based FGD system over other FGD systems as far as its generating stations are concerned. Further, large number of Wet Limestone based FGD technology providers offer an opportunity for obtaining competitive prices. The Petitioner has also suggested that the efficiency level of wet limestone based FGD system in reducing the SO_2 emissions is around 98% which is better than the other three technologies suggested by CEA. The Petitioner has also submitted that wet limestone based FGD system is best suited for generating stations/ plants which are of 500 MW and above.

41. Thus, we are of the view that the Petitioner has identified and proposed Wet Limestone based FGD systems for reduction in the SO_2 emissions taking into consideration the effectiveness, availability and cost of the Wet Limestone based FGD systems, size of the plants, operational expenses and availability of the reagents. Considering the justification submitted by the Petitioner, we are of the view that the Petitioner has done due diligence in identifying wet limestone based FGD systems as the most suitable technology for reduction of SO_2 emissions notified by MoEFCC for implementing in the subject generating stations covered in the instant two petitions.

Capital Cost of the identified ECS

42. The Petitioner has claimed the following capital cost towards implementation of Wet Limestone based FGD System to control the SO_2 emissions in the subject generating stations:

Petition No.	Generating station/unit Capacity (MW)	CEA indicative hard cost (₹ lakh per MW)	Hard cost claimed (₹ lakh per MW)	Total IDC claimed (₹ lakh)	Total IEDC claimed (₹ lakh)	Total taxes and duties claimed (₹ lakh)	Total other cost claimed (₹ lakh)	Total cost claimed (₹ lakh)
67/MP/2020	Sipat STPSS-I (1980)	37.00	35.54	3584.82	2490.83	12665.23	265.88	89369.13
515/MP/2020	Solapur STPS (1320)	37.00	36.36	4073.65	1699.2	8640	219.21	62632.06

43. MPPMCL has submitted that the capital cost of proposed Wet Limestone based FGD System in case of Solapur STPS and Sipat STPSS-I is high. The Petitioner has submitted that the cost of FGD of Solapur STPS awarded under LoT-I is ₹ 36.36 lakh/MW and that of Sipat STPSS-I awarded under LoT-I is ₹ 35.54 lakh/MW, which is within prescribed limit of the CEA recommended cost (₹ 37.00 lakh/MW).

44. We have considered the submissions of the Petitioner. The instant two petitions are for approval of installation of Wet Limestone based FGD system and

Combustion Modification System for control of SO_2 and NOx emissions respectively and the consequent ACE towards their installation. In view of the fact that the cost towards installation of FGD systems is in consonance with CEA recommended cost, in-principle approval is accorded for hard cost of ₹ 70362 lakh and ₹ 48000 lakh in case of Sipat STPSS-I and Solapur STPS respectively for installation of FGD systems. However, as the Commission is considering the instant two petitions for "in-principle approval" under Regulation 11 of the 2019 Tariff Regulations, we would not deal with the Petitioner's claim of total capital cost towards installation of ECS, which include IDC, IEDC, FERV, taxes and duties and other costs. These claims would be considered on case to case basis on petitions to be filed by the Petitioner for determination of tariff after implementation of ECS as provided under Regulation 29(4) of the 2019 Tariff Regulations. It is further observed that the capital cost claimed by the Petitioner for installation of Wet Limestone based FGD for control of SOx is lower than the capital cost of ₹ 37 lakh/MW recommended by CEA.

45. In case of Petition No. 67/MP/2020, the Petitioner vide affidavit dated 25.3.2021 has submitted that only Combustion Modification (₹ 20.86 crore) is proposed to be installed for control of NOx and SNCR proposed initially is no more required in view of the revision of norms for NOx emissions by MoEFCC. Accordingly, in-principle approval for ₹ 20.86 crore towards installation of Combustion Modification in Sipat STPSS-I, discovered through competitive bidding, is accorded. In case of Petition No.515/MP/2021, the Petitioner vide affidavit dated 25.3.2021 has submitted that the matter for revision of NOx emission norms for the stations/ units commissioned on or after 1.1.2017 (where SCR is envisaged) is sub-judice before the Hon'ble Supreme Court and installation of the same will depend upon the outcome of the apex court judgment. As such, the capital cost proposed by the Petitioner for installation of ECS for control of NOx emissions in case of Solapur

STPS is not considered in this order and will be considered after the Petitioner takes a final decision on installation of SCR.

(b) Liberty to approach the Commission

46. The Petitioner has submitted that MoEFCC Notification mandates revised ECNs for water consumption, mercury and particulate matter, besides SO_2 and NOx. As the generating stations of the Petitioner meet the norms in respect of water consumption, mercury and particulate matter as stipulated by MoEFCC, no claim has been made in respect of them. However, the Petitioner has sought liberty to approach the Commission as and when the generating stations are unable to meet those norms and work(s) pertaining to the same are undertaken in future.

47. MPPMCL has submitted that the MoEFCC Notification requires compliance with various ECNs regarding water consumption, particulate matter, SO_2, NOx and Mercury (Hg) within a specified period in one go and not individually in a phased manner. Further, Regulation 29 of the 2019 Tariff Regulations does not provide for fragmentary implementation of ECS. MPPMCL has further submitted that admitting the instant petitions would result in multiple petitions for each generating station leading to waste of valuable time of the Commission and unnecessary loading of avoidable filing fee of each petition on beneficiaries. Therefore, MPPMCL has requested to dismiss the instant petitions at the stage of admission and to direct the Petitioner to file a comprehensive revised petition covering proposed ACE for all parameters of MoEFCC Notification.

48. We have considered the submissions of the Petitioner and MPPMCL. It is observed that the MoEFCC Notification specifies revised ECNs for water consumption, particulate matter, SO_2, NOx and Mercury (Hg). The instant two generating stations of the Petitioner already meet the norms specified by MoEFCC in

case of water consumption, particulate matter and Mercury as on the date of filing of the petition. Accordingly, the Petitioner has proposed installation of ECS only in case of SO_2 and NOx. The MoEFCC Notification requires meeting revised ECNs and for that matter ECS has to be installed. In no case, does the MoEFCC Notification require a generating station to install new ECS irrespective of it meeting the revised ECNs or not. Accordingly, it is only appropriate to install ECS in respect of ECNs which are not being met by generating stations and not in case of other ECNs. Therefore, we do not find merit in the argument of MPPMCL that the Petitioner should install ECS for water consumption, particulate matter and Mercury, even if they are not required. In our view, implementing ECS without analyzing the requirements of such implementation would result in wasteful expenditure which would be to the disadvantage of the beneficiaries. Therefore, we agree with the Petitioner's methodology of installation of ECS only in case of parameters which fall short of the norms specified in the MoEFCC Notification, as it is in the interest of the beneficiaries.

49. The Petitioner's prayer for installation of ECS for control of water consumption, mercury emissions and particulate matter if required in future would be dealt as per the applicable laws and regulations.

(c) Additional Auxiliary Power Consumption (APC)

50. The Petitioner has prayed for grant of additional Auxiliary Power Consumption (APC) over and above the normative APC for the instant generating stations due to implementation of ECS under Regulation 76 (Power to Relax) of the 2019 Tariff Regulations.

51. MPPMCL has submitted that the Petitioner has not submitted the cost estimates recommended by CEA for additional APC claimed for ECS. As additional

APC will have impact on the generation tariff, the same may not be allowed without any proper justification. MPPMCL has submitted that the Petitioner has claimed that there would be further increase in Energy Charge Rate (ECR) and per unit Fixed Charge (@85% Scheduled Generation) of the generating stations by about 5 paise/kWh due to increased APC and Station Heat Rate. Further, there is no provision in the 2019 Tariff Regulations for allowing such claim and it does not call for invocation of Regulations.

52. MSEDCL has submitted that the Petitioner's claim may be decided in accordance with the 2020 Amendment Regulations, wherein the norms for APC on account of ECS of thermal generating stations have been specified.

53. In response, the Petitioner has submitted that on account of FGD system, APC for the unit/ station would increase and, therefore, the Petitioner should be suitably compensated. The instant petitions have been filed taking into account the operating parameters as envisaged at the time of filing of the petitions and the indicative tariff has been derived accordingly. The Petitioner has further submitted that additional APC for ECS has been claimed @1%, which has also been provided in the 2020 Amendment Regulations and, hence, the claim may be allowed.

54. We have considered the submissions of the Petitioner, MPPMCL and MSEDCL. The Petitioner's claim for additional APC due to installation of FGD shall be dealt as provided in Regulation 49(E)(f) of the 2020 Amendment Regulations.

(d) Gross Station Heat Rate (GSHR)

55. The Petitioner has prayed for additional GSHR over and above the normative GSHR due to implementation of ECS under Regulation 76 i.e. "Power to relax" of the 2019 Tariff Regulations.

56. MPPMCL has submitted that there is no provision in the 2019 Tariff Regulations to claim GSHR due to implementation of ECS and it does not call for invocation of Regulation 76 of the 2019 Tariff Regulations. MPPMCL has submitted that the Petitioner has neither given any reference to cost estimates given by CEA for GSHR claimed for ECS and that it will have impact on the generation tariff. Therefore, the same may not be allowed without any proper justification. MSEDCL has submitted that Regulation 29(3) of the 2019 Tariff Regulations provides that the Commission may grant approval for ACE after due consideration of the reasonableness of the cost estimates, financing plan, schedule of completion, IDC, use of efficient technology, cost-benefit analysis and such other factors as may be considered relevant. The Commission has already considered these parameters in the 2020 Amendment of Regulations. CSPDCL has submitted that there is no provision in the Regulations for allowing increase in GSHR for determination of supplementary tariff, therefore, it may not be allowed.

57. In response to the reply of MPPMCL, the Petitioner has submitted that the increase in GSHR is claimed due to installation of ECS to control NOx emissions and the same is being claimed under 'Power to Relax" as the norms specified for GSHR do not include the effect of ECS. Any implication on account of implementation of ECS in compliance of the MoEFCC Notification must be compensated. As per Regulation 29(4) of the 2019 Tariff Regulations, the impact on operational parameters shall form basis of determination of tariff and accordingly, the impact due to this parameter has been considered to compute the tentative tariff as per Regulation 29(2) of the 2019 Tariff Regulations. The Petitioner has further submitted that the instant petitions have been filed only for approval to implement ECS while for determination of supplementary tariff, the Petitioner shall approach the Commission with actual expenditure incurred for ECS post-installation of the same,

along with the normative parameters, as provided in the 2020 Amendment Regulations.

58. In response to MSEDCL and CSPDCL's reply, the Petitioner has submitted that although installation of SNCR as secondary DeNOx is no more required in view of the amended MoEFCC Notification relaxing the limit of NOx norms from 300 mg/Nm^3 to 450 mg/Nm^3, the impact of GSHR shall be there on account of primary DeNOx system i.e. the Combustion Modification System. Therefore, the Petitioner has sought approval of the impact in GSHR due to Combustion Modification System and the same shall be claimed for determination of supplementary tariff post ECS installation in the station.

59. We have considered the concerns raised by the Respondents and the clarifications given by the Petitioner. As the 2019 Tariff Regulations do not provide for allowing additional GSHR on account of installation of ECS for NOx, we are not inclined to consider the Petitioner's prayer at this stage in these petitions which are for in-principle approval for installation of ECS. The same may be considered on a case to case basis in Petitions filed for determination of supplementary tariff under Regulation 29(4) of the 2019 Tariff Regulations after implementation of ECS.

(e) Additional Water Consumption

60. The Petitioner has submitted that the quantum of water consumption would increase after the installation of Wet Limestone based FGD system. Accordingly, the Petitioner has claimed the cost of additional water consumption under Regulation 76 i.e. "Power to relax" of the 2019 Tariff Regulations on account of implementation of ECS.

61. MPPMCL has submitted that the Petitioner may be directed to submit the details of water consumption for last five years to assess the measures required to be implemented to achieve the revised ECS. MPPMCL has submitted that the claim of the Petitioner is made without any basis and there is no provision in the 2019 Tariff Regulation for allowing such claim and it does not call for invocation of Regulation 76 of the 2019 Tariff Regulations. MSEDCL has submitted that the Petitioner's claim may be decided in accordance with 2020 Amendment of Regulations, wherein the norms for additional water consumption on account of emission control system of thermal generating stations have been specified.

62. In response, the Petitioner has submitted that it should be compensated for the additional cost on account of installation of ECS in compliance of the MoEFCC Notification. The 2020 Amendment of Regulations has provided for separate operating norms on account of ECS and the cost of additional water consumption for ECS has been claimed as provided in the 2020 Amendment of Regulations.

63. We have considered the submissions of the Petitioner, MPPMCL and MSEDCL. The Petitioner's claim for additional water consumption due to installation of FGD shall be dealt in accordance with Regulation 35(1)(6) of the 2019 Tariff Regulations.

(f) Additional O&M Expenses

64. The Petitioner has submitted that with the installation of various ECS to meet the revised ECNs, there would be a requirement of additional manpower for operation and maintenance of these systems on a sustained basis. Accordingly, the Petitioner would incur additional O&M Expenses. The Petitioner has further submitted that as per Regulation 35(1)(7) of 2019 Tariff Regulations, the additional O&M Expenses on account of implementation of revised ECS shall be notified

separately. However, till the norms are notified, the Commission shall decide the additional O&M Expenses on case to case basis. The Petitioner has prayed to allow additional annual O&M Expenses @4% of capital cost of ECS.

65. MPPMCL has submitted that the Petitioner has claimed additional O&M Expenses for ECS at the rate of 4% of capital cost, which is very high and without any basis. MPPMCL has referred to the Commission's order dated 11.11.2019 in Petition. No. 152/MP/2019 [Maithan Power Ltd. Vs. Tata Power Delhi Distribution Ltd. & Ors.], wherein the Commission did not consider O&M Expenses relating to FGD system and directed Maithon Power Ltd. to submit the O&M Expenses on actual basis at the time of filling the petition for determination of tariff after commissioning of the FGD system. MPPMCL has submitted that the Petitioner has neither given any reference to cost estimate given by CEA nor any independent justification for such additional O&M Expenses claim. Further, there is no provision in the 2019 Tariff Regulations for allowing such claim and it does not call for invocation of Regulation 76. MSEDCL has submitted that the Petitioner's claim may be decided in accordance with 2020 Amendment Regulations, wherein norms for additional O&M Expenses on account of ECS of thermal generating stations have been specified. Regulation 35(1)(7) of the 2020 Amendment Regulations provides that O&M Expenses in case of coal or lignite thermal power stations shall be 2% of the capital cost as on its date of operation, which shall be escalated annually @ 3.5% during the tariff period ending on 31.3.2024. Accordingly, MSEDCL has submitted that the O&M expenses need to be considered on lower side considering the systems installed are new and the existing O&M facilities can be utilized for same and hence, the cost can be further brought down. CSPCDL has submitted that the claim of the Petitioner for additional O&M Expenses @ 4% of the capital cost of the ECS equipment is not maintainable. The Commission has already specified O&M

Expenses @2% of the admitted capital expenditure (excluding IDC and IEDC) as on its date of operation. It has further submitted that the "Admitted Capital Expenditure" has to be Capital Expenditure towards ECS equipment only and not the capital expenditure of entire power plant. As such O&M Expenses at the rate of 2% of the admitted capital expenditure towards ECS equipment should be considered.

66. In response, the Petitioner has submitted that the normative O&M Expenses for ECS have been specified in Regulation 35(7) of the 2020 Amendment of Regulations. The Petitioner's claim may be allowed in line with the 2020 Amendment of Regulations. Accordingly, the same shall be claimed by the Petitioner while filing the petition for determination of supplementary tariff for ECS of the instant station in accordance with Regulation 29(4) of the 2019 Tariff Regulations.

67. We have considered the submissions of the Petitioner, MPPMCL, MSEDCL and CSPDCL. The O&M norms for ECS for thermal generating stations have been specified in Regulation 35(1)(7) of the 2020 Amendment Regulations and the Petitioner's claim shall be dealt accordingly.

(g) Cost of Reagents

68. The Petitioner has submitted that the Wet Limestone Based FGD technology is based on using limestone or lime as a reagent, which involves a wet scrubbing process and this FGD technology is the most frequently selected for SO_2 reduction from coal-fired utility boilers. Accordingly, the Petitioner has claimed cost of chemicals reagents (limestone) on account of implementation of ECS.

69. MPPMCL has submitted that there is no provision in the 2019 Tariff Regulations for allowing such claim. MSEDCL has submitted that the Petitioner's claim may be decided in accordance with 2020 Amendment of Regulations, which

specifies the norms for cost of reagent on account of ECS of thermal generating stations. CSPDCL has submitted that for limestone consumption, the Petitioner has considered limestone consumption of 0.0173 kg/kWh i.e. an absolute figure and no calculation has been provided by the Petitioner. CSPDCL has requested to conduct a prudence check of this value as to whether the same is in conformity with the formula specified by the Commission in its 2020 Amendment of Regulations.

70. We have considered the submissions of Petitioner, MPPMCL, MSEDCL and CSDPCL. After notification of the 2020 Amendment of Regulations, respondents have submitted that the claim of the Petitioner may be decided in accordance with 2020 Amendment of Regulations wherein the norms for cost of reagent on account of ECS for thermal generating stations have been specified. The Petitioner' claim shall be dealt as provided in Regulation 44(f) of 2020 Amendment Regulations which provides for norms for consumption of reagent and any claim for such cost of the reagent shall be calculated in accordance with the formula provided therein.

(h) Deemed availability of the station/unit on account of shutdown

71. The Petitioner has submitted that each generating unit has to be taken under shut-down for about 45-60 days for implementation of ECS and stabilization of the same would take some more time. The Petitioner has submitted that during the period of shutdown of unit, there would be loss of availability of the station and would lead to under-recovery of Annual Fixed Charges on account of implementation of ECS. Accordingly, the Petitioner has prayed to consider the shut-down period of the unit for implementation of the ECS as "deemed availability".

72. MPPMCL has submitted that there is no provision in the 2019 Tariff Regulations for allowing such claim and the claim does not call for invocation of Regulation 76 (Power to Relax). The Petitioner has not given any independent

justification for such shut down period. MPPMCL has further submitted that during the shut-down period of 45-60 days, the beneficiaries will face tough times as they would have to either resort to load shedding or arrange power from alternative sources. The Respondents and their consumers have to bear the opportunity cost and, therefore, the Petitioner should provide equivalent quantum of power to all the beneficiaries from its other generating stations at the Petitioner's own cost during the period of proposed shutdown for implementation of ECS in order to claim deemed availability. MSEDCL has submitted that CGPL in its Petition No. 168/MP/2019 has estimated that installation of FGD package would lead to outage for about 22 days for each unit and the Commission vide order dated 22.6.2020 in Petition No.168/MP/2019 observed that the beneficiaries and CGPL shall plan the inter-connection of FGD system with main plant by synchronizing it with annual overhaul. Therefore, MSEDCL has requested to direct the Petitioner to align the work of installation of ECS with the annual maintenance of its generating stations so that the additional burden on Respondents can be avoided. It has further submitted that as per Regulation 42A of the 2020 Amendment of Regulations, in case of generating station or unit thereof under shutdown due to Renovation and Modernisation, the generating company shall be allowed to recover O&M Expenses and interest on loan in respect of ECS. As the Commission has already considered recovery of O&M Expenses and interest on loan during the period of shutdown of unit due to installation of ECS, it has requested not to consider deemed availability of the stations/ units on account of shutdown due to implementation of ECS, to avoid additional burden on DISCOMs and end consumers. CSDPCL has submitted that there is no provision for allowing "shutdown" period as deemed availability and as such the Petitioner's prayer may be dismissed. CSDPCL has further suggested that

the Petitioner should approach Government of India and explore possibilities for utilizing NCEEF fund for installation of ECS equipment in their power stations.

73. In response, the Petitioner has submitted that best efforts shall be made to align the shutdown period with overhauls. However, duration of installation of ECS may be more than that of annual overhauling period depending upon the layout and works involved. The shutdown period shall be opportunity loss to the Petitioner, which should be compensated. However, the same shall be claimed as per the 2020 Amendment of Regulations. The funding of expenditure towards ECS has been envisaged to be met by the Petitioner from the debt and equity as provided in the 2019 Tariff Regulations. The opportunity loss has also been considered by the Commission in the 2020 Amendment of Regulations. However, the Petitioner has claimed for consideration of deemed PAF during the additional shutdown period under 'Power to Relax'. The Petitioner has further submitted that as per Regulation 29(4) of the 2019 Tariff Regulations, the impact on operational parameters shall form the basis of determination of tariff and accordingly, the impact due to these parameters have been considered to compute the tentative tariff as per Regulation 29(2) of 2019 Tariff Regulations. As regards CSPDCL's suggestion that the Petitioner should explore the possibility of funding the expenditure towards installation of ECS from NCEEF, the Petitioner has submitted that it is beyond the scope of these petitions and, therefore, it does not find it appropriate to comment on the same.

74. We have considered the submissions of the Petitioner and the Respondents. The Commission in order dated 22.6.2020 in Petition No. 168/MP/2019 has already held that Petitioner and the beneficiaries shall plan and synchronize the inter-

connection of FGD package with the plant with the annual overhaul. The relevant portion of the order Commission's order dated 22.6.2020 reads as follows:

> *"…The Commission is of the view that beneficiaries and the petitioner shall plan the interconnection of FGD system with main plant by synchronizing it with annual overhaul…"*

75. Further, as regards the Petitioner's request that the loss of availability of the generating station/ unit should be considered as "deemed availability", it is observed that taking into consideration the installation of ECS, the Commission has already revised the computation of the Plant Availability Factor for a Month (PAFM) in the 2020 Amendment of Regulations. We are not inclined to go any further into this issue at this stage as we are of the view that the Petitioner's prayer for considering the shutdown period for implementation of ECS has to be dealt on a case to case basis.

76. As regards MPPMCL's suggestion that the Petitioner should arrange power from alternate sources at its own cost during the period of shutdown to avoid power outage and CSPDCL's suggestion that the Petitioner should explore getting funds from NCEEF and PSDF for installation of ECS, we are of the view that they are beyond the scope of the instant petitions which are for in-principle approval for implementation of ECS, and as such we are not inclined to dwell on them in this petition.

77. In view of the discussion in the foregoing paragraphs, the Commission observes that:

(a) The process from the stage of identification of FGD package to NoA was with the approval of the Petitioner's Board of Directors and as per the procedure laid down under its DoP and the bidding has been carried out in a fair and transparent manner.

(b) The Petitioner has identified and proposed wet limestone based FGD systems for reduction in the SO_2 emissions taking into consideration the

effectiveness, availability and cost of the Wet Limestone based FGD systems, size of the plants, operational expenses and availability of the reagents.

(c) The costs claimed by the Petitioner towards installation of Wet Limestone based FGD system have been discovered through a competitive bidding process and the hard costs claimed by the Petitioner for FGD are in line with the indicative cost recommended by CEA.

(d) ECS in case of NOx in case of Solapur STPS will be considered after a decision is taken by the Petitioner for installation of the same.

78. Therefore, we accord “in-principle approval” of ACE under Regulation 11 of the 2019 Tariff Regulations towards installation of ECS (hard cost for FGD system). We also accord “in-principle approval” for installation of Combustion Modification System for emission control of NOx in Sipat STPSS-I. In terms of above deliberations, the details of the “in-principle approval” of hard cost of FGD and capital cost of CMS are as follows:

Petition No.	Generating station/ unit capacity (MW)	Total hard cost (₹ in lakh)	Capital cost of CMS (₹ in crore)
67/MP/2020	Sipat STPS-I (3X660 MW)	70362	20.86
515/MP/2020	Solapur STPS (2x660 MW)	48000	-

79. We have not considered the Petitioner’s claim of total capital cost towards installation of FGD, which apart from hard cost includes IDC, IEDC, FERV, taxes and duties and other costs. These claims excluding hard cost would be considered on case to case basis on petitions to be filed by the Petitioner for determination of tariff after implementation of ECS as provided under Regulation 29(4) of the 2019 Tariff Regulations.

80. Accordingly, the Petitioner is directed to file separate petitions for determination of tariff after implementation of the revised ECS as provided in Regulation 29(4) of the 2019 Tariff Regulations.

81. The instant order disposes of Petition No. 67/MP/2020 and Petition No. 515/MP/2020 in terms of the above discussion and findings.

sd/-	sd/-	sd/-	sd/-
(Pravas Kumar Singh)	**(Arun Goyal)**	**(I. S. Jha)**	**(P. K. Pujari)**
Member	**Member**	**Member**	**Chairperson**