

**CENTRAL ELECTRICITY REGULATORY COMMISSION**

**NEW DELHI**

**Petition No. 168/MP/2019**

**Coram:**

**Shri P.K. Pujari, Chairperson**

**Shri I.S. Jha, Member**

**Date of Order: 22<sup>nd</sup> June, 2020**

**In the matter of**

Petition, under Section 79 of the Electricity Act, 2003 read with Article 13 of the Power Purchase Agreement dated 22.04.2007 and Clause 4.7 of the Competitive Bidding Guidelines and this Hon'ble Commission's Order dated 17.09.2018 in Petition No. 77/MP/2016.

**And**

**In the matter of**

Coastal Gujarat Power Limited (CGPL),  
C/o- Tata Power Company Limited,  
34, Sant Tukaram Road, Carnac Bunder,  
Mumbai- 400021

**...Petitioner**

**Versus**

1. Gujarat Urja Vikas Nigam Ltd,  
Sardar Patel Vidhyut Bhavan, Race Course,  
Vadodara-390007, Gujarat
2. Maharashtra State Electricity Distribution Company Ltd.,  
4<sup>th</sup> Floor, Prakashgad, Plot No. G-9,  
Bandra (East), Mumbai-400051, Maharashtra
3. Ajmer Vidyut Vitaran Nigam Ltd.  
Hathi Bhata, Old Power House,  
Ajmer, Rajasthan
4. Jaipur Vidyut Vitaran Nigam Ltd.  
Vidyut Bhawan, Janpath,  
Jaipur, Rajasthan.
5. Jodhpur Vidyut Vitaran Nigam Ltd.  
New Power House, Industrial Area,



Jodhpur, Rajasthan.

6. Punjab State Power Corporation Limited  
PP&R, Shed T-1, Thermal Design,  
Patiala-147001
7. Uttar Haryana Bijli Vitran Nigam Limited,  
Vidyut Sadan, Plot No. C-16, Sector-6,  
Panchkula-134112, Haryana
8. Dakshin Haryana Bijli Vitran Nigam Limited  
Vidyut Nagar, Vidyut Sadan,  
Hisar, Haryana-125005
9. Central Electricity Authority  
Sewa Bhawan,  
R.K. Puram, Sector-1,  
New Delhi-110066

...Respondent

**Parties present:**

Shri Amit Kapur, Advocate, CGPL  
Shri Kunal Kaul, Advocate, CGPL  
Shri Samikrith Rao, Advocate, CGPL  
Ms. Ranjitha Ramachandran, Advocate, GUVNL, Haryana & Rajasthan Utilities and  
PSPCL  
Ms. Poorva Saigal, Advocate, GUVNL, Haryana & Rajasthan Utilities and PSPCL  
Ms. Tanya Sareen, Advocate, GUVNL, Haryana & Rajasthan Utilities and PSPCL  
Shri Pulkit Tare, Advocate, MSEDCL  
Shri Anup Jain, Advocate, MSEDCL

**ORDER**

The petitioner, Coastal Gujarat Power Ltd. (CGPL), is a generating company operating Mundra Ultra Mega Power Project (UMPP), having installed capacity of 4150 MW (5x830 MW) at Mundra, Gujarat. The Respondents are mainly distribution licensee buying electricity generated from Mundra UMPP that have entered into Power Purchase Agreements ("PPA") dated 22.4.2007 with the petitioner consequent upon determination of tariff on basis of competitive bidding carried out under Section 63 of the Electricity Act, 2003 (hereinafter referred to as the "Act").



## **Background**

2. Ministry of Environment, Forest and Climate Change, Government of India (“the MoEF&CC”) vide notification dated 7.12.2015 (hereinafter referred to as the “2015 Notification”) *inter-alia* specified revised standards of emission applicable to thermal generating stations (hereinafter referred to as the “Revised Norms”). The Petitioner filed Petition no. 77/MP/2016 under Article 13 of the PPA, which was disposed by the Commission on 17.9.2018 with the direction to approach this Commission for determining increase in cost or/and revenue expenditure on account of implementation of Revised Norms prescribed in the 2015 Notification, in accordance with the guidelines to be issued by Central Electricity Authority (“the CEA”). On 27.9.2018, Petitioner submitted feasibility report with regard to SO<sub>2</sub> abatement to the CEA. On 21.2.2019, CEA furnished its report detailing the “suggestive technology” and “indicative cost” for installation of FGD system at Mundra Project to comply with revised emission standards. Subsequent to feasibility report with regard to SO<sub>2</sub> abatement, CGPL had, on 9.11.2018, submitted a feasibility report with regard to Nitrogen Oxide abatement measures. However, CEA has not provided any recommendation as regards Nitrogen Oxide. Though as per the 2015 Notification, the Revised Norms were to be implemented within two years of its notification, it has been revised by Central Pollution Control Board (CPCB) vide its letter dated 11.12.2017 and the same now stands as under with respect to Mundra UMPP:

<b>Unit No.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>PM</b>	Immediately				
<b>SO<sub>2</sub></b>	30.6.2020	31.3.2021	30.6.2021	31.3.2022	31.3.2022
<b>NO<sub>x</sub></b>	2022				

3. The main prayers of the Petitioner are as under:

- (a) *Approve the total capital expenditure of Rs. 2715 Crores to be incurred*

by CGPL due to installation of FGD;

(b) Approve the recurring annual operating expenditure to be incurred by CGPL due to installation of FGD, as provided in the instant petition,

(c) Approve the revised tariff as provided in the instant petition.

(d) In the alternative to Prayer (d) above, prescribe, devise and apply appropriate norms for computing the adjustment in tariff to offset the additional investment/ increase in costs due to MoEFCC Notification for restituting CGPL to the same economic position as if such Change in Law event had not occurred.

(e) Pass any such other and further reliefs as this Hon'ble Commission deems just and proper in the nature and circumstances of the present case.

4. The Respondents, GUVNL and Rajasthan Discoms have filed their reply vide affidavits dated 21.10.2019 and 17.2.2020; the Respondent, MSEDCL has filed its reply vide affidavit dated 4.11.2019; the Respondents, Haryana Utilities have filed their reply vide affidavit dated 19.10.2019; the Respondent, PSPCL has filed its reply vide affidavit dated 18.10.2019. The Respondent, CEA has not filed its reply. The petitioner has filed its consolidated rejoinder vide affidavits dated 11.11.2019 and 21.11.2019 and submitted information sought by the Commission vide affidavit dated 10.2.2020.

#### **Submissions of the Petitioner**

5. The petitioner has made the following submissions vide its affidavit filed with the main Petition:

a) On 07.12.2015, MoEF&CC had notified the Environment (Protection) Amendment Rules, 2015 (the 2015 Notification). The Revised Norms notified by this Amendment were to be complied by all Thermal Power Plants including CGPL on or before 6.12.2017.

b) On 28.6.2018, MoEF&CC issued a notification stating, amongst others, that the water consumption requirement and installation of Cooling Tower is not applicable to Thermal Power Plants using sea water. Further, MoEF&CC also provided a stack height limit for all the Thermal Power Plants with wet limestone FGD.

c) CGPL is complying with the Revised Norms prescribed in the 2015 Notification, except the emission norms in regard to Sulphur Dioxide and Nitrogen Oxide. To meet the Revised Norms in respect of Sulphur Dioxide and Nitrogen Oxide, CGPL is required to retrofit certain equipment, which would require it to incur one-time capital expenditure (including other ancillary expenditure/ liability to be incurred by CGPL) and recurring operational expenditure during the term of the PPA, for which CGPL is to be restituted to the same economic position as if such Change in Law event has not occurred.

d) Accordingly, CGPL filed Petition No. 77/MP/2016, inter-alia, seeking:

(i) A declaration that the 2015 Notification constitutes a Change in Law event under the PPA; and

(ii) In-principle approval for incurring the capital cost and prescribing a methodology for computing the adjustment in tariff to offset the additional investment or increase in costs due to the 2015 Notification, so as to reconstitute CGPL to the same economic position as if such Change in Law event had not occurred.

e) On 17.9.2018, the Commission had passed an Order in the aforesaid Petition No. 77/MP/2016 holding that the 2015 Notification amounts to Change in Law in terms of Article 13 of the PPA. Further, liberty was also granted to CGPL to approach this Commission for 'determining increase in cost or/and revenue expenditure on account of implementation of revised norms prescribed in the 2015 Notification, in accordance with the Guidelines to be issued by CEA and the mode of recovery of the same through monthly tariff'.

f) Thereafter, on 27.9.2018, CGPL submitted feasibility report to CEA, detailing Sulphur Dioxide abatement measures, specific to the Mundra UMPP. The said report provided justification for selecting sea water based FGD system and the tentative capital and operational expenditure to be incurred for retrofitting the FGD. On 9.11.2018, CGPL submitted feasibility report to CEA detailing the Nitrogen Oxide abatement measures, specific to Mundra UMPP. However, CEA has not provided its recommendations with regard to Nitrogen Oxide abatement technology or the approximate capital and operational cost.

g) On 21.2.2019, CEA issued its report recommending the technology and indicative cost for installing the FGD system to meet the Revised Norms pertaining to Sulphur Dioxide and has considered indicative capital expenditure of Rs. 0.30 crores/MW (i.e. total capital expenditure of Rs. 1,245 crores). CEA has not provided any justification, scope of work, norms, assumptions considered by it for computing the capital expenditure to be incurred by CGPL for installation of FGD system. The capital expenditure considered by CEA is merely an indicative figure and the same does not reflect the actual capital expenditure which would be incurred by CGPL to install the FGD. CGPL has carried out a detailed bidding process followed by a round of negotiations, to discover the lowest price available. However, the amount discovered is higher than the price suggested by CEA.

h) The changes in environmental parameters vide the 2015 Notification constitutes a Change in Law in terms of the PPA, which has a substantial impact on the cost (capital and operational) of the Mundra UMPP. Therefore, CGPL needs to be appropriately restituted to the same economic position as if such Change in Law had not occurred. Considering the financial health of CGPL, it would not be possible for CGPL to execute the FGD system on its own without seeking debt from the lenders. Thus, clarity is required qua revision in tariff so as to enable CGPL to arrange for necessary finance from the lenders and to proceed further.

i) Thus, in term of the liberty granted by this Commission in its Order dated 17.9.2018 in Petition No. 77/MP/2016 and in terms of Section 79 of the Electricity Act, 2003; Article 13 of the PPA; and Clause 4.7 of the Competitive Bidding Guidelines issued by the Ministry of Power, CGPL has filed the present Petition for seeking approval of Capital Cost (including recovery of other ancillary expenditure/ loss) and Operational Cost which may be incurred/ caused to CGPL for installing FGD system so as to meet the Revised Norms. Further, CGPL has sought approval of additional tariff to be allowed to offset the additional investment/ increase in costs to be incurred by CGPL due to the 2015 Notification.

j) CGPL may also be permitted to file a separate petition seeking approval of capital, operational and other expenditure qua installation of Nitrogen Oxide abatement technology, as and when the same is approved by CEA.

k) CGPL has carried out a detailed bidding process followed by a round of

negotiations, to discover the lowest price available. The tender was divided into the following five packages:

- (i) FGD Main Package [Package 1];
- (ii) Civil Works Package [Package 2];
- (iii) Chimney Civil Works [Package 3];
- (iv) HT electric power supply package [Package 4]; and
- (v) Fire-fighting System [Package 5].

Of the above five packages, CGPL has resorted to competitive bidding process to award the four critical packages i.e. packages 1 to 4. Package 5 i.e. 'Fire-fighting system' is ancillary in nature and not very cost-intensive that is estimated at Rs. 10 crores (i.e. less than 0.5% of the total expenditure of around Rs.1634.33 crores). Since most of the requirements and specifications would be firmed up after detailed engineering of packages 1 to 4 awarded to successful bidders, package 5 works may be awarded to contractor through limited tendering. In the interest of time, an open tendering process, which is time consuming, is not being envisaged in respect of this package 5.

l) Based on the competitive bidding process conducted for packages 1 to 4 and internal cost assessment in respect of package 5, the total price for the installation and operationalization of the entire FGD system is Rs. 1,634.33 crores (i.e. Rs. 0.39 crores/MW as against Rs. 0.30 crores/MW suggested by CEA). The details of the price discovered from the said bidding process is as under:

S. No.	Description	Capital Expenditure (Rs. in crores)
1.	FGD Main System Package	1,122
2.	General Civil Works Package	333.30
3.	Chimney Package	104.03
4.	HT Electric Power Supply Package	65.00
5.	Fire Protection and Detection System	10*
<b>Total</b>		<b>1,634.33</b>

\* Note: The said costs are based on the internal estimate of CGPL.

m) None of the bidders were willing to install FGD system and other equipment at the price indicated by CEA (Rs. 0.30 crores/MW). The variation between the price indicated by CEA vis-a-vis the price discovered under the bidding process could be due non-consideration of certain equipment and/ or the cost related thereto, by CEA while giving its recommendations qua installation of FGD. Some of the equipment along with the associated cost which have not been considered by CEA are as under:

Sl. No.	Equipment	Estimated Cost (Rs. in crores)
1	Gas to Gas Heater	75
2	Booster Fan	30
3	Installation of Sea Water Intake channel	105
4	Temporary Circulating Water Outfall Bypass channel	53
5	Restoration of existing access roads and re-routing of Utilities	12
6	FGD Return Water	132
7	Miscellaneous cost- Installation of Electrical & Fire safety System	75
<b>Total</b>		<b>482</b>

n) In terms of the CEA's recommendation, CGPL has carried out the bidding process to discover the lowest possible price for installation of FGD package. The capital cost to be incurred by CGPL comprises of the following:

- (i) Basic cost discovered (including GST).
- (ii) Estimated capital costs for which the negotiations are ongoing (including GST).
- (iii) Owner's cost: includes CGPL's costs towards site survey, project management, consultancy services and pre-operational expenses. CGPL has estimated the same to be around 5% of the total EPC Costs. However, there is no normative basis of computing the said expenditure and this cost has been considered to be around 5% on the basis of prudent utility practices, keeping in mind the time required for finishing the entire work. In this regard, CGPL considered some of the recent petitions filed by NTPC before this Commission. Based on the data provided in Form 5B of the Tariff Petition filed by NTPC, CGPL has worked out the fraction (i.e. percentage) of hard cost towards the owner's costs which is in the form of construction and pre-commissioning expenditure.
- (iv) IDC computed with an estimated projection of cash flows.

(v) Contingency expenditure: CGPL has considered a contingency expenditure of 5% of total capital expenditure. Contingency expenditure covers the expenditure which could not have been visualised at the time of planning and the same depends on the extent of uncertainty that may be envisaged. Further, such expenditure would also depend on the hard cost projected. In case of lower total costs, the contingency expenditure (in % terms) would be higher compared to the case when total cost is higher. Further, expenditure on FGD system is quite new to the country and there may be certain additional expenditure which may not have been contemplated at the time of initiation of work. Hence, though in the petitions of NTPC for the above power plants, the contingency expenditure is around 1%, CGPL is of the view that this quantum is quite low for a new brown field project, especially when the experience in FGD system equipment, its construction and commissioning is limited in the country. Hence, CGPL has considered 5% of the expenditure towards contingency expenditure.

(vi) Other ancillary expenditure (Opportunity Cost): The implementation of the aforesaid scheme/ installation or modification of equipment to meet revised standards would require shutting down of Mundra UMPP and/ or planned outages. As a result, Mundra UMPP may not be completely/ partially available during the period when these equipment are being installed and connected to the existing plant. In this regard, as per CGPL's estimate installation of FGD package would lead to outage for about 22 days for each unit thereby reducing the recovery of the capacity charges for this period.

o) The computation of Capital Cost is provided in the table below:

Sr.No.	Descriptions	Capex Estimate (Rs. in crores)
A	Capital Cost	
1	Total FGD EPC Cost	
1.1	FGD Main System Package	1,122.00
1.2	General Civil Works Package	333.30
1.3	Chimney Package	104.03
1.4	HT Electrical Power Supply Package	65.00
1.5	Fire Protection & Detection System	10.00
<b>1</b>	<b>Total FGD EPC Basic Price</b>	<b>1,634.33</b>
2	Spares	Included in 1
3	Owner's Cost (Consultancy Services, Site Survey, Project Management etc.)	81.72
4	GST (@18% of base cost i.e. 1+2)	308.89
5	EPC Cost incl Tax	<b>2,024.93</b>
6	Contingencies (@5% of EPC Cost)	101.25
<b>7</b>	<b>Total EPC Cost Incl Tax &amp; Contingencies</b>	<b>2,126.18</b>
8	IDC (@10.41%*)	408.01
9	Opportunity Costs	181.18
<b>10</b>	<b>Project Cost including IDC</b>	<b>2,715</b>

\*considered as per the Tariff order dated 19<sup>th</sup> March 2019 for renewable source

p) The difference between estimates of CEA and that of the petitioner is on

account of following:

(i) The CEA has considered an Auxiliary Consumption of 1% and additional 0.153% for cases using GGH with old and existing chimney, whereas additional auxiliary consumption is independent of installation of chimney.

(ii) CEA has considered a total additional annual operational expenditure of Rs. 114 crore towards auxiliary consumption, but CEA has failed to consider that the increase in auxiliary consumption would have twin impact, viz. impact on Capacity Charges (due to decrease in Declared Capacity) and the impact on Energy Charges (on account of excess consumption of coal). There is an overall reduction of availability to the tune of 1.153% due to additional auxiliary consumption which needs to be grossed up by 1.153% and the Normative Availability is to be reduced to 78.847% [80% less 1.153%]. The Net Heat Rate would be required to increase further which in turn would impact the Energy Charge.

(iii) CEA has considered additional annual operational expenditure of Rs. 24.9 crores towards operation and maintenance expenses of FGD i.e. about 2% of the total capital cost (i.e. basic cost of Rs. 0.30 crores/MW) whereas estimated annual expenditure on account of operation and maintenance of FGD would be around Rs. 65.77 crores, which works out to about 4.05% of the total capital cost as against 2% estimated by CEA.

(iv) CEA has not considered the expenditure towards insurance which is to be considered as 0.13% of GFA as an additional cost towards insurance charges.

q) The installation of FGD would impact the tariff to procurer in the following ways:

(i) Increase in capacity charge due to capital expenditure incurred.

(ii) Increase in capacity charge due to recurring operating expenditure (i.e. increase in Auxiliary Consumption, O&M expenses of FGD system and insurance cost).

(iii) Increase in energy charge due to increase in Auxiliary Consumption.

r) The capital expenditure to be incurred for installation of FGD is similar to renewable project, where the impact of capital cost incurred can be captured in terms of levelized tariff. This comes to levelized tariff of Rs 0.20 per kWh on account of the capital cost and increased O&M expenditure.

s) It would be difficult for banks to give loan for additional capital expenditure required for installing FGD system. Also, having infused so much equity and perpetual debt in the project for last six and half years, the Petitioner is not in a position to execute the FGD system on its own without loan from lenders. Even if the

petitioner is able to tie up loan for FGD system, the interest rate would be significantly higher than that applicable for similar project of other power generators.

t) Government of Gujarat had set up a High-Power Committee (“HPC”) in July 2018 to address the issue of stress faced by three projects situated in the State of Gujarat (i.e. CGPL, Essar Power Limited and Adani Power (Mundra) Limited). In this regard, the draft of Supplemental Agreement has been agreed between GUVNL and the petitioner. The Supplemental PPA is being discussed with the other Procurers. Due to very poor financial condition of the petitioner, the implementation of HPC report through Supplemental PPA is imperative and without this, it would become difficult to raise funds (either Debt or Equity) to complete the capital expenditure envisaged under this petition.

u) The compliance to the change in law would depend on the outcome of the implementation of the HPC report to enable to source required funds to finance the capital expenditure. The petitioner sought directions to the Procurers to provide for necessary contractual payment mechanism as may be required by the banks for them to lend additional funds to an already loss making project.

### **Submissions of the Respondents**

6. The Respondent No.6 vide affidavit dated 18.10.2019, Respondents 7 & 8 vide affidavit dated 19.10.2019, Respondent No. 1 vide affidavit dated 21.10.2019 and Respondent No. 2 vide affidavit dated 4.11.2019 have mainly submitted the following:

a) CGPL is seeking in-principle approval of costs which has not even been incurred yet, which cannot be granted. The in-principle approval of Change in Law has already been granted and the same should be sufficient for CGPL to undertake the work. In any case any consideration of costs at this stage should be subject to true up of actual costs including on prudence.

b) The CEA is a technical body and it has, based on considerations and submissions of CGPL, provided recommendation with regard to installation of FGD system. However, CGPL has claimed various deviations from the said recommendation. This Commission in its Order dated 17.09.2018 in Petition No. 77/MP/2016 directed CGPL to implement the revised norms in consultation with

CEA. In case CGPL is seeking to deviate from the CEA recommendations, it has to be presented to and approved by the CEA before the same can be considered.

c) CGPL has claimed that gas to gas heater is required even for new chimney though the same has not been recommended by CEA and has claimed a cost of Rs. 75 crores and additional Rs. 30 crores for booster fan. The inclusion of gas to gas heater has to be first verified by CEA.

d) The contention of CGPL that the CEA has not appropriately considered the intake system for FGD is not acceptable. CEA has considered the technology of sea water based FGD and has accounted for any additional work associated with coastal region and intake systems. This is clear from the relevant portions quoted in the Petition itself at page 16 and 28. CGPL has claimed that the existing channel is far away from FGD area and therefore a channel/ piping of approx. 2 km would be needed. However, this has to be verified. Further the cost of Rs. 105 crores for this purpose is extremely high. The cost claimed is alleged to be based on CGPL internal estimate but presumably is part of Rs. 39 lakhs/MW being the quoted amount. Similarly, CGPL has claimed temporary circulating water outfall channel which is stated to be not considered by CEA. The claim for restoration of existing access roads and re-routing of utilities is based on the requirement of the above intake and outfall channel. The requirement of the same may also be verified by the CEA.

e) In addition, CGPL is also claiming FGD return water which is not clear. This is required to be verified by CEA particularly when a substantial cost of Rs. 132 crores is being claimed. CGPL is claiming miscellaneous costs which are largely related to electricity consumption. It is not acceptable that increase in electricity consumption, if any, due to installation of FGD system would not be met from existing electric system. CGPL has not provided any details for the said contention.

f) CGPL has claimed that cost of new chimney is less than the existing chimney. In such case, it may be considered that new chimney may be more economical. However, CGPL should not be allowed to later claim higher costs after having chosen the option of new chimney on the basis of lower costs.

g) CEA noted that one of the advantages of the cost of sea water based FGD is lower costs including capital costs. In this regard, it may be noted that similarly sea

water based FGD was allowed for Adani Power Plant (1980 MW) at Mundra at Rs. 0.32 crores/MW which in fact was inclusive of all taxes, duties, miscellaneous costs etc. Even as per the CEA recommendation for plant of Talwandi Sabo Power Limited which is Wet FGD and not a sea water based FGD, the recommended cost was Rs. 0.40 crores/MW.

h) Further, the impact has to be considered based on 4000 MW power project and not 4150 MW. The bid of Tata Power was selected and the PPA was executed based on a 4000 MW Ultra Mega Power Project being 5X800 MW. It was CGPL's choice to seek expansion of the units to 830 MW and total project capacity to 4150 MW. The PPA between CGPL and the procurers do not reflect such expanded capacity and continues to be 4000 MW. Therefore, the impact of the additional 150 MW cannot be passed onto the procurers and their consumers.

i) CGPL has claimed more than Rs. 1000 crores as costs in addition to the basic hard cost of Rs. 1634.33 crores. Such costs are approx. 40% of the total cost claimed. Such high ratio cannot be accepted. CGPL has claimed owner's cost at 5% of FGD Basic cost based on petitions filed by NTPC. It is submitted that in the case of NTPC, the costs are based on the entire project whereas CGPL is considering FGD system which is a single component. Further FGD system is to be implemented through the competitive bidding route and there is no logic or rationale for the varied costs being claimed by CGPL. The costs already incurred, if any, need to be provided and there is no clarity as regards the other costs to be incurred when the project is to be implemented by the selected bidder.

j) The claimed site survey cost is without any basis. The site is already identified and the power project is already standing. It is not clear why there has to be a site survey.

k) CGPL has claimed IDC at 10.41%. The claim may be scrutinized by this Commission based on documents to be submitted by CGPL. The component of IDC is approximately 15% of the total costs which is contrary to the NTPC stations relied on which are 13.4% and 12.5% though Kudgi is 15.6% and this is inclusive of IDC, FC, FERV and hedging costs. CGPL has only claimed IDC at 15%.

l) The opportunity cost cannot be considered at all. Normative PLF for Mundra UMPP is 80% which means that CGPL can coordinate its shutdown for installing FGD system during 20% period of annual maintenance and, therefore, CGPL should plan in an appropriate manner and not burden beneficiaries with additional costs. The PPA deals with the situations of fall in availability due to any force majeure reasons.

m) CGPL is seeking to claim GST as a separate cost. However, the costs discovered in competitive bidding are inclusive of GST. The cost recommended by CEA is based on other competitive bids which may include taxes. Even otherwise, the claim of 18% as a flat rate is not justified and there is no supporting documentation. Various goods and services have different rates and as per understanding of GUVNL, the effective tax rate for works contract is 8.9% (under Notification No. 24/2018-Central (Tax) Rate of Notification 25/2018– Integrated (Tax) Rate).

n) The CEA has considered the O&M cost at 2% of the capital cost of FGD system. This was also considered by this Commission in the case of Adani Power in 104/MP/2017. Therefore, the claim of CGPL for higher costs cannot be accepted. CGPL has considered expenditure of Rs. 65.77 crores towards O&M of FGD whereas CEA, in its report, has considered total additional annual operational expenditure of Rs. 24.9 crores (2% of Base Cost @0.30 crores/MW) towards O&M of FGD. Even if basic cost is considered as 0.39 crores/MW, O&M cost @ 2% would work out to Rs. 33 crores.

o) CGPL has claimed 1.153% of auxiliary consumption. This is based on the assumption that gas to gas heater is required. Since new chimney is envisaged, the auxiliary as recommended by CEA is 1%. In case of Adani Power (Petition No. 104/MP/2017), the CEA had recommended and this Commission had accepted the additional auxiliary consumption at 1%. The auxiliary consumption may be considered as 1% or actual whichever is lower.

p) With regard to insurance cost, it is submitted that the same is included in the O&M cost of 2% of capital cost. There was no such separate cost allowed to Adani Power in Petition No. 104/MP/2017.

q) The tariff impact for increase in capital cost has to be computed by way of the formula provided in the Article 13 of PPA for increase in capacity charges due to increase in capital cost. There cannot be any separate determination considering elements of Section 62 of the Electricity Act, 2003. The PPA provides for any change of Rs. 50 crores in Capital Cost to be reflected in the change in the non-escalable capacity charges equal to 0.267%. Therefore, even if there is an increase of Rs. 2715 crores as claimed by the Petitioner, the same should be considered as 54 times change of Rs. 50 crores that translates to 14.42% ( $54 \times 0.267\%$ ) increase in non-escalable capacity charges.

r) The competitive bid process has not been done in consultation with the Procurers. This Commission may therefore consider whether the competitive bid has been transparently and reasonably carried out.

s) The contentions of CGPL on its financial position are not relevant and nor can compliance with the law be defaulted on that basis. The contentions of HPC Report and any agreement/ negotiations pursuant thereto are not relevant and cannot be considered in this Petition.

7. The Respondent No.1, 3, 4, 5, 7 and 8 vide affidavit dated 17.2.2020 have mainly reiterated submissions as above at paragraph 6 of this Order. Therefore, they are not repeated for sake of brevity. Additionally, they have submitted the following:

a) The Petitioner has claimed Rs. 2715 crores for installation of FGD system which is substantially higher than Rs. 2400 crores claimed by Sasan Power Ltd. for 3960 MW Ultra Mega Power Project (claimed in Petition No. 446/MP/2019). The awarded cost in case of Sasan Power is Rs. 0.40 crores/MW. The cost for Petitioner should be substantially lower as the Petitioner is installing sea water based FGD system as compared to wet limestone based FGD system being installed by Sasan Power Ltd. In fact, one of the benefits of sea water based FGD system given by the Petitioner is that the capital cost is lower. This was also noted in the Report of CEA wherein it is mentioned that advantages of sea water based FGD system is its low capital cost, low auxiliary power consumption, no reagent etc.

b) The bid submitted by the Petitioner/ Tata Power which was incorporated into the PPA provided for gross capacity of 4000 MW and contracted capacity of 3800 MW. The RFP required both gross capacity and contracted capacity to be bid by the bidders. The Environment Clearance for the Power Station was an Initial Consent under Schedule 2 which was obtained by the Authorised Representative (on behalf of procurers) prior to the PPA dated 22.4.2007. The said Environment Clearance dated 2.3.2007 was for 4000 MW.

c) The claim of the Petitioner is that it was decided to change the turbine or steam cycle at paragraph 7 of Additional Information – such decision was obviously of the Petitioner and it was taken at the time of construction and not at the time of the bid. Therefore, the decision to increase the installed capacity to 4150 MW and incur higher auxiliary consumption was entirely of the Petitioner.

d) The Petitioner has claimed that despite increase in auxiliary consumption, the quantum of fuel fired did not change. It is incorrect to claim that the capacity of FGD system would remain the same irrespective of plant capacity of 4150 MW or 4000 MW. In any case, the FGD system is being installed for 4150 MW whereas the capacity as per the RFP, bid and PPA is 4000 MW. The costs, therefore, have to be in proportion to 4000 MW.

e) Auxiliary consumption claimed by the Petitioner is 47.85 MW in the note handed over on 21.1.2020. This percentage of 1.153% is w.r.t. 4150 MW, but the same can be considered only vis-à-vis 4000 MW. In fact, auxiliary consumption is to be considered at 1% of 4000 MW. Even assuming but not admitting that there is no impact of emissions, there cannot be any consideration of higher auxiliary consumption due to higher installed capacity.

f) The capacity charges are payable for declared availability (Schedule 7) and the Petitioner is not entitled to any such charges (opportunity cost) on deemed availability basis or as part of change in law compensation. Respondents are also losing supply of power during shutdown, but cannot claim costs from the Petitioner for the same. Inability of the Petitioner to generate due to shutdown means that the Petitioner is perhaps not liable to pay any penalty for the shortfall in generation against the normative availability. Allowing such compensation would be outside the

scope of the PPA. This would be unfair and inequitable for the Respondent/ Procurers who not only have to deal with the shutdown and consequent non-availability of power, but shall have to incur additional loss towards alternative arrangement of power for the period of shutdown and also need to pay capacity charges to the Petitioner for such non-availability.

g) The competitive bid process for installation of FGD system has not been done in consultation with the Procurers. Further, the Petitioner has not complied with the directions in ROP of hearing wherein various information had been sought including the bidders and the L1 Bidder. The Petitioner has not disclosed the names, has not produced the documents of bidding nor produced sufficient information for the Commission to conduct a prudence check. The bid was carried out before the CEA report and, therefore, it is required to be certified whether the specifications are as per the CEA recommendation.

### **Rejoinder of the Petitioner**

8. The Petitioner has filed its consolidated rejoinder vide affidavit dated 11.11.2019 to the reply of Respondent No.1, 3, 4, 5, 6, 7 and 8 and adopted the same rejoinder vide affidavit dated 21.11.2019 to the reply of Respondent No.2. The Petitioner in its rejoinder has mainly submitted the following:

a) The Commission vide Order dated 29.8.2019 in Petition No. 77/MP/2016 had directed CGPL to approach CEA to firm up the technology being employed for FGD. Further, CEA was directed to examine CGPL's proposal in this regard. Pursuant thereto, CGPL issued a letter dated 17.9.2019 setting out CGPL's requirements for FGD, along with detailed explanations/ justifications for the same. In response to CGPL's letter dated 17.9.2019, CEA issued a letter on 07.10.2019 stating that:

- (i) Sea water based FGD is technically better and cost optimum.
- (ii) Such option of technology has been discovered by CGPL based on life cycle cost analysis and other studies as advised by CEA. Accordingly, CGPL may adopt sea water based FGD technology that is best suitable for its plant specific requirement.

b) As regards seeking approval of CEA for additional costs/ equipment, the following events may be noted:

(i) On 17.9.2018, this Commission passed its Order in Petition No.77/MP/2016.

(ii) On 21.2.2019, CEA issued its report regarding installation of FGD to comply with the revised emission standards relating to SO<sub>2</sub>. CEA in its report gave an indicative capital expenditure of Rs. 30 lakh/MW for the purpose. The CEA report did not give any recommendation/ view on various elements of cost for installing FGD nor has it provided any justification, scope of work, norms, assumptions et al considered by it for computing the capital expenditure to be incurred by CGPL.

(iii) On 6.3.2019, CGPL issued a letter to CEA providing its comments on CEA Report on FGD inter alia, raising the issue of need for a Gas to Gas Heater et al.

(iv) On 6.6.2019, CEA issued a letter in response stating that

(a) Capital Expenditure mentioned in its Report is only indicative in nature.

(b) Actual capital expenditure will be discovered after finalisation of the open competitive bidding;

(c) For additional Capital Expenditure (if any) above the base cost due to plant specific requirements, CGPL can approach the concerned regulator.

c) GGH (gas to gas heater) is a must for sea water based FGD system as it reheats the cold, treated flue gas to exiting the scrubbing system by transferring the heat of the hot untreated flue gas to the cold treated flue gas. This will prevent acidic corrosion to plant equipment. Need for a GGH has been intimated to the CEA also. In the CEA's Report, it is merely stated that the indicative cost of Rs. 30 lakhs/MW excludes costs regarding GGH. The costs submitted by CGPL for a gas to gas heater are included in the lumpsum price that has been discovered in the competitive bidding and these are not additional costs and its price has been mentioned separately, merely to explain the possible reasons for difference in the costs as considered by CEA and as discovered by CGPL in the competitive bid. In any case, by its letters dated 6.6.2019 and 7.10.2019, CEA has approved CGPL's request for installation of a sea water based FGD and has stated that for any specific requirements not being part of the CEA Report, and for the costs related thereto, CGPL may approach this Commission.

d) As regards the sea water intake system, CGPL is merely portraying the on-ground needs as regards the distance for which piping is required. The additional

cost is on account of such distance. In any case, the Procurers cannot summarily claim that cost is high while completely disregarding the ground realities and the actual requirements of Mundra UMPP or provide any alternative justifiable means/cost to achieve the said piping.

e) As regards re-routing of roads, FGD installation is a retrofit project in nature and requires even greater planning and optimisation as compared to a green field project. Since the new project would interfere with the existing infrastructure, it would involve necessary re-routing of utilities. All works to be carried out and the costs associated thereto by CGPL for complying with the 2015 Notification are genuine and necessarily required. It is nobody's case that the requirements set out by CGPL are unnecessary or can be done away with to achieve the end result.

f) As regards FGD return water, the amount of expenditure is dependent on the length, diameter and material of the pipe, its route and associated infrastructure. Procurers cannot summarily claim that cost is high while disregarding the actual requirements of Mundra UMPP. Further, it is clarified that the sea water supplied for scrubbing the flue gas becomes a low pH effluent after absorbing SO<sub>2</sub> from flue gas. This acidic sea water is termed as FGD return water. It shall be discharged back to existing outfall channel for dilution and aeration process through GRP pipes. It is pertinent to note that the costs indicated for these works form part of the total cost discovered through competitive bidding process.

g) As regards miscellaneous costs like electrical system etc., it is stated that the present electrical system at Mundra UMPP is designed to cater to the existing Units and Station auxiliaries. The power supply of CGPL is just adequate for concurrent loading of the existing Unit Auxiliary Transformer (UT) and existing Station Transformer (ST) for normal and various contingency conditions without much margin. The additional electrical load of 48 MW (additional aux of 1.153% on the installed capacity (4150 MW) for all 5 units, on account of installing the FGD systems and its operation cannot be accommodated by way of the existing electrical system. To cater to this additional load, a new station transformer is required to be installed and hence proposed. Adding a station transformer at the Generator Transformer LV voltage (26kV) would be difficult due to constraints in existing plant layout and would involve long unit outage for construction, existing bus duct modification and major modification of control and protection scheme of the power

plant/ unit. Hence, for this purpose, a station transformer at 400 kV levels is proposed to be installed and integrated to the existing 11kV system. The new augmented system will include one station transformer, extension of switchyard bay for this transformer, 11kV & 415V FGD switchgears for common systems near outfall channel, cable tie connection of this new 11kV switchgear with existing 11kV station buses (located in Main Plant building), extension of existing 11kV switchgear of each unit to cater unitised FGD loads, etc.

h) As regards the submission that costs of installing FGD for certain other power projects have been lower, it is stated that the costs of FGD depend on various criteria such as location, structure/ design of existing plant et al. In other words, the costs of installation and/ or operation would be plant specific. The FGD related costs approved by this Commission for Adani Power Ltd. was for the FGD that was commissioned in March 2014. The commissioning of FGD for CGPL would be in FY 2022 and the costs in terms of inflation, exchange rates are bound to increase over this period. More importantly, the price that has been discovered under a bidding process would depend on the demand and supply of the equipment at a particular point of time and such costs cannot be compared with a cost arrived at almost a decade back. Costs of any project depend on the peculiarity of the site, whether it is brown field or green field and whether any modifications are required to be carried out to the existing infrastructure. Hence, there cannot be an equitable comparison of costs for two different projects and that too when such costs have been incurred at different points in time.

i) The Gross Capacity of 4000 MW or 4150 MW has no relevance to the Procurers since the Contracted Capacity which is arrived at after subtracting the Auxiliary Consumption is 3800 MW and has remained unchanged since the time of signing of the PPA. The Procurers continue to pay as per the Contracted Capacity and not as per the installed capacity. The name plate capacity of the plant is 4150 MW. Even the environment clearance had been amended (EC dated 5.4.2007) to change the capacity from 4000 MW to 4150 MW.

j) The emissions of SO<sub>2</sub> would be dependent on 4150 MW and not 4000 MW. The FGD project has been designed keeping in mind this name plate capacity and the ratings of the equipment for the project have been arrived at on the basis of this capacity. Further, the system has been designed for 4150 MW capacity and the

capital cost of the project for 4000 MW capacity would not proportionately come down and therefore it would also be incorrect to consider a proportionate reduction. The emission of SO<sub>2</sub> is dependent on amount of coal to be fired and Sulphur in the coal. The installation of 4150 MW plant capacity in place of 4000 MW by CGPL is to cater to the power consumption requirement of Electrical motor driven BFPs keeping same contractual output of 3800 MW to procurers. Selection of 4000 MW plant with turbine driven BFP would have accounted for higher heat rate which in turn would have required higher coal consumption and SO<sub>2</sub> emission for the same contractual output.

k) Procurers fail to realise that the entire Project has been setup for their benefit. In such circumstances the Procurers cannot seek to claim the benefit of capacity increase from 4000 MW to 4150 MW without dealing with the corresponding cost liability, if any. In any case, it is reiterated that despite the increased Installed Capacity, the Contracted Capacity continues to remain the same and the Procurers continue to pay capacity charges as per the Contracted Capacity.

l) The Procurers submission that FGD is a single component is incorrect. Implementation of FGD is not merely about purchasing and commissioning of a single component. The FGD project is an aggregation of various systems like the water handling system, flue gas treatment system and return water treatment system and is by itself akin to a large project. Such large projects involve complex engineering, long procurement mechanism, monitoring, obtaining approvals and arrangement of finances. Hence the involvement of any owner is quite large and deep. Moreover, the implementation of the project stretches over 36 months.

m) IDC would be actually based on the interest rates for loans that are available for such project, the financial health of the company, loan drawl schedule and the construction period. This Commission is aware that CGPL is suffering losses on every unit of electricity generated and sold. The current financial health of CGPL also plays a big role in the IDC considered by CGPL for installation of FGD. For the purpose of estimating the IDC, CGPL has considered the rate as per norms being followed for renewable power projects (single part tariff mechanisms) and construction and cash flow progress based on internal estimates. IDC is merely the outcome of the calculations performed with these assumptions. In any case, IDC of about 15%, is in line with what has been considered by other NTPC projects and is prima facie reasonable.

n) Having set plant availability at 80%, the remaining 20% is to take care of routine outages, forced outage, breakdowns, non-availability of adequate fuel and limitations imposed on running equipment. Such “non-availability” of 20% is not for accommodating long outages required for implementing and commissioning of a complex FGD system. This is further evident from the fact that the PPA itself does not contemplate 20% of non-availability for long outages which are required to implementing new environmental norms. The FGD project is a brown field project and the commissioning of FGD would require dovetailing with the existing system which is in operation. This in turn would require an additional outage of units over and above the normal outage. CGPL has estimated a period 22 days for carrying out this job based on its internal computations. The opportunity costs have been estimated on the basis of the loss of capacity charge during this period.

o) The basic cost of Rs.1634 crores does not include GST. The owner’s cost is essentially in terms of services provided and would in turn attract levy of GST at the rate of 18%. Therefore, GST has been considered on the basic cost and owner’s cost together. CGPL has considered the GST rate of 18% that is applicable for composite supply of works contract as defined in clause 119 of section 2 of Central Goods and Services Tax Act, 2017. As regards the rate of 8.9% suggested by the Procurers under Notification No 24/2018 dated 31.12.2018, no workings have been provided for arriving at such rate. In fact, the said Notification is applicable for only renewable projects and not thermal projects.

p) The O&M expenditure @2% of the capital cost is without any basis. In the case of Adani Power Ltd. in Petition No. 104/MP/2017, Adani Power Ltd. had claimed a flat expenditure of Rs. 48 crores per annum. No norm has been determined by this Commission through any consultative process. On the other hand, CGPL has provided a ‘bottom up’ approach for arriving at the O&M expenditure in the Petition, justifying the assumption made. It cannot be denied that the insurance expenses of CGPL would go up on account of the addition of FGD system. CGPL has projected the insurance expenses considering an average insurance cost toward premium for protecting these assets.

q) The installation of GGH would increase the auxiliary consumption. As mentioned in the Petition, the GGH is required for preventing creation of droplet ‘raining’ in the chimney. However, the GGH would also contribute to a pressure drop

of about 100 mm water column. Hence to compensate for this additional pressure drop, a booster fan needs to be of higher capacity which in turn would account for higher auxiliary consumption of 0.15%. Hence the auxiliary consumption would go up on account of GGH irrespective of whether the old chimney is used or a new chimney is installed. The increase of auxiliary consumption on account of GGH is also acknowledged by CEA in its report. Thus, the auxiliary consumption of 1.15% is justified.

r) The Procurers' submissions that tariff impact for increase in capital cost must be computed in terms of the formula provided under Article 13.2(a) of the PPA is wrong as such formula is provided only for construction phase, and not during operation phase. The present situation is unique in that the Change in Law event is taking place during the operating phase and has an impact on the capital as well as operating cost of CGPL. Hence, the present scenario is not contemplated either under the PPA and/ or the Competitive Bidding Guidelines. In terms of the law laid down by the Hon'ble Supreme Court in *Energy Watchdog v. CERC & Ors.* (2017) 14 SCC 80, this Commission ought to exercise its regulatory powers and grant appropriate relief to CGPL. In CGPL's view, the tariff impact of FGD installation can properly be mitigated only by implementing Section 62 tariff elements as provided by CGPL.

s) CEA's recommendations were available to CGPL only on 21.2.2019, while CGPL initiated the comprehensive bidding process on 20.9.2018 keeping in mind the stringent deadlines imposed. Nowhere does this Commission's Order dated 17.9.2018 in Petition No. 77/MP/2016 mandated CGPL to carry out competitive bidding in consultation with the Procurers. In any case, in order to discover the best price, a thorough process of transparent bidding was followed.

t) The financial position of CGPL is very much relevant in light of the fact that no compliance would be possible if lenders do not advance finances for the project. The lenders need regulatory certainty that the amounts advanced by them for installation of FGD shall be recovered through tariff and for servicing of debt by CGPL. Hence, CGPL is constrained to approach this Commission by way of the above Petition to seek clarity in terms of the cost impact since there is a clear divergence in the costs estimated by CGPL and CEA. CGPL wants to avoid a scenario where it incurs the costs based on the bid carried out by it and later is only

permitted to recover the costs approved by CEA.

### **Analysis and Decision**

9. In the light of the submissions of the Petitioner, Respondents and documents placed on record, the following issues arise for our consideration:

**Issue No.1: Whether provisional approval of capital expenditure can be granted to the petitioner for incurring proposed expenditure towards installation of FGD system?**

**Issue No.2: Whether additional O&M expenses and the relaxation in other operating norms due to installation of FGD system are admissible as claimed by the petitioner?**

**Issue No.3: Whether capacity of 4150 MW or 4000 MW is to be considered towards expenditure/ relief for Installation of FGD system?**

**Issue No.4: What shall be the norms and mechanism for computing the adjustment in tariff corresponding to the additional investment and increase in the operating costs due to the 2015 Notification so as to restore the petitioner to same economic position as if such Change in Law event has not occurred?**

10. We deal with the above issues in subsequent paragraphs.

**Issue No. 1: Whether provisional approval of capital expenditure can be granted to the petitioner for incurring proposed expenditure towards installation of FGD system?**

11. The petitioner, CGPL has submitted that it had filed Petition No. 77/MP/2016 before this Commission praying that introduction of the Revised Norms be declared as event of Change in Law in terms of Article 13 of the PPA read with paragraph 4.7 of the Competitive Bidding Guidelines and requested that in-principle approval for the capital expenditure to be incurred in order to comply with the Revised Norms may be granted. This Commission vide Order dated 17.9.2018 held that a) the introduction of the Revised Norms is a Change in Law event, b) CGPL shall implement the Revised Norms as per the 2015 Notification in

consultation with CEA, c) Mundra UMPP meets the norms prescribed in the 2015 Notification with regard to particulate matters and mercury, d) there is no provision for in-principle approval in the PPA, and e) CGPL shall approach the Commission for determination of increase in cost or/and revenue expenditure on account of implementation of revised norms in accordance with the Guidelines to be issued by CEA and the mode of recovery of the same through monthly tariff. The relevant extracts of the Commission's order dated 17.9.2018 in Petition No. 77/MP/2016 are as under:

*"49. Summary of our decisions in this order are as under:*

*(a) MoEFCC Notifications, 2015 prescribing the revised environmental norms in respect of thermal Power plants which has been issued after the cut-off date of Mundra UMPP are in the nature of Change in Law in terms of the PPA dated 22.4.2007 and the MoP directions issued under Section 107 of the Act.*

*(b) The Petitioner has given notice regarding Change in Law arising out of MoEFCC Notification in terms of the PPA.*

*(c) The Petitioner is required to take steps to implement revised norms in respect of Sulphur Dioxide, Nitrogen Oxide and water consumption. The Petitioner has taken up the matter with MoEFCC for exemption from implementing the norms for water consumption and therefore, the implementation of the norms of water consumption shall be dependent on the decision of MoEFCC in this regard.*

*(d) Mundra UMPP meets the norms prescribed in MoEFCC Notification, 2015 with regard to particulate matters and mercury and accordingly, the Petitioner has not claimed the relief under Change in Law.*

*(e) The Commission has directed CEA vide its order dated 22.7.2018 in Petition No. 98/MP/2017 to prepare guidelines specifying the suitable technology for each plant and operational parameters such as auxiliary consumption, Station Heat Rate, O&M expenses, norms of consumption of water, lime stones etc. for implementation of revised environmental norms. The Petitioner shall implement the revised norms as per the MoEFCC Notification, 2015 in consultation with CEA.*

*(f) There is no provision for in-principle approval in the PPA. However, the Commission has decided that MoEFCC Notification, 2015 is in the nature of Change in Law. Accordingly, the Petitioner shall approach the Commission for determination of increase in cost or/and revenue expenditure on account of implementation of revised norms in accordance with the Guidelines to be issued by CEA and the mode of recovery of the same through monthly tariff."*

12. It is observed that pursuant to the above decision of the Commission, the Petitioner approached CEA vide letter dated 17.9.2018. CEA vide letter dated 21.2.2019 has recommended sea water based FGD system and provided the corresponding indicative

cost for Mundra UMPP. CEA has also suggested that the FGD system installation should be done through the process of open competitive bidding in consultation with representative of beneficiary States with whom PPAs had been executed. However, responsibility for adhering to timelines of relevant pollution control board was the responsibility of the Petitioner. Relevant extracts from CEA's report as regards technology and cost aspects, are as under:

**“TECHNOLOGY:**

*In the case of CGPL, two technologies are proposed as below:*

*i. Sea water base FGD*

*ii. Wet lime stone based FGD*

*I - The Sea Water based FGD is suitable for this plant considering its proximity to sea. The source of water for the plant is seawater drawn from the sea (Gulf of Kutch), which is 1.5 km from the site of Project. Seawater is used directly for condenser cooling. The outfall water from condenser will be used as source of water for FGD. The discharge of sulphur rich effluent from FGD will be diluted using outfall channel water to bring the pH to required level.*

*II---Wet Lime stone base FGD.*

**Engineering aspects considered for recommendation:**

*1. Individual Sea Water based FGD is considered for each Unit.*

*2. Limit SO<sub>2</sub> below environment norms with up to 1 % Sulphur content in Coal.*

*3. Absorber Lining - such as Ceramic Tiles or C276 (Nickel Alloy) or Steel Alloy lining or Glass flake filled multi-functional epoxy lining or glass flake lining.*

*4. Chimney*

*a) Old chimney to be changed to wet stack with suitable lining by providing temporary chimney over Absorber/ on ground. If required necessity of GGH may be explored in this case only*

*Or*

*b) Permanent FRP/Steel Chimney over Absorber.*

*Or*

*c) 05 nos. new single wet stacks Steel or RCC or FRP.*

.....

*10. APC*

*• Additional Auxiliary power Consumption (APC) for complete FGD facilities is 1.0 %.*

*• Extra APC of 0.153% to be considered only when using GGH with old/existing chimney in FGD system.*

**CAPEX:**

*The cost of retrofitting FGD for the plant should be discovered through open competitive*



*bidding in consultation with representatives of beneficiary states with whom PPA had been done, information in this regard has been sent by CEA separately Vide letter No: 44/FGD/UMPP/CEA/2019/-193 to GSECL The indicative base cost worked out to Rs 0.30 Cr/MW (CAPEX), it excludes, Opportunity cost related to interconnection period, GGH, any Tax or Duty and other financial miscellaneous costs.*

**OPEX**

*The Annual indicative Operating Cost (OPEX) will include annual APC for FGD, annual Reagent cost (if any), annual Additional water consumption associated with FGD, annual Manpower charges for O & M of FGD, annual By-product handling (if any) and annual revenue earned from disposal of by product, this shall be calculated after detailed engineering and life cycle cost benefit analysis. Also the regulator may regulate the different aspects of OPEX (as per actual) at appropriate time when the FGD starts operating. Refer the chapter no 09 OPEX.*

**OPPORTUNITY COST:**

*Since interconnection of newly lined chimneys or New wet stack or stack above absorber may result in loss of generation of the plant, hence CGPL is advised to minimize this interconnection time by taking suitable measure so that the "Opportunity cost" associated with interconnection may have least impact on CAPEX and eventually on tariff revision....."*

13. Through prayers (a) and (b) in the instant Petition, the Petitioner has requested for provisional approval of capital expenditure of Rs. 2715 crores and also for approval of recurring annual operating expenditure on account of FGD system installation. CGPL submitted that due to its precarious financial position, it is not in a position to arrange for funds to finance the capital expenditure required for installing FGD system. The petitioner submitted that it would be difficult for banks to give loan for additional capital expenditure required for installing FGD system without approval from Commission.

14. On the other hand, the Respondents have submitted that despite clear denial to grant in-principle approval of the project cost by this Commission vide Order dated 17.9.2018 in Petition No. 77/MP/2016, the Petitioner has again filed the present Petition seeking in-principle approval of costs and the same cannot be granted. The in-principle approval of Change in Law has already been granted and the same should be sufficient for CGPL to undertake the work.

15. We have considered the submissions of the Petitioner and Respondents. It is observed that the petitioner had approached the Commission by way of Petition No.

77/MP/2016 for in-principle approval based on estimated expenditure wherein Commission disallowed the prayer considering the fact that the PPA does not have a provision of in-principle approval. Subsequent to above, as per direction of the Commission, the petitioner approached the CEA and CEA vide its letter dated 21.2.2019 after considering various alternatives has suggested the technology and total indicative cost for installation of FGD system. In addition, the Petitioner has also completed the open competitive bidding for the installation of FGD system. Rejection of in-principle approval of costs and subsequent Petition for grant of provisional approval of costs has been decided by the Commission in case of another Ultra Mega Power Project i.e. Sasan Power Ltd ('SPL') that had filed petition no. 446/MP/2019. The Commission vide order dated 23.4.2020 in petition 446/MP/2019 held as under:

*"18. We have considered the submissions of the Petitioner and the Respondents. There has been material change in the situation as regards the Petitioner after the Commission issued orders in Petition No. 133/MP/2016 wherein request for in-principle approval was denied since no such provision existed in the PPA. As per directions of the Commission, the Petitioner approached CEA that has indicated the appropriate technology for installation of FGD system in the Project. CEA has also indicated tentative base cost for such installation. Through competitive bidding process, the Petitioner has selected a vendor for installation of FGD system. The Petitioner has approached financial institutions for loans where the banks through IBA have expressed difficulty in funding in view of prevailing situation in the power sector. Similar is the case with PFC that has informed the Petitioner that it needs comfort in terms of approval of the Commission so that there are no problems in debt servicing of loans that may be availed by the Petitioner. Commission is also conscious of the fact that the installation of FGD system in thermal power stations is being monitored by the Hon'ble Supreme Court. Any further delay in securing loan from financial institutions is likely to further delay installation of FGD system."*

16. We also observe that the Ministry of Power has also recognised the problems being faced by generating companies on account of financial institutions seeking assurance of fund flow after installation of FGD system. The Ministry of Power, vide its letter dated 21.1.2020, addressed to Secretary to Forum of Regulators (who is also Secretary to the Commission), stated as under:

*"2. A copy of the minutes of the meeting held in Ministry of Power on 21.10.2019 with Banks/Financial Institutions regarding issues related to financing of FGDs is enclosed wherein as per Para 4.2 inter alia mentioned as follows:*

"IPPs requested that provisional tariff on account of FGD may be allowed as Banks are not willing to finance unless there is clear cut CERC orders on additional tariff, which could be possible only when FGD is commissioned. It was requested that based on the estimation of cost by CEA, CERC may fix provisional tariff after allowing some discount (say 10%). Chairperson, CEA informed that they had drafted some norms on provisional tariff and it had been sent to CERC for consideration. Hon'ble Minister advised CEA to follow up with CERC and this issue may be taken up in the Forum of Regulators (FOR) meeting which could be convened at the earliest. The matter regarding fixation of provisional tariff on account of FGD installation may be discussed with CERC."

3. In this regard, CEA has informed that:

i. Financing of pollution control equipment is mainly an issue for the projects commissioned under section 63 of the Act.

ii. During discussion, CERC pointed out that a few generating companies, which have set up generating station under section 63 of the Act have filed petition for compensation due to change in law impacting revenue and cost during the operating period.

iii. CERC has already passed some orders in such petitions recommending requirement of installing additional equipment to meet revised environmental norms as change in law and giving liberty to the petitioner to approach to the commission for determination of revised norms.

iv. CERC was of the opinion that normally such assurance from regulator should be sufficient for the lenders to fund additional capital expenditure required to meet revised environmental norms.

4. In view of the above, it is requested that the issue on 'provisional tariff' on account of installation of FGD, may be included as an Agenda for the next Forum of Regulators (FOR) meeting and the decision taken, therein, may be communicated to Ministry of Power, at the earliest."

17. Further, the Ministry of Power vide its letter dated 20.4.2020 addressed to the Secretary of the Commission, has stated as under:

"I am directed to refer to the meeting taken by Secretary (Power) through Video Conferencing on 09.04.2020 (copy of the meeting are enclosed as **Annex-I**) and this Ministry's letter of even number dated 21.01.2020 (copy enclosed as **Annex-II**) with regard to taking up the matter with Forum of Regulators on the above mentioned subject. It was observed that CERC was also contemplating to amend the Tariff Regulations 2019-24 to provide for norms for installation of FGDS for complying with the environmental operating norms as Change in Law.

2. In the above mentioned meeting held on 09.04.2020, it was recommended that in view of the stipulated timelines decided by the Hon'ble Supreme Court for installation of FGDS, investment approval may be accorded by CERC at the earliest possible on applications of FGDS submitted by Gencos based on the CEA's benchmark cost and indicative technologies so as to facilitate funding of banks/ FIs. It was also felt that upon completion of the installation of FGD or a month before the completion of installation, the applications for fixation/revision of tariff may be filed and CERC would, as far as possible, dispose them in a time frame of 3

months so that the Gencos are not cash strapped and the lenders feel assured. Similar process may also be taken up by CERC with SERCs.

3. Accordingly, CERC is requested to take necessary action and devise a mechanism vide which applications of Gencos for installation of FGD as per norms of CEA, gets decided by the Appropriate Commission within a period of three months for Investment approval. The same is expected to facilitate assurance for lenders on their lending to Gencos for installation of FGD.

4. This issue with the approval of Hon'ble Minister of State (IC) Power and NRE.”

18. The Respondents have submitted and raised concerns about various elements of the provisional capital cost claimed by the Petitioner. They have submitted that the costs are higher than the recommendations of CEA and that certain equipment even though not envisaged in CEA recommendations, have been claimed by the Petitioner.

19. We note that consequent upon order dated 17.9.2018 of the Commission in Petition No. 77/MP/2016, the Petitioner approached CEA and the CEA vide its letter dated 21.2.2019 has made recommendations as regards cost for installation of FGD system for the Project. CGPL submits that the entire FGD project was sub-grouped into 5 packages. Further, CGPL submitted that pursuant to an open competitive bidding process for packages 1 to 4 and on basis on internal assessment in respect of package 5, the total price for installation and operationalization of the FGD system (the FGD main package) is Rs. 1,634.33 crores. The details of the price of the five packages as discovered from the said bidding process/ internal assessment are as under:

<b>Package</b>	<b>Description</b>	<b>Capital Expenditure (Rs. in crores)</b>
1.	FGD Main System Package	1122
2.	General Civil Works Package	333.30
3.	Chimney Package	104.03
4.	HT Electric Power Supply Package	65.00
5.	Fire Protection and Detection System	10*
<b>Total</b>		<b>1,634.33</b>

\* Note: The said costs are based on the internal estimate of CGPL.

20. The Petitioner has claimed total capital cost for installation of FGD to be around Rs. 2715 crores. The break-up of claimed Capital Cost is in the table below:

Sr. No.	Descriptions	Capex Estimate (Rs. in crores)
A	Capital Cost	
1	Total FGD EPC Cost	
1.1	FGD Main System Package	1122.00
1.2	General Civil Works Package	333.30
1.3	Chimney Package	104.03
1.4	HT Electrical Power Supply Package	65.00
1.5	Fire Protection & Detection System	10.00
<b>1</b>	<b>Total FGD EPC Basic Price</b>	<b>1634.33</b>
2	Spares	Included in 1
3	Owner's Cost (Consultancy Services, Site Survey, Project Management etc.)	81.72
4	GST (@18% of base cost i.e. 1+2)	308.89
5	EPC Cost incl Tax	2024.93
6	Contingencies (@5% of EPC Cost)	101.25
<b>7</b>	<b>Total EPC Cost Incl Tax &amp; Contingencies</b>	<b>2126.18</b>
8	IDC @10.41%*	408.01
9	Opportunity Costs	181.18
<b>10</b>	<b>Project Cost including IDC</b>	<b>2715</b>

\*considered as per the Tariff order dated 19<sup>th</sup> March 2019 for renewable source

21. The Petitioner has submitted that the variation in costs between the price recommended by CEA and the price discovered under the bidding process is due to non-consideration of certain equipment and/ or the cost related thereto by CEA while giving its recommendations for installation of FGD system. Further, CGPL submitted that some of the equipment along with the associated cost which have not been considered by CEA are as under:

Sl. No.	Equipment	Estimated Cost (Rs. in crores)
1	Gas to Gas Heater	75
2	Booster Fan	30
3	Installation of Sea Water Intake channel	105
4	Temporary Circulating Water Outfall Bypass channel	53
5	Restoration of existing access roads and re-routing of Utilities	12
6	FGD Return Water	132

7	Miscellaneous cost- Installation of Electrical & Fire safety System	75
<b>Total</b>		<b>482*</b>

\*A part of claimed amount of Rs.1634.33 crore discovered through competitive bidding.

22. Respondents have submitted that the petitioner's claim is not consistent with the recommendations of the CEA and have objected to the expenditure of Rs. 482 crore related to additional equipment. The petitioner in its rejoinder has submitted its response to these objections of the Respondents. The Commission vide Record of Proceedings dated 21.1.2020 directed staff of the Commission to request CEA to comment on the necessity of these equipment/ assets and their associated cost. Vide letter dated 12.2.2020, suggestions of CEA were sought with regard to additional system/ equipment and their associated cost claimed by the Petitioner. The CEA vide its letter dated 12.3.2020 in response to the said letter dated 12.2.2020, has examined the variation and sent its response. Relevant extract of the CEA letter dated 12.3.2020 is as under:

*"3. The variation in the cost recommended by CEA and the cost discovered by CGPL is due to facilities very specific to plant and cannot be estimated in advance. Without these plant specific CAPEX requirements of CGPL which is discovered through open competitive bidding (i.e. 0.39 Cr./MW), the basic cost of FGD would have been close to CEA's recommended cost.*

*4. As per CERC's Record of Proceedings RoP) attached at ANNEXURE-I. The observation on following equipment/facility at CGPL are as under:*

*i. **Gas to Gas Heater:** In RoP page:30 para:44 it has been mentioned that Treated flue gases after scrubbing will attain same temperature of 20-25 Degree celesius as of sea water and may cause "raining" effect in nearby areas.*

*Hence to avoid dispersal of residual pollutants in nearby areas CGPL may look into the option of using GGH with new chimney.*

*ii. **Booster Fan:** In RoP page:31 para:5, it has been mentioned that due to GGH installation the Flue Gas Path / duct layout will be longer, which will result in extra pressure drop. Additionally, GGH installation will also contribute to pressure drop of 100mm Water column (WC) and this extra pressure drop will be created by suitable sized Booster fan.*

*CEA is of the view that Booster fan is standard / essential equipment in all wet type FGD system and CGPL may choose **the correct Booster Fan size** to cater to their requirements.*

**iii. Installation of Sea Water Intake Channel:** In RoP page:31 para:51 it has been mentioned that sea water will be used for scrubbing purpose of flue gases, which will be sourced from existing condenser outfall cooling channel. The Proposed FGD absorber site is about 2km from condenser outfall cooling channel and a covered RCC channel is required to route water to FGD site as assessed by CGPL internally.

Since scrubbing water requirement of Sea Water based FGD system operating in open cycle are higher than conventional Wet FGD systems, CGPL may need a dedicated water intake channel from condenser outfall cooling channel to the Absorber location.

**iv. FGD return water channel:** In RoP page:33 para58, it has been mentioned that as assessed by CGPL internally Glass reinforced Plastic (GRP) piping for FGD return water (post treatment to Flue gases) is required. The length of GRP piping for each until will be approx. 02 km. These GRP piping will carry return water through Gravity flow to Aeration Basin in existing outfall channel.

Hence, to evacuate scrubbing water post treatment of Flue gases, a dedicated return route using GRP piping may be needed.

**v. Temporary circulating water outfall bypass channel:** In RoP page:32 para:54, it has been mentioned that as per CGPL's internal assessment of site conditions a temporary circulating water outfall bypass channel is required to make provision of Aeration basin after dilution (Dilution of return water will done through mixing it with CW outfall channel water ) of FGD return water. Aeration basin is required to increase the pH level of FGD return water, post scrubbing to Flue gases.

Since CGPL is using FGD scrubbing water in open cycle, aeration process is essential to elevate that pH value to scrubbed water before finally releasing it to open sea. Hence CGPL may construct temporary circulating water outfall bypass channel as per their requirements.

**vi.** In RoP page:32 para:57 & page:33 para:59 it has been mentioned that there is requirements of Restoration of existing access roads and re-routing of Utilities, installation.

It is opined that such requirements are not directly related to FGD technology. CGPL may access miscellaneous Costs due to construction of Intake water channel and FGD the suitable option on its own to execute these works, as it is difficult for us, to comment on such requirements.”

23. It is observed from the above response of CEA that the CEA based on its technical evaluation has held that additional equipment/ assets (except for two items i.e. sl.no. 5 and 7 of table at paragraph 21 of this Order) as listed by the petitioner are required for operationalization of FGD system. However, for the two assets (items at sl.no. 5 and 7 of the table at paragraph 21 of this Order) i.e. 'Restoration of Existing Access Roads and Re-Routing Of Utilities' (Rs. 12 crores), and 'Miscellaneous Costs- Installation of Electrical & Fire safety System (Rs. 75 crores) (consequent to construction of Intake water channel

and FGD installation)', CEA has observed that such requirements are not directly related to FGD technology and CGPL may assess the suitable option on its own to execute these works as it is difficult for CEA to comment on such requirements.

24. CEA, the apex technical body, has examined the technical aspects related to requirement of additional equipment. The cost of additional equipment based on the above recommendations of CEA, considered for provisional cost, is as under:

Sl. No.	Equipment	Estimated Cost (Rs. in crores)	Allowable additional cost (Rs. in crores)	Remarks based on CEA recommendations
1	Gas to Gas Heater	75	75	Recommended but not as site specific additional equipment as it is standard requirement of FGD
2	Booster Fan	30	30	
3	Installation of Sea Water Intake channel	105	105	Recommended as site specific additional equipment
4	Temporary Circulating Water Outfall Bypass channel	53	53	Recommended as site specific additional equipment
5	Restoration of existing access roads and re-routing of Utilities	12	-	<b>Additional asset not considered by CEA</b>
6	FGD Return Water	132	132	Recommended as site specific additional equipment
7	Miscellaneous cost- Installation of Electrical & Fire safety System	75	-	<b>Additional equipment not considered by CEA</b>
<b>Total</b>		<b>482*</b>	<b>395**</b>	

*\*included in base FGD cost claimed of Rs.1634.33 crore*

*\*\* Out of Rs.482 crores, Rs.377 crores (i.e. excluding Rs.105 crores for Booster Fan and GGH given at sl.no. 1 and 2 of the table) is purely for site specific additional equipment while Rs. 105 crores is recommended by CEA as being requirement for FGD system. Further, Rs.87 crores (sl. no. 5 and 7 of the above table) has not been considered by the CEA.*

25. Thus, by the aforesaid letter of CEA dated 12.3.2020, the contentions of the Respondents as regards claims for some items which had not been recommended by CEA in its initial report of 21.02.2019 stand settled. The two items for which CEA has indicated that they are not directly related to installation of FGD system and for which the Petitioner has to make its own assessment as to their requirements, the Commission is of the view

that these two items would not be considered at this stage and any decision would be taken after the installation of FGD.

26. We note that CEA in its recommendations (quoted at paragraph 13 of this order) has stated that:

*The cost of retrofitting FGD for the plant should be discovered through open competitive bidding in consultation with representatives of beneficiary states with whom PPA had been done, information in this regard has been sent by CEA separately Vide letter No: 44/FGD/UMPP/CEA/2019/-193 to GSECL The indicative base cost worked out to Rs 0.30 Cr/MW (CAPEX), it excludes, Opportunity cost related to interconnection period, GGH, any Tax or Duty and other financial miscellaneous costs.*

It is thus clear that the cost recommended by CEA (0.30 crores/MW) is an indicative cost that excludes opportunity cost, gas to gas heater, taxes, duties and other financial miscellaneous costs. CEA has also stated that the costs are 'base cost' only.

27. Even otherwise, it is not possible to indicate exact cost that can be discovered through a competitive bidding process and that is the reason CEA has only recommended the indicative cost. The generating companies such as the Petitioner are required to discover the price through open competitive bidding process. We are also aware that in recent times, bids for installation of FGD system have been floated by other generating stations as well and these may lead to change in prices of FGD system in the international market. Therefore, while approving costs of installation of FGD system, the Commission needs to take into account the recommendations of CEA and the discovered cost through open competitive bidding process and then take a view as to reasonableness of costs.

28. Issue regarding CEA recommended cost has been dealt with by the Commission in the matter of Maithon Power Ltd. in Petition No. 152/MP/2019. Though the tariff in case of Maithon Power Ltd. is determined as per provisions of Section 62 of the Act, while in the instant case, tariff has been determined as per Section 63 of the Act, the principles as

regards costs recommended by CEA and the prices discovered in competitive bidding process remain the same. Relevant extract of the Order dated 11.11.2019 is as under:

*“21. As regards the estimated expenditure, it is observed that there is difference of Rs.0.32Cr/MW (Rs.0.740-Rs.0.420) between the estimate of CEA and the petitioner. CEA has indicated that its estimates are indicative only and the petitioner shall go for open competitive bidding. This difference is due to the fact that CEA has not considered cost towards “Fire protection and detection” package, IDC, IEDC and GST @18% considered by the petitioner and also attributable to difference in cost towards “FGD main package” and “Opportunity cost.”*

*22. It is observed that for the two packages i.e. “FGD main package” and “Electrical power supply package”, cost discovered through competitive bidding by the petitioner is Rs.0.438 Crore/MW, which is higher by Rs.0.101 Crore/MW in comparison to CEA cost of Rs.0.337 Crore/MW, including spares. This difference of Rs0.101 Crore/MW gets reduced to Rs.0.058 Crore/MW compared to the revised base cost considered by CEA in its report dated 21.02.2019. CEA, in its report dated 21.02.2019, has increased the base cost of FGD system from Rs. 0.362 crore/MW to Rs.0.405 Crore/MW based on the prices discovered by various thermal plants.*

*23. Considering the above facts and recognizing that the cost considered by CEA is indicative only and the cost claimed by the petitioner has been discovered based on open competitive bidding, Commission allows the cost claimed by the petitioner for the two packages i.e. “FGD main package” and “Electrical power supply package”.*

Therefore, the Commission needs to treat the cost recommended by CEA as indicative cost and ensure that a transparent international competitive bidding process has been followed, so that prices discovered are reasonable.

29. We now proceed to compare the costs as claimed by the Petitioner with CEA recommended costs. It is clear from the table at paragraph 20 above that the claimed base cost of Rs.1634.33 crore towards “FGD main package”, works out to Rs. 0.39 crore/MW as against the CEA’s indicative figure of Rs.0.30 crore/MW that translates into Rs. 1245 crore for the 4150 MW Mundra UMPP. We note that the cost of purely site-specific additional equipment/ assets amount to Rs. 377 crores (refer footnote of table at para 24 above) in the claimed cost of Rs.1634.33 crores. Excluding this site-specific cost, the cost of FGD system comparable in scope with CEA recommended scope of FGD system, works out to Rs. 1257.33 crores (1634.33 - 377) which is very close to CEA recommended base cost of Rs. 1245 crores (0.30 crore/MW). In our view, there is hardly any difference

in the cost claimed by the petitioner vis-à-vis that indicated by CEA as regards the “FGD Main package”.

30. The Respondents have also raised objections for claimed costs other than that for the “FGD main package”, claiming that they are on the higher side or even exorbitant. Respondents have raised issues such as claims on account of IDC being higher; admissibility of opportunity costs; GST being treated as separate cost; higher claims on O&M expenses and auxiliary consumption; admissibility of insurance costs; applicability of provisions of Section 62 of the Act despite there being formula of compensation in Article 13 of the PPA itself; non-involvement of Procurers in the competitive bid process; non-relevance of financial position of the Petitioner as far as implementation of FGD is concerned; consideration of FGD for installed capacity of 4150 MW while the bid capacity was only 4000 MW etc. The Petitioner has submitted its reply to issues raised by the Petitioner in the rejoinder filed by it.

31. We note that apart from the cost of Rs. 1634.33 crores for the “FGD main package”, the Petitioner has claimed Rs. 1080.67 crores towards other components such as owner’s cost (consultancy services, site survey, project management etc.) (Rs. 81.72 crores); GST (Rs. 308.99 crores); contingencies (Rs. 101.25 crores); IDC (Rs. 408.01 crores) and opportunity costs (Rs. 181.18 crores). Petitioner has given basis of arriving at these numbers corresponding to each of the costs.

32. In a similar case related to Sasan Power Ltd. in Petition No. 446/MP/2019, vide Order dated 23.04.2020, the Commission decided as under:

*“27. ----- The Petitioner has submitted that taxes and duties @24% of base cost and expense towards project management & engineering services @3% of base cost are based upon CEA recommendations. Thus, while the provisional cost of Rs. 1663 Crores for “FGD main package” claimed by the Petitioner is almost same as that recommended by CEA, the costs claimed towards taxes and duties (Rs. 399 crores) and expense towards project management & engineering services (Rs. 50 crores) are based on percentage of base cost*

as per CEA recommendations. As regards claim towards interest during construction (Rs. 286 crores), it is a verifiable cost that is consequential to installation of FGD system. The only item that is not covered under CEA recommendations is the claim towards pre-operative expenses. Such cost can be allowed only after proper justification by the Petitioner and after prudence check by the Commission, once the FGD system is installed.

xxxxx

30. The Commission also allows the petitioner to claim expenditure towards IDC, taxes & duties, FERV (if any) and expenditure towards project management & engineering services at actuals after commissioning of the FGD system, which may be allowed after prudence check. As regards pre-operative expenses, the cost may be allowed subject to proper justification for such expense and after prudence check by the Commission.”

33. However, we note that in the instant case, CEA has not given any recommendations as regards taxes & duties and project management and engineering expenses as it had done in case of Sasan Power Ltd. In our view, these are similar projects and should be considered similarly.

34. As regards claim towards interest during construction (Rs. 408.01 crores), in our view, it is a verifiable cost that is consequential to installation of FGD system. The Petitioner and the Respondents have different views on payment of GST (and other taxes & duties). However, they are to be reimbursed as per actuals and any assessment made can only be an estimate. We note that CEA had estimated taxes & duties @24% of base cost towards taxes & duties in case of Sasan Power Ltd.

35. In view of the above, the Commission accords approval to the petitioner for following capital cost on provisional basis:

Sr. No.	Descriptions	Claimed	Allowed on provisional basis Capex Estimate (Rs. in crores)
A	Capital Cost		
1	<b>FGD EPC Cost</b>		
1	<b>Total FGD EPC Basic Price</b>	<b>1634.33</b>	<b>1547.33 {1634.33-87 (not considered by CEA)}</b>
2	Spares	Included in 1	Included in 1

36. The Commission also allows the petitioner to claim expenditure towards IDC (at actuals); GST, taxes and duties (as applicable); FERV (if any); and expenditure towards

owner's cost (at actuals) after commissioning of the FGD system, which may be allowed after prudence check.

37. As regards contingency, the Petitioner has not given proper justification. For this item, the cost may be allowed subject to proper justification for such expense and subject to prudence check by the Commission after the installation of FGD system is completed. As regards claim towards "Restoration of Existing Access Roads and Re-Routing Of Utilities" (Rs. 12 crores) and "Miscellaneous Costs- Installation of Electrical & Fire safety System" (Rs. 75 crores), we have observed that CEA has stated that these are not directly required for installation of FGD system and the Petitioner has to assess their requirements. These costs may be allowed after installation of FGD system and after considering proper justification of expenditure, subject to prudence check by the Commission.

**Issue No.2: Whether additional Operational expenses including O&M expenses and the relaxation in other operating norms due to installation of FGD system and Opportunity cost are admissible as claimed by the petitioner?**

**Additional Operational expenses:**

38. The petitioner has submitted that installation of FGD would have impact on operating expenditure on account of increase in auxiliary consumption and operation and maintenance expenditure. Further, the Petitioner has submitted that the increase in auxiliary consumption would have twin impact, viz. impact on Capacity Charges (due to decrease in Declared Capacity) and the impact on Energy Charges (on account of excess consumption of coal). There is an overall reduction of Availability to the tune of 1.153% and impact on net Heat Rate which in turn would impact the Energy Charge.

39. The Respondents have submitted that claim of auxiliary consumption as 1.153% of 4150 MW is wrong and any auxiliary consumption can be considered only vis-à-vis 4000

MW contracted capacity. The capacity charges are payable for declared availability (Schedule 7) and the Petitioner is not entitled to any such charges on deemed availability basis or as part of change in law compensation. Allowing such compensation would be outside the scope of the PPA.

40. The CEA vide its 'Recommendation Report' for CGPL dated 21.2.2019 stated the following with regard to O&M cost and Auxiliary Power Consumption of FGD

***"Estimated (indicative) OPEX for FGD system***

<b>Sl. No</b>	<b>DESCRIPTION (FOR 5x830 MW)</b>	<b>ONLY FOR FGD IMPLEMENTATION 5x830 MW (CRORE INR)</b>	<b>PER MW/YEAR COST</b>	<b>REMARK</b>
1	Annual Reagent Cost	Nil	Nil	
2	Annual Clarified & DM water consumption cost	3.39	0.000804	PLF-85%
3	Annual cost of APC-3.69/unit @1.0% (41.5 MW)	114.0	0.02746	PLF-85%
4	Annual Fixed O&M Cost (O&M manpower, services, Maint. Etc.)	24.9	0.00600	2% of Total FGD CAPEX
5	Annual By-Product handling Cost	Nil	Nil	
Annual OPEX FOR 5x830 MW Unit		142.29 (Crore INR) = 0.0342 CR/MW per year		

*The Annual indicative OPEX calculated is Approximately 142.29 (Crore INR) for CGPL (0.0342 CR/MW per year) taking per unit power cost as Rs. 03.69 (as provided by CGPL). The OPEX cost should be kept low as Reagent cost and By-product handling cost is nil. More over FGD is designed on open cycle using Cooling Tower discharge for Dilution of FGD discharge.*

**OPEX**

*The Annual indicative Operating Cost (OPEX) will include annual APC for FGD, annual Reagent cost (if any), annual Additional water consumption associated with FGD, annual Manpower charges for O&M of FGD, annual By-product handling (if any) and annual revenue earned from disposal of by product, this shall be calculated after detailed engineering and life cycle cost benefit analysis. Also, the regulator may regulate the different aspects of OPEX (as per actual) at appropriate time when the FGD starts operating. Refer the chapter no 9 OPEX."*

41. In the present case, CEA has provided the factors to be considered for OPEX including annual O&M Expenses (O&M manpower, services, maintenance, etc.), cost of auxiliary power consumed, cost of annual Clarified & DM water consumption etc. CEA has

provided the basis of arriving at the OPEX corresponding to each factor as provided in the table above at paragraph 39. CEA has also opined that the regulator may regulate the different aspects of OPEX (as per actual) at appropriate time when the FGD starts operating. The major operating cost (Rs.114 crores/annum) indicated by CEA is the cost of the Auxiliary Energy consumed by the FGD system corresponding to 1% Auxiliary consumption & 85% availability @ Rs.3.69/kWh.

42. The issue of plant capacity i.e. 4000 MW vis-à-vis 4150 MW as raised by the Respondents has been dealt as a separate issue (Issue No.3) in later part of this Order. Further, the issue raised by the Respondents regarding compensation in capacity charges consequent to operationalization of FGD system, has been dealt as Issue No.4.

43. With regard to the recovery of cost of Auxiliary Energy consumed (Rs. 114 crores) by FGD system, Commission is of the view that that impact of increased auxiliary consumption after installation of FGD system would be allowed to be recovered through increase in quoted Energy Charge Rate and Capacity Charge rate and not through OPEX at normative availability as suggested by CEA. With regard to cost of additional water consumption, Commission would consider the same after prudence check of the data collected after installation of FGD system at various Thermal Generating stations.

44. With regard to Annual O&M expenses for FGD operation, CEA has considered the same at the rate of 2% of total FGD CAPEX (Rs.0.30 crore/MW). As such, for FGD system, the O&M expenditure as considered by CEA works out to Rs.24.90 crore/MW (4150x0.30x0.02) for plant capacity of 4150 MW. However, the Petitioner has contested that the O&M expenses would be around Rs. 65.77 crores per annum. Petitioner has further submitted that CEA has not considered the expenditure towards insurance which is to be considered as 0.13% of GFA as an additional cost towards insurance charges. In

this regard, the Commission has dealt similar matter in case of Adani Power Ltd. in order dated 28.3.2018 in petition no 104/MP/2017. It was decided that the additional O&M expenses provisionally be considered @2% per annum of the capital cost of FGD system.

Relevant Para is extracted below:

*“49. Pending the prescription of norms by CEA, we allow the O&M expenses provisionally at the rate of 2% per annum of the capital cost of FGD, subject to adjustment in the light of the norms to be prescribed by CEA.”*

45. Similar decisions have been taken by the Commission in respect of Sasan Power Limited (446/MP/2019) and Sembcorp Energy India Limited (209/MP/2019) wherein O&M expenditure @2% per annum of the capital cost of FGD has been allowed. Therefore, in the instant case also, O&M expenditure is provisionally allowed @2% of the capital cost of FGD system at this stage. We direct the petitioner to submit the O&M expenses relating to FGD system on actual basis at the time of filling the petition for determination of tariff on commissioning of the FGD system.

### **Additional Auxiliary Power Consumption and Opportunity Cost**

46. With regard to additional auxiliary power consumption and opportunity cost, the Commission in its order dated 23.4.2020 in petition 446/MP/2019 held as under:

***“Operational norms:***

*35. The Commission is yet to specify operational norms in respect of systems to be commissioned for meeting Revised Norms. In absence of notified operational norms, Commission allows increased auxiliary consumption of 1% as recommended by CEA subject to revision based on the norms specified by the Commission, if any. This allowed increase in auxiliary consumption by 1% is allowed for the modification in formulae for Availability, Energy Charge and PLF on account of increased auxiliary consumption.*

*36. CEA, in its report, has observed that the generating station may be allowed to recover the opportunity cost towards shutdown of the generating units for interconnection of chimney with the absorber. However, CEA has not specified number of days for which units would have to be shutdown for interconnection of FGD system with the chimney. CEA has opined that shutdown period can be minimized by taking suitable measures. It is, however, observed that the Petitioner’s claim is based on the shutdown period of 30 days. 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. Therefore, the Commission is not considering the opportunity cost at this stage. However, the same would be considered on actual number of days of shutdown after prudence check to the effect that the Petitioner has*

*tried to synchronize the interconnection of FGD system with annual overhaul and has consulted the beneficiaries in this respect.”*

47. The CEA in its ‘Recommendation Report’ dated 21.2.2019 in regard to APC and opportunity cost for the Mundra UMPP has recommended the following:

**“10. APC**

- *Additional Auxiliary power Consumption (APC) for complete FGD facilities is 1.0%.*
- *Extra APC of 0.153% to be considered only when using GGH with old/existing chimney in FGD system.”*

**OPPORTUNITY COST:**

*Since interconnection of newly lined chimneys or New wet stack or stack above absorber may result in loss of generation of the plant, hence CGPL is advised to minimize this interconnection time by taking suitable measure so that the "Opportunity cost" associated with interconnection may have least impact on CAPEX and eventually on tariff revision.....”*

48. In view of the above, since the operational norms are yet to be specified by the Commission and based on the above precedence, the Commission allows increased auxiliary consumption of 1.153% as recommended by CEA for FGDs having GGH as their integral part. This would be subject to revision based on the norms specified by the Commission, if any. This allowed increase in auxiliary consumption by 1.153% is allowed for the modification in formulae for Availability, Energy Charge and PLF on account of increased auxiliary consumption.

49. In its report, CEA has observed that the generating station may be allowed to recover the opportunity cost towards shutdown of the generating units for inter-connection of chimney with the absorber. However, CEA has not specified number of days for which units would have to be shut down for interconnection of FGD system with the chimney. CEA has opined that shutdown period can be minimized by taking suitable measures. It is, however, observed that the Petitioner’s claim is based on the shutdown period of 22 days. 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.

Therefore, the Commission is not considering the opportunity cost at this stage. However, the same would be considered on actual number of days of shutdown after prudence check to the effect that the Petitioner has tried to synchronize the interconnection of FGD system with annual overhaul and has consulted the beneficiaries in this respect.

**Issue No.3: Whether capacity of 4150 MW or 4000 MW is to be considered towards expenditure/ relief for Installation of FGD system?**

50. The Respondents have submitted that the impact has to be considered based on 4000 MW power project as the Petitioner was selected as the successful bidder and the PPA was executed based on a 4000 MW Ultra Mega Power Project (5X800 MW). It was CGPL's choice to seek expansion of the units to 830 MW and total project capacity to 4150 MW. The PPA between CGPL and the Procurers do not reflect such expanded capacity and continues to be at 4000 MW. Additional capacity installed by the Petitioner has impact on capital expenditure, operating expenditure as well as auxiliary power consumption.

51. The Petitioner has submitted that at the time of constructing and setting up of Mundra UMPP, it was decided to change the Turbine or Steam Cycle. This entailed substituting the 'Steam Driven Boiler Feed Pump' from the Steam Cycle in the original design to 'Motor or Electricity Driven Boiler Feed Pump'. The said design modification improved the gross capacity by 30 MW per unit (or 150 MW for the plant) but at the same time increased the auxiliary consumption. However, this change did not alter the Contracted Capacity of 3800 MW. Further, CGPL submits that the Boiler (or Steam Generator) side of the plant was also not altered. The content of the SO<sub>2</sub>/ flue gases produced in the boiler is dependent on the fuel fired. It has, therefore, submitted that since the Boiler design was not altered when the capacity was enhanced, the quantum of fuel fired did not undergo a change.



*Environment Clearance dated 2.3.2007 provides for separate funds for environmental protection measures and reporting of year-wise expenditure to MoEF.*

*The Petitioner has submitted that an amount of Rs.200 crore had been earmarked by the Petitioner for environment protection measures for a period of 25 years. The Petitioner has filed the copies of the letters under which the Petitioner has submitted the compliance reports regarding environment protection measures in terms of condition 3(xxx) of the EC dated 2.3.2007 for the years 2013-14, 2014-15, 2015-16 and 2016-17. Perusal of the said letters shows that the expenditure on FGD does not form part of the environment protection measures. The fact that no objection has been raised by MoEFCC with regard to the expenditure earmarked/incurred for environment protection measures shows that FGD is not included in the expenditure under condition 3(xxx) of the EC. Therefore, it cannot be said that the Petitioner was required to include the expenditure on FGD to be incurred in future if required at a later stage in terms of condition 3(ii) of the EC dated 2.3.2007. In view of the above reasons, we hold that the judgement of the Appellate Tribunal in JSW case is not applicable in the case of the Petitioner. The requirement of installation of FGD for compliance with the revised norms for sulphur dioxide in terms of the MoEFCC Notification, 2015 is covered under Change in Law in terms of the PPA dated 22.4.2007.*

53. It is evident from the above that the RFP document for CGPL project was for 4000 MW capacity and the Environment Clearance was issued on dated 2.3.2007 and the cut-off date was 30.11.2006. The PPA was signed on 22.4.2007 between the Petitioner and the Respondents. Subsequent to the above, on 1.4.2011, Petitioner requested MoEF&CC for amendments in Environment Clearance. The MoEF&CC vide corrigendum dated 26.4.2011 approved the change in total capacity of the Mundra UMPP. Relevant extracts of the MoEF&CC Corrigendum dated 26.4.2011 is as under:

*“2. d) Under Para No.3, the condition no. (xxiv) read as ‘The proposed configuration of the project (5x800 MW) could be changed provided that the total capacity of the power plant shall not exceed 4000 MW and that no individual unit shall be less than 500 MW’, shall be substituted by the following:*

*‘The proposed generation capacity of the project could be increased only by way of adoption of waste heat recovery and entailing no additional coal and water consumption. The generation capacity thus obtained taking waste heat recovery into account shall however not exceed 4150 MW and configuration of units may be accordingly adopted at 5x830 MW.’”*

54. The Commission vide order dated 19.9.2007 in petition no.18/2007 in regard to adoption of Tariff for the Mundra UMPP observed as under:

*“3. The Central Government has been facilitating development of a number of Ultra Mega Power Projects by using the economies of scale which aims at making available comparatively cheaper power to more than one state. Mundra Ultra Mega Power Project (4000 MW) in the state of Gujarat has been conceived with the purpose of supplying power to the following distribution licensees (also referred to as the procurers) of the beneficiary states:*

- (i) Gujarat Urja Vikas Nigam Ltd.
- (ii) Maharashtra State Electricity Distribution Co. Ltd.
- (iii) Ajmer Vidyut Vitran Nigam Ltd.
- (iv) Jaipur Vidyut Vitran Nigam Ltd.
- (v) Jodhpur Vidyut Vitran Nigam Ltd.
- (vi) Punjab State Electricity Board.
- (vii) Haryana Power Generation Corporation Ltd.”

55. It is noticed that capacity recognized under the PPA dated 22.4.2007 is 4000 MW whereas the contracted capacity in the said PPA is 3800 MW. In the bid itself, the auxiliary consumption was recognized as 200 MW, equivalent to about 5%. It is admitted that the Petitioner itself had sought the expansion of Mundra UMPP. Further, the petitioner in its affidavit dated 14.10.2013 in petition 159/MP/2012 submitted that auxiliary consumption was assumed as 4.75% in its bid and installed capacity of 4000 MW. The impact of the additional capital expenditure and operating expenditure is considered within the PPA. The installed capacity of 4000 MW was one of the bid considerations at the time of entering into PPA that has not been amended or altered till today. Therefore, any consideration of impact based on installed capacity of 4150 MW would tantamount to alter the provision of PPA. Further, there will be impact on the CAPEX and auxiliary power consumption by considering the higher installed capacity of 4150 MW. The Mundra UMPP is a case-2 project, wherein the bidder is awarded the project based on the quoted tariff by the Petitioner.

56. We also take notice of the submission of the Petitioner that the FGD system has been designed for 4150 MW capacity and the costs have been accordingly claimed. It has contended that the capital cost of the project for 4000 MW capacity would not proportionately come down and, therefore, it would also be incorrect to consider a proportionate reduction. The emission of SO<sub>2</sub> is dependent on amount of coal to be fired and Sulphur content in the coal. The installation of 4150 MW plant capacity in place of 4000 MW by CGPL is to cater to the power consumption requirement of electrical motor

driven BFPs keeping same contractual output of 3800 MW to procurers. Selection of 4000 MW plant with turbine driven BFP would have accounted for higher heat rate which in turn would have required higher coal consumption and higher SO<sub>2</sub> emission for the same contractual output. However, we note that the Petitioner has not explained the rationale for such assertions. Moreover, this Petition has been filed for claim of costs related to installation of FGD system. Any claim of the Petitioner for granting costs for 4150 MW is not subject matter of this Petition. Accordingly, we hold that the calculations for capital expenditure, operating expenditure and auxiliary power consumption shall be done corresponding to installed capacity of 4150 MW, but the Respondents shall be liable to pay the expenses on pro-rata basis corresponding to 4000 MW in terms of PPA.

**Issue No.4: What shall be the norms and mechanism for computing the adjustment in tariff corresponding to the additional investment and increase in the operating costs due to the 2015 Notification so as to restore the petitioner to same economic position as if such Change in Law event has not occurred?**

57. Article 13.2 of the PPA reads as follows in the instant case:

**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 Fifty crores (Rs.50 crores) in the Capital Cost over the term of this Agreement, the increase/decrease in Non Escalable Capacity Charges shall be an amount equal to zero point two six seven (0.267%) 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. Fifty (50) crores.*

**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.*

58. It is observed that clause 13.2(a) of the PPA provides for compensation methodology to be applied to the non-escalable capacity charges if a Change in Law event results in increase in capital cost during the construction period. However, for the Change in Law events which occur during the operation period e.g. the instant change in law event requiring installation of FGD system at the generating station of the petitioner, clause 13.2(b) of the PPA has left it to the Commission to arrive at the compensation for any increase/ decrease in revenues or cost. Also as per Clause 13.2 of the PPA, *“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”*. Thus, the Petitioner is required to be restituted to the same economic position as if the Change in Law event had not occurred.

59. We note that few other similar petitions have been filed by other generating companies in respect of their generating stations wherein tariff has been determined through the tariff based competitive bidding route under Section 63 of the Act. PPAs in their case also contain similar provisions as clause 13.2(b) of the instant Petition i.e. there is no explicit provision with regard to methodology for compensation for Change in Law events which occur during the operation period. In their case too, the PPAs have left it for the Commission to decide at the compensation for any increase/ decrease in revenues or cost on account of change in law during the operation period. Since the FGD system is required to be installed by all thermal generating stations as per the 2015 Notification, several more such Petitions are likely to be filed by generating companies for determination of compensation on account of change in law during operation period.

Therefore, it would be appropriate to adopt a uniform compensation mechanism in respect of all such generating stations.

60. Accordingly, the Commission vide order dated 23.4.2020 in Petition No. 446/MP/2019, has directed the staff of the Commission to float a staff paper at the earliest on the issue of compensation mechanism and tariff implications on account of the 2015 Notification in case of those thermal power plants where the PPA does not have explicit provision for compensation mechanism during the operation period and the PPA requires the Commission to devise such mechanism, inviting comments from all the stakeholders.

61. The Petitioner has raised issue of its precarious financial position and has referred to ongoing discussions with the Procurers. In our opinion, the issue is not relevant to the present case of installation of FGD system that is a statutory compliance in terms of the 2015 Notification.

62. With regard to prayer (e) of the Petition, the Petitioner may approach this Commission by way of separate petition(s) as and when the norms are notified by MoEF&CC.

63. Petition No. 168/MP/2019 is disposed of in terms of above.

**Sd/-  
(I.S. Jha)  
Member**

**Sd/-  
(P. K. Pujari)  
Chairperson**