



केन्द्रीय विद्युत विनियामक आयोग  
CENTRAL ELECTRICITY REGULATORY COMMISSION



नई दिल्ली  
NEW DELHI

याचिका संख्या /Petition Nos.: 8/MP/2019

कोरम/Coram:

श्री पी. के. पुजारी, अध्यक्ष/Shri P. K. Pujari, Chairperson

डॉ. एम. के. अय्यर, सदस्य/ Dr. M.K. Iyer, Member

श्री. आई. एस. झा, सदस्य/ Shri I.S. Jha, Member

आदेश दिनांक /Date of Order: 21<sup>st</sup> of January, 2020

**IN THE MATTER OF:**

Petition for relaxation/modification of the provisions of the India Electricity Grid Code (Fourth Amendment) Regulations, 2016 and the Central Electricity Regulatory Commission (Deviation and Settlement Mechanism and related matters) (Fourth Amendment) Regulations, 2018 in respect of the schedule for operation of the Ratnagiri Gas Power Station

**AND IN THE MATTER OF:**

Ratnagiri Gas and Power Private Limited

Maintaining office at:

5th Floor, GAIL Jubilee Towers,

Plot 35/36, Sector-1,

NOIDA - 201 301 (UP)

AND

NTPC Bhawan, Core 7, SCOPE Complex,

7 Institutional Area,

Lodhi Road, New Delhi - 110003

**...Petitioner**

**VERSUS**

1. Power System Operation Corporation Limited

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- 0-9, Qutab Industrial Area  
Katwaria Sarai,  
New Delhi - 110016
2. Western Regional Load Despatch Centre  
F-8, Krantiveer, Andheri East,  
Mumbai - 400 096
  3. Western Regional Power Committee  
F-8, Krantiveer, Andheri East,  
Mumbai - 400 096
  4. Central Transmission Utility,  
'Saudamini', Plot No.2  
Sector 29, Gurgaon - 122 001  
Haryana
  5. Maharashtra State Electricity Distribution Company Ltd  
Hongkong Building,  
MG Road, Mumbai - 400 001
  6. Indian Railways  
256-A, Raisina Road,  
Rajpath Area, Central Secretariat,  
New Delhi -110001
  7. Govt. of Goa Electricity Department,  
Vidyut Bhawan, Panaji,  
Goa - 403 001
  8. Electricity Department  
Administration of Daman & Diu  
Daman - 396210
  9. Electricity Department  
Administration of Dadra & Nagar Haveli  
Silvassa-396230

**...Respondents**

**Parties Present:**

Shri M. G. Ramachandran, Sr. Advocate, RGPPL  
Ms. Poorva Saigal, Advocate, RGPPL  
Ms. Tanya Sareen, Advocate, RGPPL  
Shri Sanjeev Singh, Advocate, RGPPL  
Shri Arshad Jilani, RGPPL  
Shri Ashok Rajan, POSOCO and WRLDC  
Shri Alok Mishra, POSOCO and WRLDC

## आदेश/ ORDER

The Petitioner, Ratnagiri Gas and Power Private Limited is a joint venture company of NTPC Ltd., GAIL (India) Ltd, both Government of India undertakings, MSEB Holding Company Limited (a Government of Maharashtra undertaking) and Indian Financial Institutions and established as a Special Purpose Vehicle to take over the generating station and related assets at Ratnagiri, Maharashtra which were earlier owned by Dabhol Power Company Limited, a private company promoted and established by erstwhile Enron Group.

2. The Respondent No. 1, Power System Operation Corporation (hereinafter referred to as 'POSOCO'), is a Government of India enterprise which is responsible for ensuring integrated operation of the Indian power system to facilitate transfer of power within and across the regions, and trans-national exchange of power with security, reliability and economy.
3. The Respondent No.2, Western Regional Load Despatch Centre (hereinafter referred to as 'WRLDC'), is a statutory body which coordinates the scheduling and energy accounting of the power station of the Petitioner.
4. The Petitioner has filed the petition under Section 79 of the Electricity Act, 2003 read with Regulation Nos. 1 and 4 of Part 7 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2010 (hereinafter referred to as 'IEGC Regulations, 2010') and Regulation No. 12 of Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2014 (hereinafter referred to as DSM Regulations, 2014') seeking directions to modify the requirement to operate the Ratnagiri Gas Power Station of the Petitioner at a technical minimum of 55% of the maximum continuous rating / installed capacity and seeking to relax and remove difficulties in application of the above technical minimum.
5. The Petitioner has made the following prayers:
  - (a) Admit the petition;
  - (b) Exercise the power to relax and power to remove difficulties and modify the Technical Minimum loading of the Gas Turbines of the Petitioner at 65% to 67% of the MCR/capacity in place of 55% provided in the Indian Electricity Grid Code (Fourth Amendment) Regulations, 2016;

- (c) Pass ad-interim ex-parte Orders to allow the Petitioner to operate the Gas Turbines at a level not lower than 65% to 67%, pending the hearing and decision in the present petition to enable the Petitioner to sustain operation without being subjected to penalties and charges provided in the Amendment to the DSM Regulations, 2018;
- (d) Pass such further order or orders the Commission may deem just and proper in the circumstances of the case.

### **Background**

6. The Dabhol Power Company Ltd. (and its promoter Enron) ran into serious financial difficulties and could not continue to operate the power project. The project was eventually closed down in May 2001. All its assets were placed under the control of a Receiver appointed by the Hon'ble High Court of Bombay in Suit No. 875 of 2002. The Government of India explored several possibilities with regard to the revival and finally, it was decided that the Petitioner (SPV with the shareholding of NTPC Limited, GAIL (India) Ltd, MSEB, Financial institutions.) take over the assets of the project along with all the units including the integrated LNG Terminal and associated infrastructure facilities for revival.
7. On 06.10.2005, the assets were taken over by the Petitioner on 'as is where is basis' for a lump sum consideration of Rs. 8485.45 Crores. The status of the blocks was as under:

	Started Opn. LNG	CoD
Block II (633.54 MW)	August 2007	01.09.2007
Block III (633.54 MW)	October, 2007	21.11.2007
Block I (640 MW)		19.05.2009

8. The Petitioner, after undertaking the renovation and refurbishing, is currently owning, operating and maintaining the gas power generating station comprising of the following units:

Assets	Gas turbines	Steam Turbine	LNG Terminal
Block I (640 MW)	2 X 205 MW	1 X 230 MW	Common
Block II (633.54 MW)	2 X 213 MW	1 X 237.54 MW	
Block III (633.54 MW)	2 X 213 MW	1 X 237.54 MW	

9. On 28.04.2010, the Commission notified IEGC Regulations, 2010 which came into force from 03.05.2010, superseding the Indian Electricity Grid Code, 2006.

10. On 06.01.2014, the Commission notified DSM Regulations, 2014 which came into force from 17.02.2014.
11. On 06.04.2016, the Commission notified Central Electricity Regulatory Commission (Indian Electricity Grid Code) (Fourth Amendment) Regulations, 2016 (hereinafter referred to as 'IEGC 4<sup>th</sup> Amendment Regulations, 2016').
12. On 20.11.2018, the Commission notified the Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) (4<sup>th</sup> Amendment) Regulations, 2018 (hereinafter referred to as the 'DSM 4<sup>th</sup> Amendment Regulations, 2018') which came into force from 01.01.2019.
13. In terms of the IEGC 4<sup>th</sup> Amendment Regulations, 2016, the Commission has specified the technical minimum for operation in respect of a unit or units of a Central Generating Station or inter-State Generating Station as 55% of MCR loading or installed capacity of the unit of a generating station, subject to other terms and conditions as provided in the Regulations.
14. In terms of the DSM 4<sup>th</sup> Amendment Regulations, the Commission has provided for the modified charges for deviation and also specified norms for sign change by the entities connected to ISGS. In terms of these Regulations, penal charges are leviable for not adhering to the stipulations.
15. The Petitioner expressed technical difficulties in adhering to the provisions of the IEGC Regulations, 2010 & DSM Regulations, 2014 and sought directions to modify the requirement to operate the Ratnagiri Gas Power Station of the Petitioner at a technical minimum of 55% of the maximum continuous rating / installed capacity and seeking to relax and remove difficulties in application of the above technical minimum.

### **Submissions of the Petitioner**

16. The Petitioner has submitted that at the time of takeover of the assets of erstwhile Dabhol Power Project and during the preliminary assessment for repair and rehabilitation of the generating station, the exact status of various machines and their working condition etc. could not be fully ascertained. The plant and equipments of the generating station were amongst the first few advanced class machines and their repair, revival and operation and maintenance were unpredictable with no guarantee or warranty existing at the time of

takeover.

17. The Petitioner was required to operate the generating station and each of the generating units at a level envisaged for such operation of an advanced 9FA compressor and technology adopted at the Plant and the technical standards and requirements of Original Equipment Manufacture (hereinafter referred to as 'OEM') in order to effectively enforce the obligation of the OEM for the sustained operation of the power generating station. During the course of the operation of the generating station, various failures of turbines occurred. The Petitioner did not have support of the original contract with M/s GE Energy (OEM) to restart operation and maintenance as the OEM along with its principal agency, namely, M/s Bechtel who were responsible for balance work of the generating station (i.e. excluding scope of M/s GE Energy) as they were already released from their contractual obligations with regard to the supply of gas turbines and steam turbines. The OEM was also not willing to provide any guarantee for ensuring the reliability and performance of the machines and equipments, despite efforts made by the Government of India.
18. The Petitioner has submitted that after the takeover, it proceeded to undertake the repairs and connected works of the generating station in order to commence generation of electricity. Block II of the generating station was operated on liquid fuel from April 2006 to July 2007 and thereafter, on Re-gasified Liquefied Natural Gas (R-LNG) from August 2007, and Block III was operated on R-LNG from October 2007 before Block II and Block III of the generating station went into commercial operation with effect from 01.09.2007 and 21.11.2007 respectively.
19. The Petitioner has submitted that during the course of the operation of the generating station, one of the gas turbines (CTG-2B) forming part of the Block II failed on 05.01.2007. Thereafter, Second Gas Turbine of Block II (CTG-2A) also failed on 19.01.2008 as a result of compressor distress. Further, the steam turbine forming part of Block III was shut down from 18.06.2008 to 01.10.2008 due to unusual failure of a Stelite Seal in HP control valve leading to turbine diaphragm damage. This resulted in complete outage of Block III. On 08.11.2008, one of the gas turbines of Block III failed as a result of compressor distress. Further, in another gas turbine 3B, cracks in compressor blades were found which resulted in the outage of Block III from 19.11.2008 to 16.03.2009.
20. The gas turbines having been supplied by OEM with specification namely "9FA" Advanced

Class or F-Class were not comparable to other gas turbines functioning in the country and consequently, the Petitioner had no other alternative except to approach the OEM afresh for various support activities for the revival and operation and maintenance (O&M) of the generating station. The Petitioner was able to finalize a long term arrangement with the OEM for rehabilitation and support for O&M etc., in respect of the gas turbines and steam turbines, with certain assurances on performance and availability. After negotiations, an availability guarantee-based long term contractual supply and service agreement was executed with the OEM on 20.06.2009. The availability guarantee was applicable only when the Petitioner stores mandatory spares worth USD 60 million at site. This was possible only through continuous efforts by the Petitioner and the stakeholders with support of the Government of India and Government of Maharashtra and was in line with the action plan for financial restructuring agreed and concluded by the stakeholders in March, 2009. Pursuant to the agreement, the Petitioner has entrusted the restoration and rehabilitation of the failed gas turbine to the OEM. All these aspects have been considered by the Commission in its Order dated 18.08.2010 in Petition No. 283 of 2009.

21. The Petitioner has submitted that the operation of the Gas Power Station is dependent on the due performance of the obligations by the OEM under various contracts entered into with the OEM. The Petitioner is required to operate the generating station and each of the generating units at a level envisaged for such operation of an advanced 9FA compressor, technology adopted at the Plant and the technical standards and requirements of OEM in order to effectively enforce the obligation of the OEM for the sustained operation of the power generating station.
22. The Petitioner has submitted that the six Gas Turbines of the Petitioner are advanced 9 FA Class Machine with DLN-2 + (Dry Low Nox) Combustors which produce low NOx emissions only when operated at a load higher than 120 MW. Thus, when operated at a load less than 120 MW, the NOx emissions are much higher than the norm stipulated by the Maharashtra Pollution Control Board. The OEM of the said Machines is General Electric (GE) and it has been certified by the OEM that owing to the technology and configuration of the Gas Turbines installed at Ratnagiri Gas Power Station, the NOx emissions when the Gas Turbines are operating below 120 MW will be high. In support of their argument, the Petitioner submitted a copy of the letter dated 4.01.2019 issued by GE.



23. The Gas Turbines have 3 modes of combustion namely, Diffusion, Piloted Premix and Premix Steady State (PSS). Out of these modes, Diffusion and Piloted Premix modes are used during transient modes like Startup/ Shutdown of gas turbines. When a Gas turbine is loaded above 120 MW, the premix steady state mode of combustion is achieved. Premix mode of combustion is necessary for the low emissions of NO<sub>x</sub>. The NO<sub>x</sub> emissions are very high during the Diffusion / Piloted Premix mode of combustion. Petitioner has submitted the following table containing the details of the NO<sub>x</sub> emissions as per the loading of the gas turbine:

Load MW	O <sub>2</sub> ,%	CO,ppm	CO <sub>2</sub> ,%	NO <sub>x</sub> PPM	Corr NO <sub>x</sub> PPM	Mode of Combustion
60	15.5	232	3.1	59	64.5	Diffusion
80	14.8	61	3.4	111	107.4	Piloted PM
90	14.7	48	3.5	126	119.9	Piloted PM
100	14.6	44	3.5	147	137.7	Piloted PM
100	14.7	44	3.5	150	142.7	Piloted PM
120	14.4	38	3.7	178	161.6	Piloted PM
130	14.3	2	3.7	16	14.3	premix SS
140	14.2	3	3.7	24	21.1	premix SS
141	14.2	4	3.8	22	19.4	premix SS
149	14.2	4	3.8	20	17.6	premix SS
160	14.2	4	3.8	19	16.7	premix SS
180	14.1	4	3.8	22	19.1	premix SS
200	14	4	3.9	38	32.5	premix SS
200	13.9	2	3.9	26	21.9	premix SS
200	13.9	2	3.9	27	22.8	premix SS
215	13.8	2	4	28	23.3	premix SS

24. The Petitioner has submitted that as is evident from the above, when the load is reduced below 120 MW, the combustion mode changes from the Premix Steady State to Piloted Premix mode. The NO<sub>x</sub> levels in the Piloted Premix mode of combustion are more than 160 PPM (Corrected), which is much higher than the permissible limit under the Air (Prevention and Control of Pollution) Act, 1981, the modification issued thereunder and the consent to establish/operate granted by the Maharashtra Pollution Control Board, as detailed herein. As per the Consent to operate and the Schedule-II thereto dealing with the Terms and Conditions for compliance of Air Pollution Control issued by the Maharashtra Pollution Control Board on 11.07.2017, the maximum NO<sub>x</sub> limit for the emissions is 27 PPM. The relevant extracts of the Consent to Operate reads as under:



“Subject: Renewal of Consent to Operate with increase in CI under RED category

- Ref:** 1. Earlier Consent granted vide no. BO/EIC No. KP-17468-15/CAC-CELL/CAC-2751 dtd. 24.05.2016.  
2. your application approved in CAC meeting held on 24.03.2017

Your application: 0000009624  
Dated : 05.07.2016

For: Renewal of consent to operate with increase in CI under Section 26 of the Water (Prevention & Control of Pollution) Act, 1974 & under Section 21 of the Air (Prevention & Control of Pollution) Act, 1981 and Authorization under Rule 6 of the Hazardous & Other Wastes (M & T M) Rules 2016 is considered and the consent is hereby granted subject to the following terms and conditions and as detailed in the schedule I, II, III & IV annexed to this order:

1. The consent is granted for a period from 01.09.2016 to 31.08.2018.

.....  
**Schedule-II**

**Terms and Conditions for compliance of Air Pollution Control**  
.....

4. The applicant shall operate and maintain above mentioned air pollution control system, so as to achieve the level of pollutants to the following standards:

1	Particulate matter	Not to exceed	1.50 mg/Nm <sup>3</sup>
2	NO <sub>x</sub>		
2.1	Combined Cycle WHRB Stack 1A, 1B, 2A, 2B, 3A, 3B		
2.1.1	Natural Gas Firing	Not to exceed	27 ppm (v/v at 15% oxygen)
2.1.2	Naptha/Distillate Oil firing	Not to exceed	77 ppm (v/v at 15% oxygen)
2.2	Simple Cycle (Peaking) Turbine (Frame- 6 GT) Stack		
2.2.1	Natural Gas Firing	Not to exceed	42 ppm (v/v at 15% oxygen)
2.2.2	Naptha/Distillate Oil Firing	Not to exceed	77 ppm (v/v at 15% oxygen)

.....  
**Schedule-IV**

**General Conditions:**  
.....

- 12) Industry shall strictly comply with the Water (P&CP) Act, 1974, Air (P&CP) Act, 1981 and Environmental Protection Act, 1986 and industry specific

*standard under EP Rules 1986 which are available on MPCB website(www.mpcb.gov.in).”*

25. The Petitioner has submitted that in the circumstances mentioned above, the operation of the Gas Turbine units of the Petitioner at a level lower than 65%-67% of the MCR (block wise) will cause serious environmental issues and will result in violation of the environmental norms under the Air (Prevention and Control of Pollution) Act, 1981, the modification issued thereunder and the consent to establish/operate granted by the Maharashtra Pollution Control Board from time to time to the Petitioner for operation of the power project. Section 22 and 22A of Air (Prevention and Control of Pollution) Act, 1981 which provides for the consequences of violation of the emission norms stipulated by the Pollution Control Board, are as under:

***“22. Persons carrying on industry, etc., and to allow emission of air pollutants in excess of the standard laid down by State Board.***

*No person<sup>20</sup>\*\*\*\* operating any industrial plant, in any air pollution control area shall discharge or cause or permit to be discharged the emission of any air pollutant in excess of the standards laid down by the State Board under clause (g) of sub-section (1) of section 17.*

***21[22A. Power of Board to make application to court for restraining person from causing air pollution.***

*(1) Where it is apprehended by a Board that emission of any air pollutant, in excess of the standards laid down by the State Board under clause (g) of sub-section (1) of section 17, is likely to occur by reason of any person operating an industrial plant or otherwise in any air pollution control area, the Board may make an application to a court, not inferior to that of a Metropolitan Magistrate or a Judicial Magistrate of the first class for restraining such person from emitting such air pollutant.*

*(2) On receipt of the application under sub-section (1), the court may make such order as it deems fit.*

*(3) Where under sub-section (2), the court makes an order restraining any person from discharging or causing or permitting to be discharged the emission of any air pollutant, it may, in that order-*

*(a) direct such person to desist from taking such action as is likely to cause emission;*

*(b) authorise the Board, if the direction under clause (a) is not complied with by the person to whom such direction is issued, to implement the direction in such manner as may be specified by the court.*

*(4) All expenses incurred by the Board in implementing the directions of the court under clause (b) of sub-section (3) shall be recoverable from the person concerned as an-ears of land revenue or of public demand.”*

26. The Petitioner has submitted that on 16.04.2016, the Commission notified the IEGC 4<sup>th</sup> Amendment Regulations, 2016 providing for the technical minimum for operation in respect of a unit or units of a Central Generating Station or inter-State Generating Station to be 55% of MCR loading or installed capacity of the unit of a generating station. The Petitioner has

also submitted that the IEGC 4<sup>th</sup> Amendment Regulations, 2016 itself recognizes the need for complying with the environmental issues.

27. The Petitioner has submitted that they have been representing to the Western Regional Load Despatch Centre and National Load Dispatch Centre with regard to the inability of the Petitioner to operate the power generating units at a technical minimum of 55% of the MCR and/or the installed capacity specified in the IEGC 4<sup>th</sup> Amendment Regulations, 2016. Due to the supervening requirements of the Pollution Control Laws and Regulations, the Petitioner has not been in a position to operate the power plants in a manner which would result in lower NOx emission than what is permitted under the consent to establish i.e. 27 PPM.
28. The Petitioner has submitted that their generating station comprises of three blocks with each block consisting of two Gas Turbines and One Steam Turbine. The aggregate installed capacity of each block is in the range of 640 – 664 MW. Considering the requirement of the Pollution Control Laws, two gas turbines are required to be operated at a minimum of 120 MW each and consequently, the steam turbine will operate at 190 MW capacity, all aggregating to 430 MW. The said quantum of 430 MW of the total installed capacity of 640 MW constitutes 67.18% and of the installed capacity of 660 MW constitutes about 65%. The minimum capacity for injection into the Grid against 430 MW would be 420 MW after considering 2.5% towards auxiliary power consumption.
29. The Petitioner has submitted that in terms of the above amendment to the DSM 4<sup>th</sup> Amendment Regulations, 2018, the penal charges and consequences for not adhering to the technical minimum of 55% provided in the IEGC 4<sup>th</sup> Amendment Regulations, 2016 are exorbitant and also provides for serious and adverse consequences on the generating company for such deviations.
30. The Petitioner has further submitted that:
  - (a) They cannot operate the generating units at a level lower than 65% to 67% in view of the statutory provisions contained in the Air (Prevention and Control Pollution) Act, 1981 read with the Notifications issued thereunder and the requirements to follow the consent to establish/operate granted by the Maharashtra State Pollution Control Board from time to time. These are statutory mandates which the Petitioner is required to comply with;

- (b) They cannot comply with the Technical Minimum provided in the IEGC 4<sup>th</sup> Amendment Regulations, 2016 for maintaining the Generating Station at 55% of MCR/installed capacity, without being exposed to serious financial and other consequences provided in the DSM 4<sup>th</sup> Amendment Regulations, 2018;
- (c) They are required to sustain the operation of the Gas Power Units in a manner consistent with the technical requirements of 9FA Turbines and those provided in the agreement with GE Energy (OEM) failing which the Petitioner would not have the technical support required for operating the generating stations. The consequences of the same would be severe not only to the Petitioner, but also to the public interest; and
- (d) There are conflicting requirements under the provisions of the Air (Prevention and Control of Pollution) Act, 1981 and the Notification issued thereunder and the provisions of the IEGC 4<sup>th</sup> Amendment Regulations, 2016 requiring the Petitioner to maintain the Technical Minimum of 55%.

31. The Petitioner has submitted that in these special and extraordinary circumstances, considering the features of the advanced 9FA Class of Gas Turbines installed by the Petitioner, air pollution control issues and OEM contract issues, it is imperative that the Petitioner operates each of the three blocks of the generating station at a level not lower than 65% to 67% of the installed capacity block-wise and that the Petitioner is not subject to the Technical Minimum of 55% provided in the IEGC 4<sup>th</sup> Amendment Regulations, 2016.
32. The Petitioner has submitted that a similar issue on the need for modifying the Technical Minimum specified at 55% has arisen in the case of *NLC India Limited (Petition No. 144/MP/2017)* and the same is under consideration of the Commission.
33. The Petitioner has submitted that the environmental requirements of operating the power generating units of the Petitioner at 65% to 67% is a valid and justified ground for upward revision of the Technical Minimum in the case of Gas Power Generating Units from 55% to 65% - 67%.

34. The Petitioner has submitted that they are subjected to huge penalties provided under the DSM 4<sup>th</sup> Amendment Regulations, 2018 and the Petitioner suffers on account of the necessity to continue to operate the power plant at a minimum level of 65% to 67%.
35. The Petitioner has submitted that the Commission may consider the present petition on an emergent basis to release the Petitioner from financial and other liabilities provided under the DSM 4<sup>th</sup> Amendment Regulations, 2018 and allow the Petitioner for relaxation of operations of the generating station at a Technical Minimum of 65% to 67%. The Commission may also exercise the power to remove difficulties to provide for the Technical Minimum of 55% to 65-67% for the Ratnagiri Gas Power Station in view of the circumstances mentioned above.

**Submissions of the Respondent No. 1 & 2**

36. The Respondents 1 & 2 have submitted that the concerns expressed by the Petitioner & similar other generating stations have already been dealt with by the Commission in the Statement of Reasons (hereinafter referred to as 'SOR') dated 06.04.2016 w.r.t. the IEGC 4<sup>th</sup> Amendment Regulations, 2016. Relevant extracts of the said SOR are reproduced below for reference:

*“10.3.5 We appreciate the concern of the generators and the difficulties in unit operations due to technical minimum scheduling to the extent of 55% of MCR capacity but the question is whether it is avoidable under the changed conditions under which power system has to operate now and perceivable future The answer is there is perceivable change in the conditions. Earlier under acute shortage situation units once available were getting full schedule and the supply of domestic coal was also not in short supply most of the time. As such, the most of stations in the country use to run as base load stations except in eastern region where due to lack of demand units were required to be back down and taken under reserve shut down. However, the position has changed drastically in recent years and power deficit has come down drastically to about 3.57% in 2014-15 due to large capacity additions during XI and XII plans. Then there is lot of capacity addition of renewable sources of energy and there is an ambitious plan to add about 175 GW of generation capacity based on renewable energy sources by 2022 (100 GW of Solar plus 60 GW of Wind and balance others). Further there is shortage of domestic coal requiring blending of*

*imported coal.....*

*The grid frequency is also remaining close to 50 Hz most of the time or above 50 Hz for substantial period. Under these circumstances higher scheduling than the technical minimum cannot be ensured all the time. ....*

*Therefore, relying on the CEA recommendations we are not inclined to change the limit of technical minimum schedule corresponding to 55% of the Installed capacity of unit. However, considering the concerns of generators in operating their unit at such low schedule corresponding to 55% of Installed capacity due to various technical constraints the generator will have the option to take its unit in reserve shut down at schedules below 55%. However, Commission is of the view that the generator should be adequately compensated for the loss of operational Parameters due to operation of units at such technical minimum load below the normative operational level of 85%.”*

37. The Respondents have submitted that the Commission has since recognised & highlighted the changing scenario of power system operation with transition from power deficit scenario to a temporary surplus scenario with fast generation capacity addition during the past decade and a renewed thrust on renewable energy integration under the ambitious Government of India target of 175 GW renewable energy (hereinafter referred to as ‘RE’) capacity addition by 2022.

38. The Respondents have submitted that in the context of changing environment, for facilitating large scale integration of variable RE generation, the need for flexibility from the existing generation fleet has been abundantly recognized by the policy makers and planners. The technical committee of MoP, Govt. of India, on Large Scale Integration of Renewables, in its April 2016 report has emphasized on the need for flexibility. Relevant excerpts are given under:

*“8. Harnessing and Incentivizing Flexibility*

*“Flexibility in existing fleet of conventional generation as well as Pumped Storage Plants, Demand Side Management may be utilized for meeting changing load profile and maintaining system stability. Regulatory intervention is required to incentivize flexibility of conventional generation. Flexibility requirements should encompass the minimum and maximum generation level as well as the ramp up/down rates. The introduction of Flexible Generation Planning and Flexible Generation Obligation may be explored in the future.”*

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*Similarly, the Niti Aayog, Govt. of India has highlighted the need for promoting flexibility in its “Report on India’s Renewable Electricity Roadmap 2030” (issued in February 2015) wherein it has recommended mechanisms for compensation of flexible resource providers. Relevant extracts are quoted under:*

*“Power systems, especially those with a high share of RE, require access to sufficient flexible resources (e.g., demand response, gas turbines, hydroelectricity, etc.) to ensure continued stability of the grid at each moment.....*

*Finally, mechanisms for fair price discovery and compensation of flexible resource providers (e.g. ancillary services) need to be established....”*

39. The Respondents have submitted that the Commission has brought forth the much needed regulatory framework in the form of the IEGC 4<sup>th</sup> Amendment Regulations dated 06.04.2016, by specifying norms for technical minimum generation level for the thermal and gas power stations. Further, the Commission has provided adequate norms for compensating part load operation by thermal / gas power stations thereby incentivising the flexibility rendered by those stations in the changed scenario of system operation.
40. The Respondents have submitted that the IEGC 4<sup>th</sup> Amendment Regulations, 2016 also gives ample freedom to the generating stations to take their units under reserve shut down while compensating for costs involved in start-up fuel cost beyond seven start/stop in a year.
41. The Respondents have submitted that the above provisions of the IEGC 4<sup>th</sup> Amendment Regulations, 2016 have significantly improved flexibility in system operation while giving enough freedom to thermal/gas generators to either operate at part load with compensation or avail reserve shut down under a low demand and low requisition scenario. Further, being a gas fired power station, the petitioner is expected to provide greater flexibility compared to thermal power stations.
42. The Respondents have submitted that they have found the provisions for technical minimum generation level for thermal/gas power stations as specified in the IEGC 4<sup>th</sup> Amendment Regulations, 2016 to be highly beneficial in ensuring flexibility and availability of spinning reserves required for reliable system operation in the changing power scenario in the country.



### **Submissions through Rejoinder by the Petitioner**

43. The Petitioner has reiterated the submissions already made through the Petition and as such, the same have not been reproduced herewith for the sake of brevity. The Petitioner has further submitted that the Gas Turbines are most suited for flexible operation but within their technical operating range and without violation of other laws. However, provisions as contained in Section 6.3B of the IEGC Fourth Amendment Regulations, 2016 prescribing a technical minimum of 55%, cannot be given effect to, in violation of other applicable laws, namely the emission norms (Nitrogen Oxide - NOx) as specified by the Maharashtra Pollution Control Board, the provisions of which have to be mandatorily complied with in terms of the Air (Prevention & Control of Pollution) Act, 1981.
44. The Petitioner submitted that the reasons cited by this Commission (as quoted by Respondent No. 1 and 2) for giving effect to the Technical Minimum deal with the commercial concerns raised by the Generators in respect of the loss in Station Heat Rate, Auxiliary Consumption etc. on account of partial loading. At no instance, did this Commission prescribe/stipulate that the provisions of IEGC 4<sup>th</sup> Amendment Regulations, 2016 should be given effect to, even if it amounts to a violation of other laws. As stated in the Petition, owing to the peculiar configuration of the advanced 9 FA Class Machine with DLN-2 + (Dry Low Norm) Combustors, the NOx emissions are much higher when operated at a load less than 120 MW. In the circumstances, the reasoning given by this Commission in the paras relied on by Respondent No. 1 and 2 cannot be extended to include within its scope violation of the Environmental norms. Accordingly, the compensation due to a Generator for operating at Partial Load and the option of taking the generator under Reserve Shutdown, is not applicable to the facts of the present case.
45. The Petitioner has submitted that Sub Section (5) of the Amended Section 6.3B notified in the IEGC 4<sup>th</sup> Amendment Regulations, 2016 itself recognizes that the generator shall keep a check on the emissions on account of partial loading:
- “5. The generating company shall keep the record of the emission levels from the plant due to part load operation and submit a report for each year to the Commission by 31st May of the year.”*
46. The Petitioner has submitted that they are currently supplying around 500 MW to the Indian

Railways. The said 500 MW is met through a Block comprising of two Gas turbine and one Steam turbine having a cumulative capacity of 663.54 MW (2x213 +1x 237.54). The technical minimum specified by this Commission (at 55%) is beyond the operating range of the gas turbines. The Gas turbines of the Petitioner cannot be operated below 120 MW, as it will lead to higher NOx emissions in violation of the environmental norms specified by Maharashtra Pollution Central Board. As per the (Advance 9 FA) design, the technical minimum generation requirement of the machine is 420 MW (ex-bus). Any generation below 420MW for a Block or less than 120MW for a unit leads to an increase in NOx emission. The said position has been corroborated by the OEM - M/s. GE as stated in their letter dated 4.01.2019.

47. The Petitioner has submitted that in many time blocks the Petitioner is getting “-ve” RRAS schedule to the tune of 355/378 MW. Accordingly, in order to maintain the NOx level in compliance with the norms specified by the Maharashtra Pollution Control Board, the Petitioner has to increase the load to 420 MW, which amounts to a violation of the Technical Minimum norms set by this Commission. Further, due to the continuous negative (-) RRAS (below 420 MW) for more than six time blocks, the Petitioner is paying additional penalties as per the DSM 4<sup>th</sup> Amendment Regulations, 2018.
48. The Petitioner has submitted that in this context and on account of the low RRAS schedule given by RLDC, the Petitioner has been incurring revenue losses. Therefore, any violation of norms/laws by the Petitioner is traceable to the actions of Respondent No. 1.
49. The Petitioner has submitted that flexible operation within the technical operating range of their Plant machines include, (i) Full Block Capacity of power plant = 663.54 MW (2 Gas Turbine of capacity 213 MW + One Steam turbine capacity of 237.54 MW), (ii) Ex bus generation =647 MW (Less 2.5% APC of 663.54 MW). The Petitioner has submitted that the technical minimum gross generation could be equivalent to 430 MW (120+120+190), which corresponds to 65% of the full Block capacity.
50. Due to the specific circumstances of the project, the Petitioner has prayed that this Commission be pleased to exercise its powers of relaxation and grant the relief, as prayed for by them.

### **Hearing held on 10.01.2019**

51. During the hearing held by the Commission on 10.01.2019, the Petitioner submitted that the present Petition has been filed for seeking modification of technical minimum loading of the gas turbines of the Petitioner at 65% to 67% of the MCR/capacity in place of 55% provided in the IEGC 4<sup>th</sup> Amendment Regulations, 2016. When load is reduced below 120 MW, the combustion mode changes from the Premix Steady State to Piloted Premix mode and NOx levels in the Piloted Premix mode of combustion are more than 160 PPM (corrected) which is much higher than the permissible limit under the Air (Prevention and Control of Pollution) Act, 1981. The Petitioner requested the Commission to pass ad-interim ex-parte order to allow the Petitioner to operate the gas turbine at a level not lower than 65% to 67% till the decision in the petition. The Commission admitted the Petition and directed to issue notices to the Respondents and directed the staff to refer the matter to CEA and obtain its expert opinion in the matter.

### **Submissions of the Central Electricity Authority**

52. In pursuance to the directions of the Commission, the Central Electricity Authority (CEA) submitted its report vide letter dated 14.06.2019, in which it was, inter alia, recommended that:

- a. The technical minimum load of RGPPL's CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system, for MPCB stipulated NOx emission compliant operation without making major modification in the combustion system, should be set at 62% of CCGT rated load (corresponding to about 52% GT loading).
- b. The technical minimum load of individual CCGT module can be reduced below the 62% value @ 1.5% point for every 10 deg F reduction in set point of combustion reference temperature if achieved by GE during DLN tuning of RGPPL's 9FA machines at Dhabol in near future.
- c. If major modifications are carried out in a module in terms of complete replacement of combustion hardware from present DLN 2/2+ to DLN 2.6+, the module can be operated below the level of 60% CCGT load with NOx emission within the stipulated limit.

### **Hearing held on 25.11.2019**

53. In the hearing held on 25.11.2019, the Petitioner submitted that pursuant to the direction of the Commission, Central Electricity Authority (CEA) has given its report in which CEA inter alia has recommended that the technical minimum load of RGPPL's CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system, for MPCB stipulated NOx emission compliant operation without making major modification in the combustion system, should be set at 62% of CCGT rated load (corresponding to about 52% GT loading). The Petitioner submitted that the above recommendation is predicated on a unit capacity of 663.54 MW. In so far the Block-1 capacity is concerned, the same is 640 MW (2X250 MW GTs+1X230 MW ST) and not 663.54 MW. Accordingly, if the unit is to function at a load of 420 MW, then 420 MW out of 640 MW works out to 65.62%. Therefore, the Petitioner's plant should be allowed to run at a technical minimum of 65.62%. The Commission reserved the petition for Order.

### **Analysis and Decision**

54. After hearing the submissions of the parties, the Commission considered the prayer (b) of the Petitioner for upward revision of technical minimum to a level not lower than 65% to 67%, to sustain operation without being subjected to penalties and charges provided in the Fourth Amendment to the DSM Regulations, 2018, citing the technical difficulties being faced by the generating units of the petitioner. The Commission has observed the following from the report of CEA:

- a. As per CERC Regulations, technical minimum load for operation of thermal power plants (coal, lignite and gas / liquid fuel based stations) is 55% of rated load. It is understood that this has been set as per normal capability of existing coal based stations without requiring any major modification in plant equipment / systems.
- b. In case of coal / lignite based stations, the flame stability is the constraint for achieving a lower minimum load of the unit. However, in case of Dry Low NOx (DLN) combustor based gas / liquid fuel based stations, there is no such constraint, but the limitation comes from sharply increased NOx emission below a

preset load of GT as per change of combustion mode from pre-mix mode to piloted premix mode which is governed by a calculated combustion reference temperature.

- c. The manufacturer's (M/s GE) technical document (No. GER-3568G) indicates this change over load for DLN 2/2+ combustion system as 50% GT load, below which the NOx emission is indicated to sharply increase from level of 25 ppm to about 100 ppm.
- d. As such, the reference for consideration of technical minimum load for DLN 2/2+ combustion based plants (maintaining NOx emission level without requirement of major plant modifications) should be the changeover load (50% GT load) and to provide for some operational margin, the same should be set as 52% GT load with corresponding CCGT / plant loading taken as 62% (vis-à-vis technical minimum load of 55% for coal based stations).
- e. Data from manufacturer (M/s GE) was sought on the components of GT & ST outputs at part loading upto 50% CCGT loading. The data received was analysed and it was observed that for CCGT loading of 55%, the individual GT loading amounts to 43.7% which is much below the minimum GT loading of 50% of premix / premix steady state (PMSS) mode required for NOx emission within stipulated limit.
- f. For GT loading of 49.5%, the CCGT loading corresponds to 60%. Thus, for keeping individual GT loading at 50% or above, the CCGT loading needs to be kept above 60%.

55. Accordingly, CEA's recommendation with respect to upward revision of technical minimum of RGPPL's CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system is as follows:

- a. The technical minimum load of RGPPL's CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system, for MPCB stipulated NOx emission compliant operation without making major modification
-

in the combustion system, should be set at 62% of CCGT rated load (corresponding to about 52% GT loading).

- b. The technical minimum load of individual CCGT module can be reduced below the 62% value @ 1.5% point for every 10 deg F reduction in set point of combustion reference temperature if achieved by GE during DLN tuning of RGPPL's 9FA machines at Dhabol in near future.
- c. If major modifications are carried out in a module in terms of complete replacement of combustion hardware from present DLN 2/2+ to DLN 2.6+, the module can be operated below the level of 60% CCGT load with NOx emission within the stipulated limit.

56. After consideration of the above observations based on the technical issues as brought out by the Petitioner and recommendations as submitted by CEA in its report, the Commission is of the view that technical minimum of 55% as per the IEGC 4<sup>th</sup> Amendment Regulations, 2016 is not sustainable for CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system for MPCB stipulated NOx emission compliant operation.

57. Accordingly, the Commission, in line with the recommendation of CEA, is inclined to agree that technical minimum of 62% (corresponding to 52% GT loading) CCGT rated load may be allowed for RGPPL's CCGT plant modules at Dhabol, having GE make 9FA machines provided with DLN 2/2+ combustion system.

58. The Commission, in exercise of its powers to relax under Part 7 (4) of IEGC Regulations, 2010, hereby allows Technical Minimum loading of the Gas Turbines of the Petitioner at 62% of the MCR/capacity in place of 55% provided in the Indian Electricity Grid Code (Fourth Amendment) Regulations, 2016.

59. With regard to prayer (c) for ad-interim exparte Order, the said prayer has become infructuous since the petition has been disposed of finally in terms of the directions in this Order.

60. With the above directions, Petition No. 8/MP/2019 stands disposed of.

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सदस्य

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