CENTRAL ELECTRICITY REGULATORY COMMISSION
(NEW DELHI)

Petition No. 06/SM/2021 (Suo-Motu)

Coram:
Shri P.K.Pujari, Chairperson
Shri I.S.Jha, Member
Shri Arun Goyal, Member
Shri P.K.Singh, Member

Date of Order: 13.8.2021

In the matter of

A mechanism to determine Compensation on account of installation of Emission Control System by the generating companies in compliance with the Revised Emission Standards issued by Ministry of Environment, Forest & Climate Change (MoEF&CC), Government of India, vide Environment (Protection) Amendment Rules, 2015 on 07.12.2015 in respect of the Thermal Generating stations whose tariff is determined through competitive bidding under Section 63 of the Electricity Act, 2003.

ORDER

The Central Electricity Regulatory Commission (in short, 'the Commission') has recognized the need for a mechanism to determine the compensation on account of installation of Emission Control Systems by the thermal generating stations in compliance of Revised Emission Standards notified by the Ministry of Environment, Forest & Climate Change, Government of India (MoEF&CC) vide Environment (Protection) Amendment Rules, 2015 on 07.12.2015 and further amended vide MoEF&CC's Notification dated 19.10.2020 and 01.04.2021 in respect of the thermal generating stations, whose tariff is determined through competitive bidding under Section 63 of the Electricity Act, 2003 (hereinafter referred to as "the Act").

BACKGROUND

2. Vide Notification No.23/11/2004-R&R (Vol.II) dated 19.01.2005, the Ministry of Power, Government of India, in exercise of the powers conferred under Section 63 of the Act, notified the "Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees" (hereinafter referred to as "the Guidelines") along with Standard Bidding Documents (amended from time to time). The Guidelines recognize two different types for bidding, namely Case-1 bidding and Case-2 bidding depending upon project characteristics. Subsequently, on 21.09.2013, the Ministry of Power repealed the Guidelines for Case-2 bidding and notified "Guidelines for Procurement of Electricity from Thermal Power Stations set up on Design, Build, Finance, Operate and Transfer (DBFOT) basis". On 09.11.2014, the Guidelines for Case-1 bidding were repealed and the Ministry of Power notified "Guidelines for Procurement of Electricity from Thermal Power Stations set up on Design, Build, Finance, Own and Operate (DBFOO) basis". The Commission notes that about 53,660 MW of power generation capacity was installed under the private sector in the 12th plan period during 2012-17, for which the distribution licensees have entered into power purchase agreements with generating companies for procurement of electricity. Supply of electricity has commenced after commercial operation of the generating station(s) in accordance with the provisions of respective power purchase agreements.

3. The generating stations were established in compliance with the laws in force including the environmental laws. Subsequently, Ministry of Environment, Forest & Climate Change, Government of India notified the Environment (Protection) Amendment Rules, 2015 on 7.12.2015 (hereinafter referred to as "the 2015 Rules") amending the Environment (Protection) Rules, 1986 specifying revised emission standards and water

consumption limit for coal and lignite based thermal generating stations. Revised emission standards include the emission limit of Particulate Matters, Sulphur Dioxide (SO_2), Oxides of Nitrogen (NOx) and Mercury (Hg) as notified in the 2015 Rules, substituting serial number 25 in Schedule-I of the Environment (Protection) Rules, 1986. Further, MoEF&CC vide Notification dated 19.10.2020 ("the 2020 Notification") amended the NOx emission standards and vide Notification dated 1.4.2021 ("the 2021 Notification") amended the timelines for complying with the revised emission standards. Several coal and lignite based thermal generating stations are required to install or upgrade emission control systems (ECS) to meet the revised emission standards.

4. Consequently, additional capital expenditure is required for installing or upgrading such emission control system/s. The generating companies are invoking the provisions of change in law of respective power purchase agreements to recover such additional impact of cost arising on account of installation or up-gradation and operation of the emission control system/s. Along with invocation of change in law, the generating companies are also seeking approval of provisional capital cost on *ex-ante* basis, based on the chosen technology.

5. While acknowledging the 2015 Rules as Change in Law event under PPAs and approving provisional cost for installation of flue-gas desulfurization (FGD) system in few cases, the Commission has taken cognizance of the concerns of the parties regarding the compensation mechanism. The Commission, vide order dated 23.4.2020 in Petition No. 446/MP/2019 and order dated 18.5.2020 in Petition No. 210/MP/2019, directed the staff of the Commission to float a staff paper on the issue of compensation mechanism and tariff implications on account of the 2015 Notification in case of thermal generating

stations covered under Section 63 of the Act, where the PPA does not have explicit provision for compensation mechanism during the operation period and the PPA requires the Commission to devise such a mechanism.

6. The Staff Paper was published in September 2020 on the subject matter and suggestions of the stakeholders on compensation mechanism and different aspects of determining such compensation were received. The Commission, considering the comments received on the Staff Paper, issued the draft Suo-Motu order (earlier numbered as Petition No. 4/SM/2021, which was subsequently revised numbered as Petition No. 06/SM/2021, the present petition) on 12.4.2021 on mechanism for compensation due to installation of emission control system/s in compliance of revised emission standards in case of power purchase agreements under Section 63 of the Act and invited comments of the stakeholders. 13 stakeholders have submitted their comments in response to the draft Suo-Motu order, list of which is enclosed as Annexure-II. The comments received from the stakeholders have also been uploaded on website of the Commission and the same may be accessed at *https://cercind.gov.in*. After duly considering all the comments received from the stakeholders on the draft Suo-Motu order in Petition No. 06/SM/2021, this final Suo-Motu order in Petition No. 06/SM/2021 is being issued.

LEGAL FRAMEWORK AND JURISDICTION

7. Ministry of Power, Government of India, vide its notification No. 23/11/2004-R&R dated 19.1.2005 issued “Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees” which provides as under in respect of impact of any change in law event on cost or revenue of the generating station:

“4.7 Any change in law <u>impacting cost or revenue from the business of selling</u> <u>electricity to the procurer</u> with respect to the law applicable on the date which is 7 days before the last date for RFP bid submission shall be adjusted separately. In case of any dispute regarding the impact of any change in law, the decision of the Appropriate Commission shall apply.” (Emphasis supplied)

8. Clause 10.3.1 of the Model Power Purchase Agreement under Case-1 bidding deals with relief during construction period, whereas Clause 10.3.2 of the model PPA deals with relief during operation period for any Change in Law event. These clauses are extracted as under:

“10.3 Relief for Change in Law

During Construction Period

As a result of any Change in Law, the impact of increase/decrease of Capital Cost of the Power Station in the Tariff shall be governed by the formula given below:

For every cumulative increase/ decrease of each Rupees...................................[Insert amount] in the Capital Cost during the Construction Period, the increase/ decrease in Non Escalable Capacity Charges shall be an amount equal to ……………….[Insert amount] of the Non Escalable Capacity Charges. In case of Dispute, Article 14 shall apply.

It is clarified that the abovementioned compensation shall be payable to either Party, only with effect from the date on which the total increase/ decrease exceeds amount of Rs...[Insert Amount].

During Operating Period

The compensation for any decrease in revenue or increase in expenses to the Seller shall be payable only if the decrease in revenue or increase in expensesof the Seller is in excess of an amount equivalent to 1% of the value of the Letter of Credit in aggregate for the relevant Contract Year.

For any claims made under Articles 10.3.1 and 10.3.2 above, the Seller shall provide to the Procurer(s) and the Appropriate Commission documentary proof of such increase/ decrease in cost of the Power Station or revenue/ expense for establishing the impact of such Change in Law.

The decision of the Appropriate Commission, with regards to the determination of the compensation mentioned above in Articles 10.3.1 and 10.3.2, and the date from which such compensation shall become effective, shall be final and binding on both the Parties subject to right of appeal provided under applicable Law.”

9. Clause 13.2 of the Model Power Purchase Agreement under Case-2 bidding provides as under:

*“**13.2 Application and Principles for computing impact of Change in Law***
While determining the consequence of Change in Law under this Article 13, the Parties shall have due regard to the principle that the purpose of compensating the Party affected by such Change in Law, is to restore through Monthly Tariff Payments, to the extent contemplated in this Article 13, the affected Party to the same economic position as if such Change in Law has not occurred.
a) Construction Period

As a result of any Change in Law, the impact of increase/decrease of Capital Cost of the Project in the Tariff shall be governed by the formula given below:

For every cumulative increase / decrease of each Rupees [Insert amount] in the Capital Cost over the term of this Agreement, the increase/decrease in Non Escalable Capacity Charges shall be an amount equal to [Insert amount] of the Non Escalable Capacity Charges. Provided that the Seller provides to the Procurers documentary proof of such increase/ decrease in Capital Cost for establishing the impact of such Change in Law. In case of Dispute, Article 17 shall apply.

It is clarified that the above mentioned compensation shall be payable to either Party, only with effect from the date on which the total increase/decrease exceeds amount of Rs. [Insert amount].

(b) Operation Period

As a result of Change in Law, the compensation for any increase/decrease in revenues or cost to the Seller shall be determined and effective from such date,as decided by the Central Electricity Regulatory Commission whose decision shall be final and binding on both the Parties, subject to rights of appeal provided under applicable Law.

Provided that the above mentioned compensation shall be payable only if and for increase/ decrease in revenues or cost to the Seller is in excess of an amount equivalent to 1% of Letter of Credit in aggregate for a Contract Year.”

10. For Case-1 bidding document under DBFOO model, Clauses 34.1, 34.2, 34.3, 34.4, 34.5 and 36.4 of the model PPA deal with relief for any Change in Law event. Relevant clauses are extracted as under:

“34.1 Increase in costs

If as a result of Change in Law, the Supplier suffers an increase in costs or reduction in net after-tax return or other financial burden for and in respect of Contracted Capacity, the aggregate financial effect of which exceeds the higher of Rs. 1 crore (Rupees one crore) and 0.1% (zero point one per cent) of the Capacity Charge in any Accounting Year, the Supplier may so notify the Utility and propose amendments to this Agreement so as to place the Supplier in the same financial position as it would have enjoyed had there been no such Change in Law resulting in the cost increase, reduction in return or other financial burden as aforesaid. Upon notice by the Supplier, the parties shall meet, as soon as reasonably practicable, but no later than 30 (thirty) days from the date of notice, and either agree on amendments to this Agreement or on any other mutually agreed arrangement:

Provided that if no agreement is reached within 90 (ninety) days of the aforesaid notice, the Supplier may by notice require the Utility to pay an amount that would place the Supplier in the same financial position that it would have enjoyed had there been no Change in Law, and within 15 (fifteen) days of receipt of such notice, along with particulars thereof, the Utility shall pay the amount specified therein; provided that if the Utility shall dispute such claim of the Supplier, the same shall be settled in accordance with the Dispute Resolution Procedure. For the avoidance of doubt, it is agreed that this clause
shall be restricted to changes in law directly affecting the Supplier's costs of performing its obligations under this Agreement

34.2 Reduction in costs

If as a result of Change in Law, the Supplier benefits from the reduction in costs or increase in net after-tax return or other financial gains for and in respect of Contracted Capacity, the aggregate financial effect of which exceeds the higher of Rs. 1 crore ((Rupees one crore) and 0.1% (zero point one per cent) of the Capacity Charge in any Accounting Year, the Utility may so notify the Supplier and propose amendments to this Agreement so as to place the Supplier in the same financial position as it would have enjoyed had there been no such Change in Law resulting in the decrease cost, reduction in return or other financial gains as aforesaid. Upon notice by the Supplier, the parties shall meet, as soon as reasonably practicable, but not later than 30 (thirty) days from the date of notice, and either agree on such amendments to this Agreement or on any other mutually agreed arrangement:

Provided that if no agreement is reached within 90 (ninety) days of the aforesaid notice, the Utility may by notice require the Supplier to pay an amount that would place the Supplier in the same financial position that it would have enjoyed had there been no Change in Law, and within 15 (fifteen) days of receipt of such notice, along with particulars thereof, the Supplier shall pay the amount specified therein; provided that if the Supplier shall dispute such claim of the Utility, the same shall be settled in accordance with the Dispute Resolution Procedure. For the avoidance of doubt, it is agreed that this clause
34.1 shall be restricted to changes in law directly affecting the Supplier's costs of performing its obligations under this Agreement.

34.3 Protection of NPV

Pursuant to the provision of Clauses 34.1 and 34.2 and for the purpose of placing the Supplier in the Supplier in the same financial position as it would have enjoyed had there been no Change in Law affecting the costs, returns or other financial burden or gains, the parties shall rely on the Financial Model to establish a net present value (the " NPV") of the net cash flow and make necessary adjustment in costs, revenues, compensation or other relevant parameters, as the case may be, to procure that the NPV of the net cash flow is the same as it would have been if no Change in Law had occurred.

34.4 Restriction on cash compensation

The Parties acknowledge and agree that the demand for cash compensation under this Article 34 shall be restricted to the effect of Change in Law during the respective Accounting Year and shall be made at any time after commencement of such year, but *no later than one year from the close of such Accounting Year. Any demand for cash compensation payable for and in respect of any subsequent Accounting Year shall be made after the commencement of the Accounting Year to which the demand pertains, but no later than 2 (two) years from the close of such Accounting Year.*

34.5 No claim in the event of recovery from Buyers

Notwithstanding anything to the contrary contained in this Agreement, the Utility shall not in any manner be liable to reimburse to the Supplier any sums on account of a Change in Law if the same are recoverable from the Buyers."

………………

36.4 Adjudication by the Commission

In the event a Dispute is required under Applicable Laws to be adjudicated upon by the Commission, such Dispute shall, instead of reference to arbitration under Clause 36.3, be submitted for adjudication by the Commission in accordance with Applicable Laws and all references to Dispute Resolution Procedure shall be construed accordingly. For the avoidance of doubt, the Parties hereto agree that the adjudication hereunder shall not be final and binding until an appeal, if any, against such adjudication has been decided by the appellate tribunal or no such appeal has been preferred within the time specified in the Applicable Law.

36.4.2 Where any dispute is referred by the Commission to be settled through arbitration, the procedure specified in Clause 36.3 shall be followed to the extent applicable."

11. The provisions of the Competitive Bidding Guidelines, the Model PPA under Case-1 bidding, Case-2 bidding and DBFOO model provide as under regarding Change in Law:

(a) The Competitive Bidding Guidelines provide that any Change in Law impacting cost or revenue from the business of selling electricity to the procurer after the cut-off date (which is 7 days before the last date for RFP bid submission) shall be adjusted separately. In case of dispute regarding impact of Change in Law, the decision of the Appropriate Commission shall be final.

(b) Model PPAs under Case-1 bidding and Case-2 bidding provide that while deciding the consequences of Change in Law, there shall be due regard to the principle that the purpose of compensating the Party affected by such Change in Law, is to restore the affected Party to the same economic position as if such Change in Law has not occurred.

(c) In the Model PPA under Case-1 bidding and Case-2 bidding, there is a specific formula for Change in Law during the construction period. However, for

Change in Law event during the operation period, no specific formula has been provided. The determination of the compensation for any increase/ decrease in revenue or cost to the Seller on account of change in law during operation period including its effective date has been left to be decided by the Commission. It further provides that the decision of the Commission shall be final and binding on both the Parties (subject to rights of appeal against any such decision). In other words, the model PPA under Case-1 bidding and Case-2 bidding vests unfettered jurisdiction on the Commission to determine the impact of change in law on cost or revenue during the operation period and the effective date from which it is to be implemented.

(d) For increase in cost under the DBFOO model, it has been provided that the Supplier may so notify the Utility and propose amendments to the Agreement so as to place the Supplier in the same financial position as it would have enjoyed had there been no such Change in Law resulting in the cost increase, reduction in return or other financial burden as aforesaid. Upon notice by the Supplier, the parties shall either agree on amendments to the Agreement or on any other mutually agreed arrangement. In case of disputes, matter is to be referred to the Commission for adjudication.

12. The Power Purchase Agreements between the parties have been signed on basis of the aforesaid model PPAs notified by the Ministry of Power. Thus, provisions of Change in Law are mutandis mutatis the provisions in the model PPAs (in cases where there have been variations, they may be dealt with as and when such cases come to notice of the Commission) as quoted in earlier paragraphs of this order. Thus, the parties to the power purchase agreements have agreed to the compensation to be determined by the Commission and to restitute the affected party to the same economic position as if the change in law event has not occurred.

13. Implementation of ECS to meet the revised emission standards results in increase in cost, inter alia, on account of additional capital expenditure, additional Operation and

Maintenance Expenses, Interest on Working Capital and consumption of reagent. Also, it results in decrease in revenue on account of additional auxiliary energy consumption as the net saleable energy available for selling to the procurers decreases. In keeping with the principle laid down in PPAs of restitution of restoring the Affected Party (in this case, the thermal generating stations) to the same economic position as if no Change in Law had occurred, a compensation mechanism has been finalized through this order.

14. The compensation mechanism through this order neither intends to override the provisions of the PPAs where the parties have already agreed to a mechanism for compensation for change in law nor does it prevent parties to mutually agree to an alternative mechanism for compensation through any supplementary agreements. Thus, for compensation for change in law on account of implementation of the revised emission standards, the parties may either agree to the compensation mechanism decided by the Commission through this order or may work out a mechanism through mutual agreement and approach the Commission for amendment of the Power Purchase Agreements.

PRINCIPLES OF COMPENSATION

Economic Restitution

15. The standard bidding documents issued by the Central Government under Section 63 of the Act do not provide any specific formulation for computation of compensation during the operating period but contain the principle of restitution to restore the affected party to the same economic position as if the change in Law event has not occurred. The Commission has finalized the compensation mechanism to compensate the affected party (in present case, the thermal generating stations) during the operation period by invoking the principle of restitution contained in the PPAs.

Carrying Cost

16. The issue of "carrying cost" arises on account of time lag between the occurrence of Change in Law event and actual payment of compensation for the Change in Law. The Appellate Tribunal for Electricity has interpreted the provision of restitution in the Power Purchase Agreements to encompass the carrying cost in its judgement dated 13.4.2018 in Appeal No. 210 of 2017. It has held as under:

> *"x. Further, the provisions of Article 13.2 i.e. restoring the Appellant to the same economic position as if Change in Law has not occurred is in consonance with the principle of 'restitution' i.e. restoration of some specific thing to its rightful status. Hence, in view of the provisions of the PPA, the principle of restitution and judgment of the Hon'ble Supreme Court in case of Indian Council for Enviro- Legal Action vs. Union of India &Ors., we are of the considered opinion that the Appellant is eligible for Carrying Cost arising out of approval of the Change in Law events from the effective date of Change in Law till the approval of the said event by appropriate authority. It is also observed that the Gujarat Bid-01 PPA have no provision for restoration to the same economic position as if Change in Law has not occurred. Accordingly, this decision of allowing Carrying Cost will not be applicable to the Gujarat Bid-01 PPA."*

17. The Hon'ble Supreme Court (vide its judgement dated 25.02.2019 in Civil Appeal No. 5865 of 2018) has upheld the above judgment of APTEL and observed as under:

> "*10. A reading of Article 13 as a whole, therefore, leads to the position that subject to restitutionary principles contained in Article 13.2, the adjustment in monthly tariff payment, in the facts of the present case, has to be from the date of the withdrawal of exemption which was done by administrative orders dated 06.04.2015 and 16.02.2016. The present case, therefore, falls within Article 13.4.1(i). This being the case, it is clear that the adjustment in monthly tariff payment has to be effected from the date on which the exemptions given were withdrawn. This being the case, monthly invoices to be raised by the seller after such change in tariff are to appropriately reflect the changed tariff. On the facts of the present case, it is clear that the respondents were entitled to adjustment in their monthly tariff payment from the date on which the exemption notifications became effective. <u>This being the case, the restitutionary principle contained in Article 13.2 would kick in for the simple reason that it is only after the order dated 04.05.2017that the CERC held that the respondents were entitled to claim added costs on account of change in law w.e.f. 01.04.2015.</u> This being the case, it would be fallacious to say that the respondents would be claiming this restitutionary amount on some general principle of equity outside the PPA. Since it is clear that this amount of carrying cost is only relatable to Article 13 of the PPA, we find no reason to interfere with the judgment of the Appellate Tribunal." (Emphasis supplied)*

18. Hence, as per the judgment of APTEL and Hon'ble Supreme Court, even in the

absence of specific provision in the PPA to grant relief for carrying cost, the same can be allowed by invoking the principle of restitution contained in the PPA.

APPLICABILITY OF THE COMPENSATION MECHANISM

19. The Compensation Mechanism decided through this order shall be applicable as under:

(a) Applicable to thermal generating stations which have valid PPA(s) with the procurer(s), having provisions of restitutionary relief under Change in Law or having specific provision which vests power in the Commission to determine the impact of change in law during operation period;

(b) Not applicable in case of thermal generating stations where the power purchase agreements entered into by the parties already have a mechanism for compensation on account of change in Law for the expenditure incurred during the operation period;

(c) In cases where the power purchase agreements do not provide for a mechanism for compensation but the parties to the power purchase agreements have agreed mutually to a compensation mechanism, the compensation worked out as per this order shall be the ceiling compensation payable to the thermal generating station;

(d) The applicability of the Compensation Mechanism shall be subject to the admissibility of the 2015 Rules read with the 2020 Notification and the 2021 Notification as change in law event in terms of the respective power purchase agreements.

Capital cost

20. Additional capital expenditure on emission control system/s shall include hard cost, incidental expenditure during construction, financing charges, insurance charges, interest during construction, gain or loss on foreign exchange rate variations and initial

spares. Hard cost of emission control system would need to be discovered through a process of transparent competitive bidding by the generating company owning the thermal generating station. Admissibility of any other expenditure shall be decided on case to case basis. Once the capital cost (additional capital expenditure) of emission control system is determined, the compensation mechanism shall be applicable to work out the compensation.

STRUCTURE OF COMPENSATION

21. Ministry of Power vide Gazette notification No 23/11/2004-R&R (Vol.II) dated 19.1.2005 published “Guidelines for Determination of Tariff by Bidding Process for Procurement of Power by Distribution Licensees” and subsequent amendments thereof. Clause 4 of the above Guidelines provides details regarding tariff structure for bidding. It provides that capacity charges and energy charges can be quoted separately or on combined basis. Where capacity charges and energy charges are quoted separately, the revenue streams would consist of two components.

22. Clause 4.7 of the same Guidelines provides that the compensation is to be assessed based on impact on cost or revenue. The installation of emission control system would increase the cost of generation due to (i) servicing of additional capital expenditure; (ii) additional operation and maintenance expenses; (iii) servicing of additional working capital; and (iv) additional expenses towards consumption of reagents. At the same time, there would be decrease in revenues on account of increased auxiliary energy consumption which reduces net saleable energy available for selling to the procurers. As such, the principle of restitution requires to compensate the thermal generating stations for such increase in cost of generation and reduction in revenue recovery consequent to

the installation of ECS/s with effect from the start date of operation of ECS/s.

23. The standard bidding guidelines and model power purchase agreements generally provide for a two-part tariff structure, consisting of capacity charges and energy charges. However, the standard bidding guidelines and model power purchase agreement also recognize consolidated tariff in case of medium-term procurement. Relevant provisions of the bidding guidelines are extracted below:

"4. Tariff Structure

For procurement of electricity under these guidelines, tariff shall be paid and settled for each payment period (not exceeding one month). A multi-part tariff structure featuring separate capacity and energy components of tariff shall ordinarily form the basis for bidding. However, for medium term procurement, the procurer may, at his option, permit bids on a single part basis, and the same shall be clearly specified in the Request for Qualification (RFQ)/ Request for Proposal (RFP).

Procurement under case-2 where procurer offers a captive fuel source (such as captive coal mine) for concurrent development and use for power production covered under the procurement query would also have a multi-part tariff structure featuring separate capacity and energy components of tariff.

(emphasis supplied)"

24. The Model Power Purchase Agreement (for Case-2 bidding) issued by the Central Government as part of Standard Bidding Guidelines provides the mechanism for payment of compensation of Change in Law as under:

"13.4.2 The payment for Changes in Law shall be through Supplementary Bill as mentioned in Article 11.8. However, in case of any change in Tariff by reason of Change in Law, as determined in accordance with this Agreement, the Monthly Invoice to be raised by the Seller after such change in Tariff shall appropriately reflect the changed Tariff."

25. Therefore, in case of two-part tariff structure, the recovery of compensation would be through supplementary capacity charges and supplementary energy charges. In case of consolidated tariff, the recovery of compensation shall be through supplementary tariff. The structure of compensation shall be in line with tariff structure in the Power Purchase

Agreements, as supplementary capacity charges and supplementary energy charges or supplementary tariff, as the case may be.

26. Thus, the structure of compensation in case of two-part tariff structure would be as under:

A. The Supplementary Capacity Charge (**SFC**) shall consist of:

(i) Servicing of Additional Capital Expenditure:

(a) Depreciation (**DEP_e**); and

(b) Cost of Additional Capital Expenditure (**COC_e**);

(ii) Additional Operation and Maintenance Expenses (**$O\&M_e$**);

(iii) Additional Interest on Working Capital (**IWC_e**); and

(iv) Additional Capacity Charges due to Additional Auxiliary Energy Consumption (**ACC_e**).

B. The supplementary Energy Charge **(SEC**) shall consist of:

(i) Expenses towards consumption of reagent (**COR_e**); and

(ii) Additional Energy Charges due to Additional Auxiliary Energy Consumption (**AEC_e**).

27. In case of consolidated tariff, the supplementary tariff shall be calculated on case to case basis by considering components of supplementary capacity charges and supplementary energy charges.

SUPPLEMENTARY CAPACITY CHARGE (SFC)

28. The compensation on account of additional capital expenditure would be through following components:

(a) Depreciation (DEP_e); and

(b) Cost of Additional Capital Expenditure (COC_e).

Depreciation (DEP_e) component of SFC

29. Many stakeholders have submitted comments mainly on two issues - period over which depreciation is to be recovered and the rate of depreciation. Some stakeholders have suggested that the recovery should be over the balance useful life or balance extended life of the thermal generating station or the balance tenure of the long term PPA, whichever is lower. Some stakeholders have suggested that the useful life of the emission control system should be considered as the remaining useful life of the thermal generating station and depreciation for the initial 12 years of operation may be considered at a rate of 6% to 7.5% for servicing the debt repayment and the remaining depreciation should be on Straight Line method basis till the end of useful life of the thermal generating station. Some stakeholders have pointed out that the standardized recovery of depreciation @ 3.6% per annum is premised on the assumption that all thermal generating stations shall continue to operate efficiently for 25 years post-installation of the emission control system, irrespective of their actual years of operation, at the time of installing the emission control system.

30. One of the stakeholders has justified the approach proposed by the Commission on the ground that almost all the thermal generating stations under competitive bidding have been commissioned during the last fifteen years and since their useful life is considered as forty years, the consideration of 25 years for recovery of depreciation is logical.

31. We have considered al the suggestions and comments of the stakeholders. We are of the view that the useful life of a thermal generating station is to be considered as 40 years in line with the Companies Act, 2013. The life of emission control system has been

considered as 25 years in line with other major equipment of thermal generating stations. The Commission observes that as on today, there are no thermal generating stations with competitively bid tariff which have completed more than 15 years of life after COD. Therefore, based on 40 years of life of thermal generating stations, 25 years of life of emission control system would be available for recovery of depreciation. Further, the recovery of depreciation in 25 years also balances the interest of the generating companies and the procurers.

32. Accordingly, 90% of additional capital expenditure on account of installation of ECS (considering salvage value of 10%) shall be recovered by the generating company in 25 years as depreciation (straight line method @3.6% per year). The depreciation shall be computed from the date of operation of the emission control system after meeting all applicable technical and environmental standards, certified through the Management Certificate duly signed by an authorized person. The value base for the purpose of depreciation shall be the additional capital expenditure of the emission control system as admitted by the Commission. The computation of depreciation during each year of the contract period shall be worked out by the parties directly based on admitted capital cost and the depreciation rate as follows:

$$DEP_e = (0.036) \times ACE_e$$

Where,

ACE_e is the gross capital cost (in Rupees) of emission control system as admitted by the Commission;

DEP_e is annual depreciation (in Rupees).

Cost of Additional Capital Expenditure (COC_e) component of SFC

33. In the draft Suo-Motu order in this Petition, the suggested approach of servicing of cost

of capital employed was in line with industry practice unlike the servicing of debt and equity separately as followed for thermal generating stations whose tariff is determined under Section 62 of the Act. Relevant extract of the draft Suo-Motu order at paragraph 36 is as under:

> *"4.10. The cost of capital employed also known as the cost of fund infused represents the weighted average cost of debt fund and equity fund deployed in the project. Considering the fact that any compensation mechanism needs to be based on the principle of restitution, there can be no expectation of profit in any component of tariff.*
>
> *4.11. Accordingly, additional capital expenditure on installation of emission control system is proposed to be serviced on Net Fixed Assets (NFA) basis (value of fixed assets reducing each year by the depreciation value) @weighted average rate of interest of loans raised by the generator or at the rateof Marginal Cost of Lending Rate of State Bank of India (for one year tenor) plus 350 basis points, as on 1st April of the year in which emission control system is put into operation, whichever is lower."*

34. Most of the Stakeholders have suggested to adopt the notional debt to equity ratio of 70:30 with consideration of actual debt in case of higher debt and have also suggested to service equity at the rate of 15.5% post tax i.e. with grossing up with tax rate and servicing of debt at the rate lower of actual rate or SBI MCLR+3.5%. Further, they have also suggested that the capital base be worked out based on Gross Fixed Assets (GFA) to provide a level playing field for thermal generating stations under Sections 62 and 63 of the Act for compliance to the revised emission standards.

35. One of the stakeholders (Reliance Power Ltd) has suggested that power sector is already facing severe stress. Under the current circumstances, arranging equity to install ECS to meet revised emission standards is a challenge. Accordingly, it has proposed that base return on equity in respect of additional capital expenditure should be at a specific premium of 3% per annum over the debt funding cost. One of the stakeholders (RUVNL) has suggested that weighted average rate of interest of SBI MCLR (one year tenor) plus 350 basis points as proposed in draft suo-motu order, should be reduced to

SBI MCLR (one year tenor) plus 250 basis points. RUVNL has also suggested that if there is any delay in commissioning of ECS by the generating company, carrying cost should not be allowed.

36. We have considered all the suggestions and comments of the stakeholders. However, the Commission notes that the approach of net fixed assets and cost of capital employed suggested in the draft Suo-Motu order satisfies the principle of economic restitution. The Commission is aware of the concerns and financial position of the generating companies. However, compensation for change in law cannot be a mechanism to improve their financial position. Accordingly, the proposed approach of servicing investment through cost of capital employed is appropriate, being consistent with the principle of economic restitution.

37. The servicing of capital employed during each year of the contract period shall be worked out based on net fixed asset (derived by adjusting cumulative depreciation of emission control system) and interest rate of fund. The interest rate will be weighted average rate of actual interest on loans of the thermal generating station including ECS or Marginal Cost of Lending Rate of State Bank of India (for one year tenor) as on 1st April of the year under consideration plus 350 basis points, whichever is lower. The generating companies shall workout the applicable interest rate for the cost of capital employed towards emission control system for the year under consideration. The cost of capital employed during the year shall be worked out as follows:

$$COC_{e(n)} = NFA_{(n)} \times RI_{(n)} / 100$$

Where,

$NFA_{(n)} = ACE_e – [(n-1) X (DEP_e)]$

COC_e Servicing cost of Additional Capital Expenditure in Rupees per annum;

$NFA_{(n)}$	is the net fixed asset of the of the year "n";
$RI_{(n)}$	is the weighted average rate of interest (in %) worked out based on weighted average rate of interest on loans of the generating station including ECS or at the rate of Marginal Cost of Funds based Lending Rate (MCLR) of State Bank of India (for one year tenor) as on 1st April of the year plus 350 basis points, whichever is lower.
n	represents the year starting from the date of operation of emission control system.
DEP_e	is annual depreciation (in Rupees).
ACE_e	is the gross capital cost (in Rupees) of emission control system as admitted by the Commission;

Additional Operation and Maintenance Expenses ($O\&M_e$) component of SFC

38. The installation of emission control system would result in additional operation and maintenance expenses due to repair and maintenance, human resource deployment, reagent consumption, additional working capital expenses etc. In the draft Suo-Motu order, it was proposed that the additional revenue expenses for operation and maintenance ($O\&M_e$) for the first two years of operation (including part financial year), shall be @2% (for first year or part of it) of the additional capital expenditure (ACE_e) for installation of ECS (excluding IDC and FERV) as admitted by the Commission, to be escalated at the rate of 3.5% per annum for the second year. The O&M expense from the third year onward was proposed to be as per norms and escalation rate to be determined separately by the Commission. The additional O&M expenses ($O\&M_e$) was proposed to be worked out as follows:

First Year (or part of it):	2% of ACE_e excluding IDC and FERV
Second Year:	2% of ACE_e escalated at the rate of 3.5%
Third Year onwards:	As per norms to be specified by the Commission

39. Some of the stakeholders have suggested that the approach of linking additional O&M expenses with additional capital expenditure is not appropriate as sufficient data is not available. Further, there is difficulty in separating additional O&M expenses on account of emission control system from the overall O&M expenses of the thermal generating station. Some stakeholders have suggested that additional O&M expenses should be allowed at least @4% of additional capital expenditure with an annual escalation of 5%.

40. Some stakeholders (Dhariwal Infrastructure limited and Nabha Power Ltd.) have suggested that for initial two years, truing up of additional O&M expenses may be allowed based on the actual expenses.

41. Some of the stakeholders have raised the issue of gypsum disposal cost and cost of increase in water consumption and requested for additional 2% O&M expenses over and above the proposed amount. They have submitted that gypsum is environmentally hazardous and for its disposal and storage, safe measures are required to be adopted which entails significant expense. Some stakeholders have suggested for additional amount @0.5% for coastal plants for O&M expenses. Further, some stakeholders (MB Power Madhya Pradesh Ltd, Association of power Producers and FICCI) have suggested for Rs. 150/MT for handling and disposal of gypsum.

42. One of the stakeholders (RUVNL) has suggested that additional O&M expenses should be @2% of Additional Capital Expenditure or actual O&M expenses, whichever is lower, and that escalation should be based on composite percentage of WPI/CPI or 3.5%, whichever is lower.

43. We have considered all the suggestions and comments of the stakeholders. The Commission appreciates concerns of stakeholders as regards difficulty in availability of data relating to O&M expenses due to lack of ECS in operation. The Commission also notes that the issues raised by the stakeholders regarding expenses for handling and disposal of gypsum and additional water consumption due to ECS installation needs to be addressed.

44. Accordingly, the Commission is of the view that operation and maintenance expenses shall be allowed @2.5% (instead of 2% proposed in the draft Suo-Motu order) of the additional capital expenditure (ACE_e) for installation of ECS (excluding IDC and FERV) as admitted by the Commission and to be escalated at the rate of 3.5% per annum for the period up to 31.03.2024 and, thereafter, the norms shall be reviewed based on available data. Till 31.03.2024, the additional O&M expenses ($O\&M_e$) shall be worked out as follows:

First Year:	2.5% of ACE_e excluding IDC and FERV (to be allowed proportionately if operation of ECS is for part of the year)
Second Year onwards:	2.5% of ACE_e escalated annually at the rate of 3.5%

Additional Interest on Working Capital (IWC_e) component of SFC

45. Draft Suo-Motu order envisaged the computation of Working Capital based on the following components:

a) Cost of limestone or reagent for stock of 20 days corresponding to the normative annual plant availability factor;
b) Advance payment for 30 days towards cost of limestone or reagent for generation corresponding to the normative annual plant availability factor;
c) Operation and maintenance expenses in respect of emission control system for

one month;

d) Maintenance spares @20% of operation and maintenance expenses in respect of emission control system; and

e) Receivables equivalent to 45 days of supplementary capacity charge and supplementary energy charge for sale of electricity calculated on the normative annual plant availability factor.

46. Some of the stakeholders have suggested that there is uncertainty about the location of limestone sources. Accordingly, these stakeholders have suggested that the cost of limestone or reagent stock may be allowed for 30 days in place of the proposed 20 days corresponding to the normative plant availability factor. Further, they have suggested that condition of limestone minimum purity of 85% may also be relaxed.

47. Stakeholder, SBICAP, has suggested that considering the payment situation in different States, receivables of 60 days may be allowed instead of 45 days as proposed, as most of the PPAs allows credit period of 60 days to the Discoms for payment.

48. RUVNL has suggested that for computation of interest on working capital, 250 basis points above the Marginal Cost of Lending Rate of State Bank of India (for one-year tenor) may be considered.

49. Some stakeholders have suggested for a lower interest rate for computation of interest on working capital.

50. We have considered all the suggestions and comments of the stakeholders. As regards uncertainty about the location of limestone sources, we are of the view that tie-up for procurement of limestone is to be done by the generating companies well in advance. As such, working capital requirement of 45 days along with interest rate i.e.

Marginal Cost of Lending Rate of State Bank of India (for one year tenor) plus 350 basis points as proposed in the Suo-Motu order balance the interest of generating companies as well as the procurers.

51. Therefore, Working Capital (WCe) allowed shall include following components:

a) Cost of limestone or reagent for stock of 20 days corresponding to the normative annual plant availability factor;

b) Advance payment for 30 days towards cost of limestone or reagent for generation corresponding to the normative annual plant availability factor;

c) Operation and maintenance expenses in respect of emission control system for one month;

d) Maintenance spares @20% of operation and maintenance expenses in respect of emission control system; and

e) Receivables equivalent to 45 days of supplementary capacity charge and supplementary energy charge for sale of electricity calculated on the normative annual plant availability factor.

52. Accordingly, the Additional Interest on Working Capital (IWCe) shall be worked out as under:

$$IWC_{e(n)} = WC_{e(n)} \text{ x } WCIR_{(n)}/100.$$

Where,

$WC_{e(n)}$	is the Working Capital of the year for which compensation is to be determined (refer paragraph 51)
$WCIR_{(n)}$	is Working Capital Interest rate (in %) which is Marginal Cost of Lending Rate of State Bank of India (for one year tenor) plus 350 basis points as on 1st April of the year for which compensation is to be determined.

Additional Capacity Charges due to Additional Auxiliary Energy Consumption (ACC_e) component of SFC

53. The bidding guidelines issued by the Central Government provide for quoting

escalable and non-escalable capacity charges based on normative availability factor. However, availability gets reduced on account of installation of Emission Control System due to additional auxiliary energy consumption. Hence, appropriate adjustment will be required to be made in the capacity charges to compensate for additional auxiliary energy consumption.

54. In the draft Suo-Motu order, following formula was proposed to work out the additional capacity charges due to addition auxiliary energy consumption (ACC_e):

$$ACC_e \text{ (Rs/kWh)} = \text{Quoted Capacity Charges} \times \left\{ \frac{(1-AUXo)}{(1-AUXt)} - 1 \right\}$$

Where,

Quoted Capacity Charge is sum of Quoted Escalable and Non-escalable Capacity Charges in the contract year in accordance with the PPA;

AUX_t is the total auxiliary energy consumption and is equal to ($AUX_o + AUX_e$);

AUX_o is the original auxiliary energy consumption as agreed under the definition of thermal generating station's net capacity or otherwise; and

AUX_e is the additional auxiliary energy consumption due to emission control System as specified by the Central Electricity Authority and admitted by the Commission from time to time.

55. The Original Auxiliary Energy Consumption (AUX_o) shall be worked out based on the definition of thermal generating station's net capacity as provided in the model Power Purchase Agreement. Relevant paragraph of the Model PPA for Case-1 bidding is extracted below:

"Power Station's Net Capacity shall mean [………] MW, being Installed Capacity of the Power Station measured at the bus-bar, reduced by the normative auxiliary power consumption as prescribed by CERC from time to time:

In case of a dedicated transmission line connecting the bus-bar and the Interconnection

Point, the Power Station's Net Capacity shall be ….MW, being the Installed Capacity of the Power Station measured at the Interconnection Point and reduced <u>by the normative auxiliary power consumption and losses</u>, if any, of such dedicated transmission line" (Emphasis supplied)

56. One of the stakeholders, Reliance Power Ltd. has suggested that as sufficient data is not available about Auxiliary Energy Consumption of ECS, CEA may be advised to consider actual auxiliary energy consumption for initial 3-4 years and subsequently based on the data collected for different unit rating, norms of additional auxiliary energy consumption for ECS may be notified.

57. Some of the stakeholders have suggested that additional auxiliary energy consumption of 0.2% over and above the CEA notified norms may be allowed.

58. One stakeholder (Prayas Energy Group) has suggested that auxiliary energy consumption is also linked with availability of ECS and, therefore, ECS availability factor may be incorporated while working out the additional capacity charges due to additional auxiliary energy consumption.

59. We have considered all the suggestions and comments of the stakeholders. We are of the view that auxiliary energy consumption norms for ECS specified by the Central Electricity Authority are based on some study, available data and discussions with technology providers. Therefore, the Commission at this stage, when sufficient operational data regarding auxiliary energy consumption of ECS is not available, considers it appropriate to be guided by the norms suggested by Central Electricity Authority (CEA). Further, it is observed that CEA has not specified any part load compensation with regard to auxiliary energy consumption of ECS. We also do not find any provision in the PPAs which provides for any relief to the seller for lower PLF.

Accordingly, the suggestion for linking the auxiliary energy consumption of ECS with plant load factor is not considered for the purpose of devising the compensation mechanism.

60. In view of the above deliberations, additional capacity charges due to additional auxiliary energy consumption (ACC_e) shall be arrived at based on the formula (quoted at paragraph 54 above) as proposed in the draft Suo-Motu order and norms of auxiliary energy consumptions for ECS specified by CEA (Annexure–I).

61. Further, AUX_o (the original auxiliary energy consumption as agreed under the definition of thermal generating station's net capacity or otherwise) shall be considered based on normative auxiliary power consumption as prescribed by the Tariff Regulations of the Commission applicable as on seven days prior to the bid deadline or difference between installed capacity and thermal generating station's net capacity indicated in the respective PPA, whichever is lower. Where dedicated transmission line is connecting bus bar and interconnection point, AUX_o shall be worked out by considering auxiliary energy consumption and losses of dedicated transmission line as per agreement or difference between installed capacity specified under PPA and thermal generating station's net capacity as mentioned in PPA, whichever is lower.

62. In case of the Model PPA for Case-2 bidding, both the installed capacity and contracted capacity (including merchant capacity, if any) arrived based on rated net capacity, are mentioned upfront at the time of bidding. Accordingly, AUX_o shall be worked out based on difference between installed capacity and contracted capacity (including merchant capacity, if any) recognized under the Case-2 PPA.

SUPPLEMENTARY ENERGY CHARGES (SEC)

Expenses towards consumption of reagent (COR_e)

63. In draft Suo-Motu order, cost of reagent per unit of electricity generated during the month was proposed to be calculated based on the specific reagent consumption (grams/kWh) and landed price (in Rs.) of the reagent at the generating station as follows:

$$CORe(Rs/kWh) = \left(\frac{SRCe \times LPRe}{1000}\right)$$

Where,

COR_e	is expenses towards consumption of reagents in Rs/kWh
SRC_e	is the specific reagent consumption on account of emission control system (in grams/kWh) for a unit generated at generator terminal. This shall be normative number recommended by CEA for different variants of ECS;
LPR_e	is the weighted average landed price of reagents for ECS (in Rs/kg) during the month.

64. Some of the stakeholders have suggested that additional 3-5% consumption of reagent may be allowed over and above the reagent consumption worked out through the proposed formula and condition of 85% purity of limestone may be relaxed till sufficient data is available.

65. RUVNL has suggested that reagent consumption should be based on technical studies and data analysis. In this regard, CEA should float white paper based on the comments/ suggestions.

66. Dhariwal Infrastructure Limited has suggested that while computing the landed price of reagent, i) transit and handling losses; ii) cost of ultimate analysis of coal; and iii) handling cost, unloading charges, charges for third part sampling and applicable

statutory reagent and reagent testing & analysis charges should be included.

67. Some stakeholders have suggested for specifying the methodology to work out the landed price of limestone.

68. We have considered all the suggestions and comments of the stakeholders. Specific reagent consumption norm has been finalized by CEA based on discussions with technology providers and available data. Therefore, suggestions of additional reagent consumption of 3-5% over and above CEA specified norms and relaxing the norms of 85% purity of limestone cannot be allowed.

69. As regards request for specifying the methodology to work out the landed price of limestone, it is clarified that landed price of the reagent shall include the cost of reagent and transportation expenses and shall be worked out based on actual payment made by the generating company backed by documentary proof. Accordingly, cost of reagent per unit of electricity generated for the month shall be worked out based on the formula as proposed in the draft Suo-Motu order (quoted in paragraph 63 of this order). The reagent expenses for a month shall be calculated on month to month basis based on actual landed price.

Additional Energy Charges due to Additional Auxiliary Energy Consumption (AEC_e)

70. The standard bidding guidelines issued by the Ministry of Power provide for Quoted energy charges i.e. sum of Escalable Energy Charges and Non-Escalable Energy Charges. The energy charges are payable on scheduled energy on ex-bus level by the generating company. On account of installation of emission control system, there would be additional auxiliary energy consumption, resulting in decrease in revenue, which

would have to be compensated.

71. In draft Suo-Motu order, the following formula was proposed to work out Additional Energy Charges due to Additional Auxiliary Energy Consumption (AEC_e):

$$AEC_e = \text{Quoted Energy Charges} \times \left\{ \frac{(1-AUXo)}{(1-AUXt)} - 1 \right\}$$

Where,

Quoted Energy Charges is sum of Escalable and non-Escalable Energy Charges in Rs/kWh.

72. Reliance Power Limited has suggested that the Commission may publish unit rating wise additional energy consumption as specified by CEA. It has further suggested that the Commission may also clarify original auxiliary energy consumption to be considered in case thermal generating station's net capacity is not defined under PPA.

73. We have considered the suggestion and comment. We note that CEA has specified auxiliary energy consumption based on the technology rather than unit rating. Therefore, we are of the view that auxiliary energy consumption as specified by CEA (enclosed as Annexure–I) shall be applicable irrespective of unit rating.

74. Thus, the Additional Energy Charges due to Additional Auxiliary Energy Consumption (AEC_e) shall be worked out as proposed in the draft Suo-Motu order (quoted in paragraph 71 of this order).

RECOVERY OF COMPENSATION

75. The model power purchase agreements issued by the Central Government as part

of standard bidding guidelines provides the mechanism for payment of compensation of Change in Law as under:

> *"13.4.2 The payment for Changes in Law shall be through Supplementary Bill as mentioned in Article 11.8. However, in case of any change in Tariff by reason of Change in Law, as determined in accordance with this Agreement, the Monthly Invoice to be raised by the Seller after such change in Tariff shall appropriately reflect the changed Tariff."*

76. Accordingly, in the draft Suo-Motu order, it was proposed that compensation for capacity charges shall be recovered on monthly basis in the form of Supplementary Capacity Charges and the compensation for energy charges shall be recovered in the form of Supplementary Energy Charges on monthly basis.

77. Reliance Power Limited has suggested that PPAs already have a procedure for payment of Bills and there is no need to devise any separate procedure for the purpose of payment of monthly Supplementary Capacity Charges and monthly Supplementary Energy Charges. The generating company may raise the Bill for payment on account of operation of ECS in the same manner as any other bill provided in the PPA and such Bill shall be paid by the procurer(s). Provisions related to Due Date, Rebate, Late Payment Surcharge etc. will be as provided in the PPAs.

78. Reliance Power Limited has also suggested that payment security mechanism needs to suitably cover enhanced value of monthly billing in terms of enhanced value of Letter of Credit/ enhanced quantum of cash flows identified under Escrow Mechanism, etc.

79. We have considered all the submissions and comments of the stakeholders. PPAs already have a provision of raising monthly bills and in our view, there is no need to devise any other mechanism for recovery of Supplementary Capacity Charges and

Supplementary Energy Charges under Change in Law through compensation mechanism decided in this order. Recovery of compensation shall be done in the same manner by raising monthly bills as is being done in case of any other monthly bills to be paid under PPAs. Same principle applies for payment security mechanism.

Recovery of Supplementary Capacity Charge - $SFC_{(m)}$

80. With regard to recovery of supplementary capacity charges, following was proposed in the draft Suo-Motu order:

"68. *The supplementary capacity charges (SFC(m)) would consist of two components:*

a. Compensation for additional fixed Charges due to additional capital expenditure, O&M and IWC (AFE_e) (in Rs per KWh); and
b. Compensation for Capacity Charges due to additional Auxiliary Consumption = ACC_e (in Rs per KWh)

69. Per unit Supplementary Capacity Charge (SFC(m)) on account of installation of the Emission control system shall be computed with respect to the installed capacity of unit or generating station, as the case may be, and shall be recovered with reference to the contracted capacity under each power purchase agreement. The compensation for additional fixed expenditure due to ECS shall be computed by applying following formulae:

$$AFEe = \left(\frac{\sum[DEPe, COCe, O\&Me, IWCe]}{(IC \times 1000 \times NA \times (1-AUXt) \times h)}\right) \text{ (in Rupees per KWh)}$$

Where,

IC is Installed Capacity (in MW);

NA is Normative Availability of the generating station expressed in decimal; and

h is Total number of hours in the year;

70. Accordingly, per unit supplementary capacity charges shall be worked out as under:

$$SFC_{(m)} = AFE_e + ACC_e \quad \text{(in Rupees per KWh)}$$

By applying the above value of the Supplementary Capacity Charge rate (Rs/kWh), the generating company shall recover the supplementary capacity charges on monthly basis under each PPA depending upon the cumulative availability achieved till the end of each month. No supplementary incentive shall be allowed to the generating company for *declaring the availability beyond the normative availability. The availability and payment of supplementary capacity charges shall be reconciled on annual basis. Irrespective of the availability declaration by the generating station, if the generating company has operated the generating station without operation of the ECS for any period of time, the supplementary capacity charges shall be payable corresponding to the availability achieved by ECS only. If the contract period as per PPA is less than the useful life of the emission control system, the obligation of the procurer shall be limited to its contract period and contracted capacity."*

81. Some of the stakeholders have suggested that (i) availability of ECS should be linked with plant availability and additional incentive should be payable on higher availability; (ii) if ECS availability is worked out separately, it will increase disputes among generating companies and Discoms; (iii) the methodology to work out availability of ECS should be specified; and (iv) the Commission may make it mandatory for Discoms to purchase power from thermal generating stations beyond power purchase agreement.

82. Reliance Power Limited has suggested that as per provisions of the Grid Code, availability of the thermal generating station is declared as a whole including all auxiliaries. Therefore, maintaining individual availability of all auxiliaries including ECS shall be very difficult.

83. Some of the stakeholders have suggested that generating company should submit monthly availability report of ECS to procurers and concerned pollution control board.

84. We have considered all the suggestions and comments of the stakeholders and concerns raised regarding declaration of availability of the ECS system. As per provisions of the Grid Code, availability of thermal generating stations is declared as a whole and not for the individual auxiliaries. To comply with requirements of the 2015 Rules and subsequent notifications of MoEF&CC regarding emission standards, the thermal generating stations cannot be in operation without ECS. Therefore, availability of

the ECS need not to be declared separately and for the purpose of payment of supplementary capacity charges, the availability declared by the thermal generating station shall be applicable for ECS too.

85. With regard to the contention of some of the stakeholders that incentive for declaring higher availability of ECS should be payable, we are of the view that principle of restitution does not allow any such incentive.

86. In view of the above deliberations, recovery of supplementary capacity charges SFC(m) shall be done as under:

A. The supplementary capacity charges SFC (m) would consist of two components:

a. Compensation for additional fixed Charges due to additional capital expenditure, O&M and IWC (AFE_e) (in Rs per KWh); and

b. Compensation for Capacity Charges due to additional Auxiliary Consumption (ACC_e) (in Rs per KWh)

Accordingly, per unit supplementary capacity charges shall be worked out as under:

$$SFC_{(m)} = AFE_e + ACC_e \qquad \text{(in Rs/ kWh)}$$

B. Per unit Supplementary Capacity Charge SFC(m) on account of installation of the Emission Control System shall be computed with respect to the installed capacity of unit or generating station, as the case may be, and shall be recovered with reference to the contracted capacity under each power purchase agreement.

The compensation for additional fixed expenditure due to ECS shall be computed by applying following formulae:

$$AFEe = \left(\frac{\sum[DEPe, COCe, O\&Me, IWCe]}{(IC \times 1000 \times NA \times (1-AUXt) \times h)}\right) \quad \text{(in Rupees per KWh)}$$

Where,

IC is Installed Capacity (in MW);

NA is Normative Availability of the generating station expressed in decimal; and

h is Total number of hours in the year;

C. ACCe in Rs/KWh shall be calculated as per the following formulae mentioned in Paragraph 54.

$$ACC_e = \text{Quoted Capacity Charges} \times \left\{ \frac{(1-AUXo)}{(1-AUXt)} - 1 \right\}$$

D. By applying the above per unit value of the Supplementary Capacity Charge rate (Rs/kWh), the generating company shall recover the supplementary capacity charges on monthly basis under each PPA depending upon the cumulative availability of the thermal power plant or generating unit, as the case may be, till the end of each month. No supplementary incentive shall be allowed to the generating company for declaring the availability of ECS beyond the normative availability of the thermal generating station where ECS is installed. The availability and payment of supplementary capacity charges shall be reconciled on annual basis. If the contract period as per PPA is less than the useful life of the emission control system, the obligation of the procurer shall be limited to its contract period and contracted capacity.

Recovery of Supplementary Energy Charge – $SEC_{(m)}$

87. With regard to recovery of supplementary energy charges, following was proposed in the draft Suo-Motu order:

"71. Per unit Supplementary Energy Charges on account of installation of the emission control system shall be computed on the basis reagent consumption and additional quoted energy charges. Monthly Supplementary Energy Charges (SEC(m)) shall be computed as follows:

$$SEC_{(m)} = AEO(m) \ X \ [COR_e/(1- AUX_t) + AEC_e]$$

Where,

$AEO_{(m)}$	*is scheduled energy during the month 'm' (in kWh);*
COR_e	*is expense towards consumption of reagents (Rs. per kWh)*
AUX_t	*is Total Auxiliary Energy consumption*
AEC_e	*is Additional Energy Charge due to Additional Auxiliary Energy Consumption (Rs. per kWh)*
$SEC_{(m)}$	*Supplementary Energy Charges for the month 'm'.*

88. Reliance Power Limited has suggested that the recovery of the supplementary energy charges should also include (i) cost of additional water required for emission control system; (ii) water treatment cost and waste water disposal cost; and (iii) product disposal cost.

89. We have considered the suggestion and comment of the stakeholder. As mentioned in the earlier part of this order, the Commission has already increased the additional O&M expenses to 2.5% (as against the proposed 2% in the draft order) of additional capital expenditure (excluding IDC and FERV) on account of installation of ECS. Therefore, the Commission is of the view that concerns of stakeholder have already been taken care of. Accordingly, the formulation for recovery of supplementary energy charges is being retained as proposed in the draft Suo-Motu order (quoted in paragraph 87 of this order).

Availability Calculation

90. In competitive bidding based projects, auxiliary energy consumption is not a bidding parameter but has impact on tariff as the contracted capacity is net of auxiliary energy consumption. Installation of emission control system alters the auxiliary energy consumption assumed at the time of arriving at the contracted capacity. The additional

auxiliary energy consumption impacts the contracted capacity (CC), thereby impacting the computation of availability factor. Accordingly, in the draft Suo-Motu order, the following was proposed to work out the availability:

> *"Since contracted capacity under the power purchase agreement has been revised to give effect of additional auxiliary energy consumption, the availability factor shall also be calculated based on revised contracted capacity. Accordingly, the computation of Availability factor on account of impact on contracted capacity due to additional auxiliary energy consumption of the emission control system shall be as under:*
>
> *Availability (%) = (Availability declared in MWx100)/(CC(Revised))*
>
> *Where,*
>
> $AUX_t = AUX_o + AUX_e$
>
> $CC(Revised) = CC_o \times (1- AUX_t)/(1- AUX_o);$
>
> CC_o *is Original Contracted Ex-Bus capacity of unit or generating station, as the case may be"*

91. Prayas Energy Group has suggested that additional auxiliary energy consumption should be linked with availability of ECS as the additional auxiliary consumption is dependent on availability factor of ECS and contracted capacity.

92. We have considered the suggestion and comment of the stakeholder. As already discussed in earlier part of the order, declaring availability of ECS separately is not in line with the provisions of the Grid Code and, therefore, the Commission has already decided that availability of the thermal generating station shall be considered as the availability of ECS.

93. Therefore, the proposed formulation in the draft Suo-Motu order to work out the availability (quoted in paragraph 90 of this order) is retained.

MISCELLANEOUS ISSUES

Shutdown Period

94. In draft Suo-Motu order, the following was proposed with regard to shutdown period:

> *"75. We have examined the suggestions. As regards the normative availability factors in annual shutdown period, the parties to the PPAs shall coordinate and plan the interconnection of emission control system with main plant by synchronizing it with the annual overhaul. The Commission is of the view that if the period of shut down exceeds beyond annual shutdown period factored in the normative availability under PPA, either on account of delay in timely completion of activities for interconnecting emission control system or lack of coordination, the consequential cost for the same cannot not be passed on to the consumers."*

95. Some of the Stakeholders have suggested that (i) for integration of ECS with thermal generating station/ generating unit, 30 days normative shutdown for each unit may be allowed; (ii) during shutdown period for ECS installation, all incentives linked with availability of the thermal generating station may be reimbursed; (iii) during shutdown period, thermal generating station may be compensated for complete defrayment of fixed charges, LTA charges, waiver of penalty under PPA, if any, and waiver of charges for short/ non-lifting of coal as per FSA, if any; and (iv) for the projects with captive coal mines, the compensation during the shutdown period may also include loss of contribution margin (total tariff without any change in law per unit – coal cost per unit) on average PLF in the previous two financial years.

96. We have considered all the suggestions and comments of the stakeholders. In our view, it is appropriate to deal with this issue on case to case basis. However, we would like to state that the thermal generating stations are required to take appropriate measures to keep the shutdown period to the minimum possible level. The Commission is also of the view that the generating company should plan interconnection of ECS with

thermal generating station during annual overhaul. The procurer(s) must be consulted while undertaking such interconnection. Any claims of costs associated with such shutdown would be considered by the Commission on prudence check after installation of ECS.

Open Capacity

97. In the draft Suo-Motu order dated 12.4.2021, the following was stated with regard to Open capacity:

> "*76. A suggestion has been received for consideration of compensation mechanism for open capacity to provide all the generating stations, with and without emission control systems a level playing field. We are of the view that the risk associated with open capacity needs to be addressed by the concerned market player and therefore, we do not find need for any regulatory intervention for open capacity at this stage."*

98. Some of the stakeholders have suggested that additional cost recovery mechanism may be developed for projects with open capacity which are selling power on power exchange or on DEEP portal.

99. The Commission is of the view that this issue is beyond the scope of this order.

De-gradation of Gross Station Heat Rate (GSHR) due to installation of De-Nox system

100. Some of the stakeholders have suggested that de-gradation of GSHR due to installation of de-NOx system needs to be deliberated. Stakeholders have also submitted that due to installation of de-NOx system, combustion pattern of the boiler will change resulting in increase in combustibles in fly ash as well as bottom ash. Such increase in unburnt combustibles shall consequently reduce the boiler efficiency thereby increasing the existing GSHR of the thermal generation stations by more than 1%.

101. We have considered all the suggestions and comments of the stakeholders. The

Commission notes that MoEF&CC vide notification dated 19.10.2020 has revised the norms of the NOx emission from 300 mg/Nm^3 to 450 mg/Nm^3. Also, issue regarding revision of NOx emission norms in respect of thermal generating stations commissioned after 01.01.2017 is sub-judice before the Hon'ble Supreme Court. Therefore, the

Commission is not inclined to consider the issue of GSHR degradation due to de-NOx system at this stage. The same may be taken up on case to case basis.

Capital Expenditure (CAPEX) for augmentation of environment protection equipment

102. Some of the stakeholders have suggested that capital expenditure for augmentation of environment protection equipment needs to be addressed where ECS is already installed in thermal generating stations.

103. Stakeholders have also suggested that CAPEX in existing ECS may be allowed under change in law as the replacement of ECS is being carried out much before completion of useful life. They have submitted that the Commission needs to address this anomaly in a pragmatic way to ensure that the generating companies are not penalized unnecessarily and that all relief granted pursuant to change in law follows the restitution principle in its true spirit.

104. We have considered all the suggestions and comments of the stakeholders and are of the view that such issues are required to be dealt on case to case basis.

Income Tax

105. One of the stakeholders (Dhariwal Infrastructure Ltd.) has suggested that the Commission may allow developers to recover income tax on the contribution to profit element arising out of the compensation through supplementary tariff in line with the

provisions of CERC (Terms & Conditions of Tariff) Regulations, 2019 read with its amendments.

106. We have considered the suggestion and comment of the stakeholder. The Commission is of the view that there should be any element of profit arising out of the compensation mechanism, since the same is based on the principle of restitution. Accordingly, the suggestion of the stakeholder is not tenable.

Penalties on account of non-compliance of Environment (Protection) Amendment Rules, 2021

107. One of the stakeholders (Prayas Energy Group) has suggested that penalties imposed on generating companies for non-compliance to the revised emission norms shall not be passed through to beneficiaries. It has suggested that the Commission should clarify that costs on account of non-compliance of the Environment (Protection) Amendment Rules, 2021, will be disallowed and are to be borne by the respective generating companies.

108. We have considered the submissions of the stakeholder. The Commission notes that there is no provision in the proposed compensation mechanism that allows recovery of any penalties and passing the same through to beneficiaries.

Provisional Tariff

109. Some of the stakeholders have suggested that issue of provisional/ ad hoc tariff needs to be deliberated. These stakeholders have suggested that the Commission may grant provisional tariff @90% of the estimated capital expenditure 2(two) to 3(three) months before commissioning of ECS and the same may be subsequently trued up on the basis of actual CAPEX on ECS. The stakeholders have submitted that this will enable

secure return on investment made by the generating companies and, at the same time, reduce the burden of arrears on procurers in terms of supplementary tariff and carrying cost.

110. We have considered the suggestions and comments of the stakeholder. We are of the view that provisional tariff needs to be mutually agreed between procurers and sellers taking into account the compensation mechanism decided in this order.

111. Petition No. 06/SM/2021 is disposed of in terms of the above.

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

Abbreviations Used

Abbreviation	Unit	Description
ACE_e	Rupees	Gross capital cost of Additional Capital Expenditure on emission control system as admitted by the Commission
ACC_e	Rupees	Additional Capacity Charges due to additional Auxiliary Energy Consumption
AEC_e	Rupees	Additional Energy Charges due to additional Auxiliary Energy Consumption
AFE_e	Rupees	Compensation for additional fixed Charges due to additional capital expenditure, O&M and IWC
AUX_t	Percentage (%)	Total Auxiliary Energy consumption
AUX_e	Percentage expressed in decimals	Additional Auxiliary energy consumption due to emission control System as specified by the Central Electricity Authority and admitted by the Commission
AUX_o	Percentage expressed in decimals	Original Auxiliary energy consumption as agreed under the definition of Net Power contracted capacity or otherwise
$AEO_{(m)}$	kWh	Scheduled energy during the month ‘m’
CC	MW	Ex-Bus Contracted Capacity
CCRevised	MW	Ex-Bus Contracted Capacity revised due to increase in Auxiliary consumption of Emission Control system
COC_e	Rupees	Cost of Additional Capital Expenditure
COR_e	Rs/kWh	Expenses towards Consumption of Reagent
DEP_e	Rupees	Depreciation
GFA	Rupees	Gross Fixed asset

Abbreviation	Unit	Description
IWC_e	Rupees	Interest on Working Capital
LPR	Rs/Kg	Landed Price of Reagent used for emission control system
NFA	Rupees	Net Fixed asset
MCLR	Percentage (%)	Marginal *Cost of fund based Lending Rate*
NA	Percentage (%)	Normative Availability as specified inthe PPA
$O\&M_e$	Rupees	Operation and Maintenance Expenses
SEC	Rs/kWh	Supplementary Energy Charges due to Emission control system
SFC	Rupees	Supplementary Capacity Charge (also known as Supplementary Fixed Charges)
SRC	gm/kWh	Specific Reagent Consumption
RI	Percentage (%)	Weighted Average Rate of Interest
WCIR	Percentage (%)	Working Capital Interest rate

Annexure-I

(In line with Recommendations of CEA)

1. Additional Auxiliary Energy Consumption (∆AUX):

Name of Technology	**∆AUX (as % of gross generation)**
(1) For reduction of emission of Sulphur Dioxide:	
a) Wet Limestone based FGD system (without Gas to Gas heater)	1.0%
b) Lime Spray Dryer or Semi dry FGD System	1.0%
c) Dry Sorbent Injection System (using Sodium bicarbonate)	NIL
d) For CFBC Power plant (furnace injection)	NIL
e) Sea Water based FGD system (without Gas to Gas heater)	0.7%
(2) For reduction of emission of oxide of nitrogen:	
a) Selective Non-Catalytic Reduction system	NIL
b) Selective Catalytic Reduction system	0.2%

Provided that where the technology is installed with Gas to Gas heater, auxiliary energy consumption specified as above shall be increased by 0.3% of gross generation."

2. Norms for consumption of reagent:

(1) The normative consumption of specific reagent for various technologies for reductionof emission of sulphur dioxide shall be as below:

(a) For Wet Limestone based Flue Gas Desulphurisation (FGD) system: The specific limestone consumption (g/kWh) shall be worked out by following formula:

= [0.85 x K x SHR (kCal/kWh) x S (%)]/[GCV (kCal/kg) x LP (%)]

Where,

S = Sulphur content in percentage,

LP = Limestone Purity in

percentage;

Provided that value of K shall be equivalent to (35.2 x Design SO_2 Removal Efficiency/96%) for units to comply with SO_2 emission norm of 100/200 mg/Nm^{3}or (26.8xDesign SO_2 Removal Efficiency/73%) for units to comply with SO_2 emission norm of 600 mg/Nm^3;

Provided further that the limestone purity shall not be less than 85%.

(b) For Lime Spray Dryer or Semi-dry Flue Gas Desulphurisation (FGD) system: The specific lime consumption shall be worked out based on minimum purity of lime (PL) as at 90% or more by applying formula [0.90 x 6 /PL(%)] gm/kWh;

(c) For Dry Sorbent Injection System (using sodium bicarbonate): The specific consumption of sodium bicarbonate shall be 12 gm per kWh at 100% purity.

(d) For CFBC Technology (furnace injection) based generating station: The specific limestone consumption for CFBC based generating station (furnace injection) at 85% purity limestone (kg/kWh) shall be computed with the following formula:

= [62.9 x S (%) x [SHR (kCal/kWh) /GCV (kCal/kg)] x [0.85/ LP]

Where

S= Sulphur content in percentage, LP

= Limestone Purity in percentage.

(e) For Sea Water based Flue Gas Desulphurisation (FGD) system: The reagent used is sea water, therefore there is no requirement for any normative formulae for consumption of reagent.

(2) The normative consumption of specific reagent for various technologies for reductionof emission of oxide of nitrogen shall be as below:

(a) For Selective Non-Catalytic Reduction (SNCR) System: The specific urea Consumption of SNCR system shall be 1.2 gm per kWh at 100% purity of urea.

(b) For Selective Catalytic Reduction (SCR) System: The specific ammonia consumption of SCR system shall be 0.6 gm per kWh at 100% purity of ammonia.

Annexure-II

List of stakeholders who submitted comments on the draft Suo-Motu order:

Sr. No.	Description
1	Nabha Power Limited
2	MB Power (Madhya Pradesh) Limited
3	Costal Gujarat Power Limited
4	Dhariwal Infrastructure Limited
5	SBI CAP
6	Adani Power (Mundra) Limited
7	Rajasthan Urja Vikas Nigam Limited
8	CUTS International
9	Reliance Power limited
10	Federation of India Chambers of Commerce and Industry
11	Association of Power Producers
12	Haryana Power Purchase Centre
13	Prayas (Energy Group), Pune