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NEW DELHI

Petition No. 357/MP/2023 and Petition No. 66/GT/2024

Coram:

Shri Jishnu Barua, Chairperson
Shri Ramesh Babu. V, Member
Shri Harish Dudani, Member

Date of Order: 30th March, 2025

Petition No. 357/MP/2023

IN THE MATTER OF:
Petition under Sections 79 (1)(a) and 79(1)(f) of the Electricity Act, 2003 along with CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulation 2020 as amended in the matter of fixation of final tariff for the 92 MW floating solar Photo Voltaic Plant at Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam, Kerala.

AND IN THE MATTER OF:
Kerala State Electricity Board Limited (KSEBL)
Vydyuthi Bhavanam, Pattom,
Thiruvananthapuram
Kerala-695004

……Petitioner

Versus

NTPC Ltd.
NTPC Bhawan
Core-7, Scope Complex
7, Institutional Area, Lodhi Road
New Delhi-110 003 **……Respondent**

Petition No.66/GT/2024

IN THE MATTER OF:
Petition under Section 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter-V of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999

along with Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 for determination of project specific levelized tariff for 92 MW floating solar Photo Voltaic Plants in two phases (first phase 22 MW and second phase 70 MW) at Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam, Kerala

AND IN THE MATTER OF:

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

Versus

Kerala State Electricity Board Limited (KSEBL)
Vydyuthi Bhavanam, Pattom,
Thiruvananthapuram
Kerala-695004

……Respondent

Parties Present: Ms. Swapna Seshadri, Advocate, NTPC
Ms. Ritu Apurva, Advocate, NTPC
Mr. Karthikeyan Murugan, Advocate, NTPC
Ms. Sanjeevani Mishra, Advocate, NTPC
Shri M.S. Nagar, NTPC
Ms. Sheela, NTPC
Shri Anand K. Ganesan, Advocate, NTPC
Shri Priyanshu Tyagi, Advocate, KSEBL
Shri Prabhas Bajaj, Advocate, KSEBL
Shri Ritvik Mathur, Advocate, KSEBL

ORDER

1. Kerala State Electricity Board Limited (KSEBL), the Petitioner in Petition No.357/MP/2023 and the Respondent in Petition No.66/GT/2024, is an integrated State Public Sector power utility company constituted by the State Government which carries out Generation, Transmission and Distribution functions through three strategic business units.
2. The NTPC Limited (NTPC), the Respondent in Petition No.357/MP/2023 and the Petitioner in Petition No.66/GT/2024, is a ‘Generating Company’ as defined under Section 2(28) of the

Electricity Act, 2003 and operates power stations/projects across different regions and places in the country. Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam is one such plant located in the State of Kerala from which the generated power is supplied to the Kerala State Electricity Board Limited (KSEBL).

3. Petition No.357/MP/2023 is filed under Sections 79 (1)(a) and 79(1)(f) of the Electricity Act, 2003 along with the CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations2020 as amended in the matter of fixation of final tariff for the 92 MW Floating Solar Photo Voltaic (SPV) Plant("Project") at Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam, Kerala by KSEBL. While, the Petition No. 66/GT/2024 is filed under Sections 62 and 79 (1) (a) of the Electricity Act, 2003 read with Chapter V of the Central Electricity Regulatory Commission (Conduct of Business) Regulations, 1999 along with the Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 for determination of project specific levelized tariff for the said project by the NTPC.

4. The Petitioner KSEBL in Petition No. 357/MP/2023 has made the following prayers:

   KSEBL humbly request Hon'ble Commission that the provisional tariff fixed for the 92MW floating solar project at RGCCPP, Kayamkulam may kindly be reviewed and final tariff be fixed considering the submissions of KSEBL

5. The Petitioner NTPC in Petition No.66/GT/2024 has made the following prayers:

   (a) Approve/ determine the revised levelized tariff of Kayamkulam 92 MW floating solar PV project for the tariff period.
   (b) Allow the recovery of filing fees as & when paid to the Hon'ble Commission and publication expenses from the beneficiaries.
   (c) Give liberty to execute works related to motorable road and security related works and same shall be recovered from tariff on mutually agreed methodology between NTPC and KSEBL.
   (d) Pass such other further orders which this Hon'ble Commission may deem just in the facts and circumstances of the present case.

Brief Background:

6. A Memorandum of Understanding was signed between KSEBL and NTPC on 11.05.2018 to explore the possibility of setting up renewable power generation projects, more specifically land-based and floating solar plants, subject to their feasibility in the State of Kerala.

7. Based on the MoU, NTPC initiated the bidding process for selection of EPC contracts for setting up 92 MW Floating Solar Photo Voltaic Plants in two phase (first phase 22 MW and second phase 70 MW) at Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam, Kerala, through two separate International Competitive Bidding (ICB) based

tenders. The successful bidders selected for 22MW and 70MW were Bharat Heavy Electricals Limited and Tata Power Solar Systems Limited, respectively.

8. The total capacity of 92 MW was tendered in two phases. However, a single PPA was signed with KSEBL for a total capacity of 92 MW.

9. KSEBL and NTPC signed a draft Power Purchase Agreement (PPA) agreeing to the terms and conditions set therein for the procurement of power from the project. According to Article 6 of the draft PPA, the tariff will be computed based on the EPC cost discovered through competitive bidding. Further, the tariff payable by the KSEBL for the energy up to a maximum 28% CUF supplied at the delivery point from the Kayamkulam floating SPV Project will be Rs. 3.16 per kWh, subject to the approval of the Kerala State Electricity Regulatory Commission (KSERC).

10. Accordingly, KSEBL filed a Petition before KSERC for approval of the draft PPA for the Kayamkulam MW floating SPV Project. The KSERC, vide its Order dated 24.07.2019 in Petition No. OP 46/19, observed that as per Clause (a) of Sub Section (1) of Section 79 of the Electricity Act, 2003 (in short, “the Act”), the authority for determination of tariff of electricity generated from the said project installed by the Petitioner was vested with the Central Commission and granted provisional approval to the draft PPA subject to the modifications under Article 6.1 of the draft PPA in such a way that the Respondent tariff for the said project would be either mutually agreed.

11. KSERC, vide its Order dated 24.07.2019, directed that the tariff for the electricity generated from the 92 MW floating solar plant to be developed by the Petitioner at its RGCCPP at Kayamkulam shall be the lower of the tariff to be determined by this Commission based on a petition filed by the Petitioner as per the provisions of the Act or the mutually agreed tariff of ₹3.16/unit between the KSEBL and NTPC, whichever is lower.

12. Accordingly, NTPC had filed a Petition No. 341/GT/2019 before the Commission for the determination of tariff of the Project as directed by the KSERC and as per the provision incorporated in the final PPA signed by the parties on 28.08.2019.

13. The Commission initially determined the interim tariff for the electricity generated from the 92 MW Kayamkulam Floating Solar Plant (“Project”) of the Petitioner at Rs. 2.94 per kWh in its Order dated 09.05.2022 in Petition No. 341/GT/2019. However, since the project had not been commissioned at that time, the Commission granted the Petitioner the liberty to approach this Commission with a detailed breakdown of actual costs and other relevant parameters, if required.

14. Thereafter, the 92 MW Kayamkulam floating SPV Project achieved its Commercial Operation Date (CoD) on 24.06.2022.

Petition No. 357/MP/2023

Submission by the Petitioner, KSEBL, in Petition No. 357/MP/2023

15. The Petitioner KSEBL, in Petition No. 357/MP/2023, has submitted the following:

(i) KSEBL and NTPC entered into a Power Purchase Agreement (PPA) on 28.8.2019 for the procurement of 92MW power from the floating solar plant of the Petitioner at Rajiv Gandhi Combined Cycle Power Project at Kayamkulam.

(ii) As per the PPA, the tariff for the electricity generated from the 92 MW floating solar plant to be developed by NTPC at its RGCCPP at Kayamkulam will be the lower of, the tariff to be determined by this Commission or the mutually agreed tariff of Rs 3.16/unit between the KSEBL and the NTPC, whichever is lower.

(iii) Accordingly, the NTPC had filed petition No. 341/GT/2019 for the determination of tariffs for the Kayamkulam floating SPV Project. At the time of filing the said petition, the entire 92MW project was not commissioned. Therefore, this Commission had fixed the interim tariff of Rs.2.94 per kWh for the entire 92 MW floating solar project subject to the liberty to NTPC to approach the Commission with a detailed break-up of actual cost and other parameters, if required.

(iv) Subsequently, the project was commissioned on 24.06.2022. However, NTPC has not so far filed any petition before the Commission for the determination of the final tariff of the project.

(v) Further, the Commission in its Order on interim tariff for the Project in Petition No 341/GT/2019, while approving the capital cost of Rs. 518.76 Crore for the 70MW Project, had included Rs. 50.77 crore towards infrastructure cost for construction of the motorable road for the 70MW floating solar project. However, even two years after the commissioning of the project, NTPC has not built any motorable road, and hence, the cost approved in the Capital Cost of 70MW towards the construction of such a motorable road needs to be deducted when finalising the tariff for the said project.

(vi) Such a huge expenditure for road construction is unwanted as the 50MW cluster (out of 70 MW) has access on three sides, and the fourth side of this 50MW (out of 70 MW) opens to the backwaters, which are already accessible. Further, the remaining part of the floating solar plant can be accessed by boat from this side.

(vii) The maintenance of inverter and transformer which are housed in 10 platforms will require the towing of these floating platforms on which it is housed and the proposed road will be a hindrance to its movement unless an elevated bridge is also constructed.

(viii) The proposed road would have been necessary during the construction of the floating solar plant for transporting men, material, and machinery like solar panels, inverters, transformers, materials for ferrocement platforms, etc. However, all these components were transported, and the plant was commissioned without this road. For O&M, boat access is available.

(ix) NTPC may explore more economical solutions to provide protection to the solar plant rather than costly bund structures, which will hinder the natural flow of water and cause environmental issues.

(x) It is, therefore, requested that the provisional tariff fixed for the 92MW floating solar project at RGCCPP, the Kayamkulam project, may be revised, and the final tariff may be fixed duly considering the submission made by KSEBL.

<u>Submission by the Respondent, NTPC, in Petition No. 357/MP/2023</u>

16. The Respondent, NTPC in Petition No. 357/MP/2023, has submitted the following:

(i) The contentions of the Petitioner about not filing the Petition for the determination of the final tariff for the project even after commissioning the project on 24.06.2022 are wrong and denied.

(ii) The petition for the determination of the Final Tariff of the said project had been filed under the head of 'Miscellaneous Petition' on 22.08.2023, bearing Diary No. 347 of 2023. Pursuant to the filing of the above petition, the Registry of the Commission had directed the Respondent to file the same under the head of 'Generation Tariff.' Accordingly, a Petition under the head of 'Generation Tariff' bearing Petition No. 66/GT/2024 has been filed before the Commission seeking determination of project-specific levelized tariff for 92 MW Floating Solar Photo Voltaic Plants at RGCCP, Kayamkulam, Kerala. Further, when the present matter was listed before the Commission on 13.03.2024, the aforementioned developments were brought to the knowledge of the Commission.

(iii) The Commission on hearing NTPC (on 13.03.2024) had clubbed the present Petition and the Petition No. 66/GT/2024 and directed the parties to complete their pleadings in both these matters.

(iv) KSEBL's prayer in the present petition was to fix the final Tariff for the Project. Whereas in light of the aforementioned, since the petition for the determination of tariff has already been filed by NTPC and has been listed for hearing on 06.08.2024, KSEBL's prayer does not survive, and the present petition becomes infructuous.

<u>Hearing dated 13.03.2024 in Petition No. 357/MP/2023</u>

17. During the course of hearing held on 13.03.2024, the learned counsel for NTPC, submitted that it had already filed Petition No. 66/GT/2024 before this Commission seeking final determination of tariff for 92 MW floating solar PV Plant at Rajiv Gandhi Combined Cycle power Project (RGCCP) and the same is yet to be heard. The learned counsel for KSEBL submitted that the present Petition (357/MP/2023) may be listed and heard along with Petition No. 66/GT/2024 and may be disposed of by a common order that was not objected to by the learned counsel of the NTPC. The Commission admitted the petition and directed that the petition shall be clubbed with Petition No.66/GT/2024 (filed by NTPC), and the parties are directed to complete their pleadings.

As per the direction in the ROP dated 13.03.2024, Petition No. 66/GT/2024 and Petition No. 357/MP/2023 were heard together on 13.08.2024, 30.09.2024, 17.10.2024, and 14.11.2024. The submissions made by both the parties in the Petitions have been outlined in the subsequent paras while dealing with Petition No. 66/GT/2024.

Petition No.66/GT/2024

Submission of the Petitioner, NTPC in Petition No. 66/GT/2024

18. The Petitioner, NTPC in Petition No 66/GT/2024, has submitted as follows

(a) The project was delayed by 19 months from the date of Scheduled Commercial Operation Date (SCOD), i.e, 23.11.2020, with regard to the First Phase (22 MW) and by 13 months from the date of SCOD, i.e, 23.05.2021, with regard to the Second Phase (70 MW). The said delay was mainly caused on account of unforeseen reasons such as COVID-19 pandemic, intervention of local union leaders (delay period: 01.07.2020-24.02.2021), disruption in supply of modules, delay in grant of connectivity (delay period: February 2020- November 2020) and suspension of the approved metering scheme (delay period: July 2021-March 2022). The Petitioner also requested the Commission to condone the said delay of around 19 months and 13 months for the commissioning of the 22 MW and 70 MW floating solar projects, respectively. KSEBL, vide its letter dated 11.10.2022, extended the Scheduled Commissioning Date of the project up to 30.06.2022.

(b) NTPC filed the present Petition with detailed break-up of actual costs and other parameters and also requested to consider the module degradation of 0.7% per annum, Auxiliary Power Consumption of 0.75%, System Unavailability of 1.25% for calculation of annual generation for 25 years of project life, along with additional expenditure of Rs. 50.77 Crore towards construction of 7 KM long motorable road to have access to waterbodies for 70 MW Phase-2 project.

(c) NTPC proposed to construct a motorable road around the Project areas for proper approach at an estimated cost of INR 50.77 Crores. NTPC further submitted that the Superintending Officer of Irrigation South Circle visited the site and proposed a Bund with a motorable road since they are not surrounded by land. According to the NTPC, the 92 MW solar project is spread across three locations, having water bodies for 22 MW, 20 MW and 50 MW. The area for 22 MW is surrounded by land, whereas for the other two locations for 20 MW and 50 MW parts, the old existing boundary is badly damaged, which makes it accessible to local fishermen and susceptible to miscreants. The construction of the access road could not have been done earlier since it would have affected the installation of the Solar plant itself. NTPC has appointed a consultant to get the financial estimate of the work, and the said report is still to be received. NTPC may be granted liberty to execute the works, and the total cost incurred shall be recovered from tariff on the mutually agreed methodology between NTPC and KSEBL as a contingent measure

(d) Based on the actual costs and all the parameters considered, the tariff for the project prayed is Rs. 3.22/kWh.

Reply by the Respondent, KSEBL, in Petition No 60/GT/2024 dated 12.08.2024

19. The Respondent submitted the following:

(a) The phase-I project (22 MW) was delayed for 19 months, and the phase-II project (70 MW) was delayed for 13 months. The delay, as per the petitioner, was mainly due to COVID-19-related issues and the intervention of local union leaders. These events are force majeure events, and hence, the force majeure clause under the agreement becomes applicable. As per the mutually agreed PPA, approved by KSERC, in the event of a force majeure event, neither party will be liable for any claim for any loss or damages due to a force majeure event. Accordingly, any claim on cost incurred due to the delay in the commissioning of the project, including IDC during the delay period, cannot be passed on to the tariff.

(b) MNRE, dated 20.03.2020 and 17.04.2020, issued directions to treat the delay on account of disruption of the supply chain due to COVID-19 as Force Majeure and grant suitable extension of time for the projects. Accordingly, by applying the provisions of Force Majeure, the Scheduled Commission Date was extended to 30.06.2022 by KSEBL.

(c) Petitioner has not provided a break-up of the Capital Cost and hence difficult to ascertain the prudency of the investment. The details of liquidated damages, if any, recovered from the contractors are not mentioned. Capital Cost may be approved only after a prudence check and considering the prevailing market trends.

(d) The Petitioner has estimated an amount of Rs. 50.77 Cr for 7 km of motorable road for the 70 MW plant. On site inspection by officers of the Respondent, it was observed that the Petitioner has not constructed any kind of access road to the water bodies and floating solar panels for phase-II of 70MW, even after completing two years of the Commissioning of the project. Also, it is felt that there is no chance of constructing the access road in the future. More economical solutions, such as floating fencing with CCTV and boundary fencing, were suggested instead of costly bund structures. Hence, the infrastructure cost, which is not actually executed, may not be included in the tariff calculation.

(e) Any claim regarding Module degradation should be disallowed as there is no regulatory provision in this regard provided in the RE Tariff Regulations, 2020. Further, the project is generating more than 92 MW without showing any symptoms of degradation.

(f) The O& M cost for the first 3 years from COD is included in the EPC cost. The Petitioner has claimed Rs. 5 lakh/MW for the 4th year with a 3.87% escalation. The Commission, in its order dated 09.05.2022 in Petition No. 341/GT/2019, has considered the O&M expenses of Rs.3.5 lakh/ MW Year for both phase-1 of 22MW and phase-2 of 70 MW project. The O&M cost approved by the Commission in the Order dated 09.05.2022 in Petition No. 341/GT/2019 is adequate and is in accordance with the market trend. Further, it is submitted that the O&M cost involves water cleaning of solar panels twice a month. All the necessary pumping schemes have already been put in place.

(g) As per the Audited accounts furnished by the Petitioner in the petition, there is no equity infusion in the project. The Balance Sheet furnished by the Petitioner shows a loss of Rs. 1.44 Cr. Thus, the Petitioner is not eligible for claiming equity and is eligible only for a normative loan, and as per the account statement furnished by the Petitioner, there is no actual infusion of equity. Hence, the Petitioner is not eligible to claim any RoE.

(h) The Petitioner may be directed to avail CDM benefit and share it with the beneficiaries. The Commission may consider the benefit of accelerated depreciation while determining the tariff.

(i) As per the PPA, the metering will be done at the interconnection point, which is the interface point of the project with the STU/CTU transmission network at 220 KV level at the existing premises of RGCCP. At present, 5 numbers of 220 kV evacuation lines are available in the plant. The power generated from the Project can be evacuated through these feeders, and thus, there exists a strong backup network. Hence, the system unavailability claim of the Petitioner is not correct. Further, the Petitioner has not furnished any supporting documents for proving the system unavailability of 1.25%. As per the report of the State Transmission Utility of Kerala, the system availability is 99.9%.

(j) The discount factor may be computed with a debt-equity ratio of 100:0 as the Petitioner has not infused any equity in this project.

<u>Hearing held on 13.08.2024</u>

20. During the course of the hearing, the learned counsel for the Petitioner requested two weeks' time to file its rejoinder to the reply filed by the Respondent, KSEBL. The Commission granted permission for the rejoinder to be submitted.

<u>Rejoinder submitted on behalf of the Petitioner, NTPC, on 18.09.2024</u>

21. The Petitioner submitted the following rejoinder on the reply filed by the Respondent, KSEBL, dated 12.08.2024:

(a) The uncontrollable time and cost over-run caused in the Project is due to Force Majeure events that were faced by NTPC during the construction phase. Once the events qualify as force majeure, NTPC becomes entitled to the IDC and IEDC qua the delay in the SCOD of the project. The issue of claiming the IDC & IEDC on account of the force majeure is no more res-integra on account of the passage of various Orders/ judgments by this Commission, as well as by the Appellate Tribunal for Electricity. Therefore, the principle for awarding the IDC and IEDC is that the Project must suffer from a 'delay' that is not attributable to the Project, i.e., it should be on account of force majeure. NTPC had no option but to incur additional IDC for the periods when the commissioning of the Project was delayed due to Force Majeure events as detailed in the petition.

(b) NTPC, in line with the relief granted by MNRE vide its Office Memorandum dated 13.08.2020, wrote several letters to KSEBL. On 11.10.2022, KSEBL accepted the request of NTPC and extended the SCOD to 30.06.2022.

(c) With regard to the liquidated damages, it is submitted that it has not recovered any liquidated damages as of now. As and when the same is recovered, the details will be provided by NTPC.

(d) The proposed road has not been constructed on date. However, since there is no physical barrier in the water body, the local fishermen have access to the Floating Solar Plant in both the 20 MW and 50 MW areas. There are reported theft cases and damage to the property at regular intervals. The damaged solar PV modules are replaced, leading to additional O&M costs. There are instances of cable thefts (earthing wire), which pose a safety hazard for the O&M personnel working in the Floating Solar Plant.

(e) NTPC has explored various options for a boundary fence to be constructed in the water body. It had also approached the Irrigation department of the Government of Kerala for suggestions on the construction of a boundary fence. NTPC had assigned the work for the Design of Boundary System to LBS Institute of Technology for Women, Thiruvananthapuram, on 12.01.2023; the consultant submitted the Report on 23.08.2024, which is being reviewed by NTPC for final acceptance. Therefore, NTPC requested that the additional expenditure to be incurred in the future for the security of the Plant be allowed.

(f) On the issue of granting the module degradation factor, NTPC submitted that degradation is the inherent property of the module. The annual degradation of the PV modules technology installed at the said plant varies from a minimum of 0.7% and can exceed 1% in some cases. The Standard clause for Module degradation (@0.7% per annum) had been part of the Tender Specification of the Kayamkulam Floating Solar project, based on which the EPC cost has been discovered.

(g) After considering the Annual degradation of 0.7%/ per year, the CUF of the project for Phase-1 of 22 MW project and Phase-2 of 70 MW is 20.71 % and 22.47%, after 25 years, which is in line with the minimum CUF criteria of 19% as per the above CERC regulation.

(h) The Operation and Maintenance (O&M) cost claimed is on the basis of the cost incurred by it, and the same ought to be allowed after a prudence check. The cost is not only restricted to water cleaning of solar panels but also includes many other components. The cost of O&M of a Floating Solar Plant is higher than the O&M cost of land-based Solar Plants.

(i) The NTPC project faces several challenges in maintaining its operations. Migratory birds using the solar panels as resting spots lead to reduced output and increased module cleaning due to bird excreta. Additionally, rats often bite through solar cables, exposing high-voltage connections, which poses a safety hazard to personnel and can result in ground faults, complicating fault detection and repair. Damage to cable insulation can also cause short circuits, potentially igniting fires that threaten both the infrastructure and safety, as the combustible floaters are made of HDPE. Furthermore, the brackish and saline water environment accelerates the corrosion of equipment. Seasonal changes introduce additional complications, such as the influx of waterborne hyacinth, which obstructs access to the plant. It has placed the contract for O&M of its ground-mounted Solar project wherein the cost of O&M is Rs. 5 Lakh per MW annually.

(j) CDM benefit will be shared by the beneficiaries, as accorded in the PPA.

(k) The actual equity and debt invested in the ratio of 69:31. The station’s standalone balance sheet does not reflect the equity infusion whereas the consolidated Share Capital & Equity is being reflected in the Consolidated Balance Sheet of NTPC as a whole which in turn is applied in the standalone station wherever required and the ROE will be calculated in terms of the PPA and in line of the CERC Renewable Energy Regulations, 2020.

(l) The Solar PV Project, consisting of Modules, Inverters, Inverter Transformers, Cables, Power Transformers, Switchyard, etc., is a static system, analogous to a Transmission system. Any system is prone to failure and has its own Availability factor. Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 stipulates a Normative Annual Transmission availability factor of 98% for the recovery of Fixed Cost. Similar to the Transmission System, the Availability factor needs to be considered for the Floating Solar PV system. In view of the above, a System Unavailability of 1.25% is requested to be considered for the calculation of Annual Generation for 25 years of Project Life.

<u>Hearing held on 30.09.2024 and 17.10.2024</u>

22. Based on the consent of the learned counsel for both parties, the matter was adjourned.

<u>Hearing held on 14.11.2024</u>

23. During the course of the hearing, the Commission directed the Petitioner, NTPC to provide a detailed break-up of the actual capital cost along with an explanation for the delay in the SCOD, its cost implications (IDC & IED), and any liquidated damages recovered or to be recovered from the EPC contractors. NTPC was also directed to submit documents on equity and debt arrangements, including Board approvals, loan details, interest rates, and payment terms. Justification for deviating from the approved 80:20 debt-equity ratio and explanation for the increase in O&M costs from ₹3.5 Lakh/MW/Year to ₹5 Lakh/MW/Year were also sought. The Commission further directed the Petitioner to provide actual data on auxiliary power consumption and generation details, transmission system unavailability, justifications for motorable roads and security measures with a cost-benefit analysis, and an Excel sheet showing the tariff determination for the project. The Respondent, KSEBL, was permitted to file a reply, followed by NTPC’s rejoinder. Subject to this, the Order was reserved.

<u>Additional Information by the Respondent, KSEBL, dated 14.11.2024 and 18.11.2024</u>

24. The Respondent reiterated its submission and requested the Commission to reject NTPC’s claims for module degradation in tariff calculation, higher O&M costs, and ROE due to a lack of regulatory basis and evidence. The Respondent also asserted that metering is as per the PPA and with a strong backup network, making NTPC’s system unavailability claim baseless.

25. It emphasized the sanctity of the concluded contracts and submitted that NTPC’s request to modify the PPA due to delay or cost variations has no legal basis. As per the agreed PPA, neither party is liable for force majeure-related delays, and additional costs cannot be passed on to consumers.

26. Further, KSEBL maintains that NTPC cannot include the costs of unexecuted infrastructure in the tariff calculation, as the plant operates effectively without the road. It has additionally submitted the Google map details furnished by the petitioner, clearly indicating the site access.

<u>Reply by the Petitioner, NTPC on 31.01.2025 in compliance with the ROP dated 14.11.2024</u>

27. In Compliance with the direction by the Commission in the ROP dated 31.01.2025, the Petitioner submitted the following:

(a) NTPC stated that it had already submitted an audited balance sheet as on the date of commercial operation of the project for a detailed breakdown of the capital cost. The reasons for the delay in the SCOD were also provided earlier. In line with the Ministry of New and Renewable Energy's official memorandum, NTPC passed the benefits of time extension to the EPC agencies and appreciated KSEBL for waiving liquidated damages for the delay. NTPC clarified that no liquidated damages were deducted for the project's delay and also provided details of the cost implications, including IDC and IEDC.

(b) The Petitioner also submitted details regarding a long-term loan, which lists out the rate of interest, loan tenure, and payment terms, if any.

(c) Initial debt-equity ratio envisaged was 80:20 at the time of investment approval, but the actual debt and equity has been in the ratio of 69:31, which is in line with the RE Tariff Regulations, 2020 which allows debt-equity ratio of 70:30. Additionally, an explanation for the increase in O&M costs, citing challenges with floating solar plants are also provided. The details regarding the O&M costs of a similar 25 MW Floating Solar PV project were also submitted, wherein the O&M cost is Rs. 8 lakh per MW annually.

(d) Clarified that the increase in the O&M cost from Rs. 3.5 lakh/MW/year to Rs. 5 lakh/MW/year is due to the unique challenges associated with floating solar plants. They also highlighted that the O&M cost for a 25 MW Floating Solar PV project is Rs. 8 lakh per MW annually.

(e) Only actual generation data for FY 2024-25 was submitted in response to a request for auxiliary power consumption and generation details.

(f) Provided details to account for 1.25% system unavailability for the floating solar plant, citing issues with the existing gas-insulated substation and concerns about the potential obsolescence of its spares in the future.

(g) Explained that during the planning phase, they had approached the Kerala Irrigation Department for the construction of a 7 km long motorable road to access water bodies and floating solar panels for Phase-2 of the project. A preliminary estimate of Rs. 50.77 Crore was received for the construction of a bund to protect the water body. NTPC also explained that Phase-2, comprising 70 MW, faced challenges with damaged boundaries that could be accessed by local fishermen, thus necessitating the road construction.

(h) Submitted the detailed excel sheet showing the determination of tariff with the components for the project is submitted.

<u>Reply by the Respondent on the Petitioner's submission dated 07.02.2025</u>

28. The Respondent submitted the following:

(a) The Petitioner did not provide documentary evidence or invoices to substantiate the capital cost of the 92 MW plant in the submission. Regulation 46 of the RE Tariff Regulations 2020 requires justification of the capital cost based on prevailing market trends, which the petitioner did not provide.

(b) Discrepancies in Capital Cost and Financial Statements:

(i) The capital cost claimed in the petition (Rs. 457.18 Cr) contradicts the balance sheet's stated asset value of Rs. 454.35 Cr

(ii) The plant and machinery cost for solar, as per the balance sheet, is Rs. 4540944640/-. However, in note 2, the plant and machinery (including civil works) cost as on 30.06.2022 (CoD of the plant is 24.06.2022) is specified as Rs. 4523459621.97/- (i.e., Rs. 452.34 Cr).

(iii) The Petitioner has not furnished the approval of the Board of the petitioner for the Investment approval.

(iv) The Petitioner has not provided details on actual equity infusion into the project.

(v) No details of interest on loans were provided.

(vi) A deferred payroll expense of Rs. 26,481.81 is claimed without clarification.

(vii) An amount of Rs. 116.46 Cr is claimed under financial liabilities without explanation.

(viii) Rs. 339.33 Cr listed as inter-unit account lacks evidence.

(ix) Rs. 3.01 Cr of revenue from power sales on CoD is mentioned but needs to be adjusted with the capital cost for tariff determination.

(x) Rs. 2.54 Cr claimed for depreciation lacks item-wise details for verification.

(xi) Bond amounts of Rs. 3.23 Cr and Rs. 1.77 Cr were claimed without documentary proof.

(xii) The insurance expense of Rs. 1.98 lakh lacks supporting documentation and should be disallowed.

(c) During the force majeure period, neither party can be held liable for delays or associated costs. Such costs are expected to be covered through insurance mechanisms.

(d) The Petitioner only provided the loan approval letter (Form 8) and did not submit other necessary documents or details about the equity infusion.

(e) The balance sheet shows a loss of Rs. 1.44 crore, suggesting the petitioner is not eligible for equity claims and should only be eligible for the normative loan component.

(f) The Petitioner compared the O&M costs with NTPC Simhadri station, which is not applicable due to differing operational conditions and costs at Kayamkulam.

(g) The auxiliary consumption provided by the Petitioner exceeds the CERC regulation limit of 0.75% for floating solar projects.

(h) The Petitioner did not provide specific instances of transmission system unavailability but mentioned hypothetical conditions that lack regulatory basis.

(i) The Petitioner proposed constructing costly bund structures for boundary protection despite existing access to the plant. A more economical solution, such as floating fencing with CCTV, was suggested, and costs for unexecuted infrastructure should not be included in the tariff calculation.

Analysis and Decision

29. We have heard the learned counsels of parties and have carefully perused the records.

30. The Commission, in its Order dated 09.05.2022 in Petition No. 341/GT/2019, initially determined an interim tariff of Rs. 2.94 per kWh for electricity generated from the 92 MW Kayamkulam Floating Solar Plant. However, as the project had not been commissioned at that time, the Commission allowed the Petitioner to approach the Commission to submit a detailed breakdown of actual costs and other relevant parameters.

31. Accordingly, the Petitioner filed the present Petition under the Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 for determination of project specific levelized tariff for 92 MW Floating Solar Photo Voltaic Plants at Rajiv Gandhi Combined Cycle Power Project (RGCCP), Kayamkulam, Kerala after achieving the COD of the project.

32. The Commission notes that both parties have agreed that the tariff applicable for the Kayamkulam Floating Solar PV project shall be lower than Rs.3.16 per kWh or the tariff determined by this Commission.

33. As submitted by the Petitioner, the commercial operation date (COD) of the project is 26.06.2022, which comes under the control period of under Central Electricity Regulatory Commission (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 (RE Tariff Regulations, 2020 hereafter). The Commission notes that the COD has been delayed by around 19 months for the 22 MW project and 13 months for the 70 MW project. According to the Petitioner, the delayed COD on 24.06.2022 is on account of delays due to unforeseen factors, including the impact of the COVID-19 pandemic, interventions by local union leaders, disruptions in the supply of modules, delays in obtaining connectivity approval, and the suspension of the approved metering scheme.

34. The determination of project-specific tariff is governed by the Regulations 7 & 8 of the RE Tariff Regulations 2020. The relevant extracts of the Regulations are reproduced as under:

"7. Project Specific tariff
a) Project specific tariff, on case to case basis, shall be determined by the Commission for the following types of renewable energy projects:
i. Solar PV power projects, floating solar projects and solar thermal power projects;
ii. Wind power projects (both on-shore and off-shore);
iii. Biomass gasifier based power projects and biogas based power projects – if a project developer opts for project specific tariff;
iv. Municipal solid waste based power projects and refuse derived fuel based power projects;
v. Renewable hybrid energy projects;
vi. Renewable energy with storage projects; and
vii. Any other project based on new renewable energy sources or technologies approved by MNRE.
b) Financial and operational norms specified in these regulations, except for capital cost shall be the ceiling norms while determining the project specific tariff.

8. Petition and proceedings for determination of tariff

(1) In case of renewable energy projects for which generic tariff has to be determined as per these regulations, the Commission shall determine such generic tariff at least one month before the commencement of year for each year of the Control Period:

Provided that for first year of Control Period i.e., from 1.7.2020 to 31.3.2021, the generic tariff shall be determined upon issuance of these regulations.

(2) A petition for determination of project specific tariff shall be accompanied by such fee as may be specified in the Central Electricity Regulatory Commission (Payment of Fees) Regulations, 2012 as amended from time to time or any subsequent reenactment thereof, and shall be accompanied by:

a) Information in forms 1.1, 1.2, 2.1, 2.2 and 2.3, as the case may be, as appended to these regulations;

b) Detailed project report outlining technical and operational details, site specific aspects, basis for capital cost, detailed break-up of capital cost and financing plan;

c) A statement of all applicable terms and conditions and anticipated expenditure for the period for which tariff is to be determined;

d) A statement containing details of calculation of any grant or subsidy or incentive received, due or assumed to be due, from the Central Government or State Government or both. This statement shall also include the proposed tariff calculated without such subsidy or incentive;

e) Consent from beneficiary for procurement of power from renewable energy project at tariff approved by the Commission, in the form of initialled Power Purchase Agreement or Memorandum of Understanding; and

f) Following documents in case of petition for determination of project specific tariff by renewable energy projects, where tariff from such renewable energy sources is generally determined through competitive bidding process in accordance with provisions of Section 63 of the Act:

i. Rationale for opting project specific tariff instead of competitive bidding; and

ii. Competitiveness of the proposed tariff vis-à-vis tariff discovered through competitive bidding/ tariff prevalent in the market.

g) Any other information directed by the Commission.

(3) The proceedings for determination of tariff shall be in accordance with the provisions of the Conduct of Business Regulations.

35. The technical and operational norms for Solar PV Projects are specified in Chapter 7 of the RE Tariff Regulations 2020. The relevant extracts are reproduced as under:

"Chapter 7: Parameters for solar PV power projects, solar thermal power projects and floating solar projects

46. Capital Cost

The Commission shall determine only project specific capital cost considering the prevailing market trends.

47. Capacity Utilisation Factor

The Commission shall only approve capacity utilisation factor for project specific tariff:
Provided that the minimum capacity utilization factor for solar PV power projects shall be 21%:
Provided further that the minimum capacity utilization factor for solar thermal power projects shall be 23%:
Provided also that the minimum capacity utilisation factor for floating solar projects shall be 19%.
48. Operation and Maintenance expenses
The Commission shall determine only project specific O&M expenses considering the prevailing market trends.
49. Auxiliary Consumption
The Commission shall only approve auxiliary consumption for project specific tariff:
Provided that the maximum auxiliary consumption for solar PV power projects shall be 0.75%;
Provided further that the maximum auxiliary consumption for solar thermal power projects shall be 10%;
Provided also that the maximum auxiliary consumption for floating solar projects shall be 0.75%.

Tariff Design

36. Regulations 9 & 10 of the RE Tariff Regulations, 2020 state as under:

9. Tariff Structure
The tariff for renewable energy sources shall consist of the following components:
(a) Return on equity;
(b) Interest on loan;
(c) Depreciation;
(d) Interest on working capital; and
(e) Operation and Maintenance expenses;
Provided that for renewable energy projects having fuel cost component, like biomass power projects with rankine cycle technology, biomass gasifier based power projects, biogas based power projects, non-fossil fuel based co-generation projects and refuse derived fuel based power projects, single part tariff with two components, fixed cost component and fuel cost component, shall be determined.

10. Tariff Design
(1) The generic tariff shall be determined, on levelized basis, considering the year of commissioning of the project, for the tariff period of the project:
Provided that for renewable energy projects having single part tariff with two components, fixed cost component shall be determined on levelized basis considering the year of commissioning of the project while fuel cost component shall be determined on year of operation basis in the Tariff Order to be issued by the Commission.
(2) For the purpose of levelized tariff computation, discount factor equivalent to post-tax weighted average cost of capital shall be considered.

(3) The above principles shall also apply for project specific tariff.

37. Accordingly, the Commission shall determine the project-specific tariff of the Petitioner's (NTPC) 92 MW Floating Solar PV project as a single part tariff considering the year of commissioning of the project and the financial and operational norms as ceiling norms wherever required as specified in the RE Tariff Regulations 2020.

38. Further, financial parameters as estimated in the levelized generic tariff Order dated 7.11.2022 in Petition No. 14/SM/2022 for FY 2022-23 have been considered by the Commission wherever required.

<u>Debt-Equity Ratio</u>

39. The Petitioner, NTPC, submitted that the Debt-Equity of 80:20 was envisaged initially at the time of investment approval. However, as per the availability of equity funds, the actual equity and debt invested is in the ratio of 69:31. The Petitioner also submitted details of the debt incurred and the Debt-to-Equity ratio maintained across various financial years. Accordingly, the Petitioner requested to consider a normative Debt: Equity Ratio of 70:30 for the determination of the project-specific tariff for the project.

40. The Respondent, KSEBL, submitted the Commission had adopted a debt equity ratio of 80:20 while determining the interim tariff in order dt. 09.05.2022 in Petition No 341/GT/2019 based on the review of Board approval for 20% equity component along with the financial viability report. According to the Respondent, the Petitioner has not furnished the details of actual equity infused in the project. The audited accounts submitted by the Petitioner show no equity has been infused in the project. The Petitioner is not eligible to claim equity in the project and is eligible only for a normative loan.

41. The Petitioner, in its rejoinder, has submitted that the station's standalone balance sheet does not reflect the equity infusion, whereas the consolidated Share Capital & Equity is being reflected in the Consolidated Balance Sheet of NTPC as a whole, which in turn is applied in the standalone station wherever required. The Petitioner reiterated that the actual debt equity invested in the project is in the ratio of 69:31.

42. The Commission notes that as per the prevailing practice of preparing financial statements, the consolidated Balance sheet of a company reflects overall share capital and equity and not the standalone project balance sheet. The financial statement of RGCCPP as provided by the NPTC reflects the capital expenditure related to the said project under Plant and Machinery Asset Class and Other Solar Asset Class. It is expected that these Assets are also accounted for under the total property, plant, and equipment (PPE) category in the consolidated financial statements of NTPC. Further, it is also expected that all revenues and costs associated with the said project, including the loss of Rs. 1.44 Crore shown in the standalone balance sheet, have been included in the consolidated financial statement of NTPC.

43. However, a Statutory Auditor's certificate for the said project would have clearly provided the 'sources of fund and application of fund' for capital expenditure to reflect the debt equity(D/E) ratio in the said project. Hence, the Commission in the ROP had asked for the Auditor Certificates from NTPC, but NTPC has provided only the standalone balance sheet

of RGCCPP. In the future, the Commission expects that the Petitioner shall adhere to these requirements meticulously.

44. Regulation 13 of the RE Tariff Regulations 2020 states as under:

"13. Debt Equity Ratio

(1) For determination of generic tariff and project specific tariff, the debt equity ratio shall be considered as 70:30:

Provided that, for project specific tariff, where the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan;

Provided further that for project specific tariff where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff;

….

Provided also that debt equity ratio shall be considered after deducting the amount of grant or capital subsidy received for the project for arriving at the amount of debt and equity.

Explanation-The premium, if any, raised by the generating company, while issuing share capital and investment of internal resources created out of its free reserve, for the funding of the project, shall be reckoned as paid up capital for the purpose of computing return on equity, only if such premium amount and internal resources are actually utilised for meeting the capital expenditure of the renewable energy project.

(2) The project developer shall submit the resolution of the Board of the company or approval of the competent authority in other cases regarding infusion of funds from internal resources in support of the utilization made or proposed to be made to meet the capital expenditure of the renewable energy project."

Quarterly Debt Equity Ratio for Kayakulam ((RS. Crore)							
Year	**Quart -er**	**Expr. During Qtr**	**Cumul -ative Expr.**	**Debt Applied (Dom Borr & Bonds)**	**Interest debited**	**Cumulative Debt**	**Debt: Equity**
2019-20	4	20.10	20.10	15.00	-	15.00	75:25
2020-21	1	0.02	20.12	-	-	15.00	75:25
2020-21	2	4.20	24.32	3.50	-	18.50	76:24
2020-21	3	21.14	45.46	17.95	-	36.45	80:20
2020-21	4	31.18	76.64	20.00	-	56.45	74:26
2021-22	1	26.25	102.89	17.50	-	73.95	72:28
2021-22	2	62.71	165.60	58.25	-	132.20	80:20
2021-22	3	25.52	191.12	19.95	-	152.15	80:20
2021-22	4	102.19	293.31	11.50	-	163.65	56:44
2022-23	1	47.48	340.79	88.30	16.00	235.95	69:31

45. The Commission has noted the submission of the parties on the debt-equity ratio and has gone through the information furnished by the parties. The Commission observes that in its interim order dt. 09.05.2022 in Petition No 341/GT/2019, the Debt-Equity ratio was considered as 80:20 based on the Board’s approval for the investment. In the instant petition, the Petitioner has submitted a statement providing details of Project financing through a combination of loans from various domestic financial institutions and bonds (Form-14). The Petitioner has also submitted quarterly details of the loan drawn for financing the project up to the commissioning date of the Project (i.e., 26.06.2022) (Form-14A).

46. As submitted by the Petitioner, the cumulative loan deployed up to the commissioning of the project is Rs. 251.95 Crore with Rs. 16 Crore shown toward interest paid up to the commissioning of the Project. After carefully going through the information provided by the Petitioner, the Commission observes that the interest debit shown by the Petitioner till the commissioning of the Project works out as Rs. 14.62 Crore and not Rs. 16 Crore. With an interest of Rs 14.62 Crore, the debt-equity ratio works out to be 70:30 instead of 69:31, as claimed by the Petitioner. Accordingly, the Debt-Equity Ratio as on commissioning of the project comes to 70:30, and it has been the same for the 92 MW of the Kayamkulam floating solar project while determining the tariff in this order.

<u>Return on Equity</u>

47. The Petitioner, NTPC, has considered MAT till FY 2032-33 and thereafter Corporate Tax for the purpose in the tariff Petition. The Petitioner has submitted that it has a portfolio of power plants based on various sources of energy, including coal, hydro, wind, biomass, Solar, etc., and based on the current portfolio, it is expected to remain under MAT provisions till FY-2025-26. Thereafter, the Petitioner will be in the ambit of the Corporate Tax in place of MAT and utilizing the MAT credit till FY 2032-33. Accordingly, the Petitioner has submitted that the MAT rate has been considered till FY 2032-33 and thereafter Corporate Tax for the purpose of tariff determination.

48. The Respondent, KSEBL, submitted that as per the account statement furnished by the Petitioner, there is no actual infusion of equity. Hence, the Petitioner is not eligible to claim any RoE.

49. Regulation 16 of the RE Tariff Regulations 2020 states as under:

16. Return on Equity
(1) The value base for equity shall be as determined under Regulation 13.
(2) The normative Return on Equity shall be 14%. The normative Return on Equity shall be grossed up by the latest available notified Minimum Alternate Tax (MAT) rate for the first 20 years of the Tariff Period and by the latest available notified Corporate Tax rate for the remaining Tariff Period.

50. As per Regulation 16 of the RE Tariff Regulations, normative ROE needs to be grossed up by the MAT rate for the first 20 years of the tariff period and by the Corporate Tax Rate for the remaining tariff period. The Commission, in its generic tariff order dated 07.11.2022 in

Petition No 14/SM/2022 for the renewable energy project to be commissioned in FY 2022-23, has considered the MAT rate of 17.47% and the Corporate Tax rate of 34.94%.

51. The Commission notes that for the FY 2022-2023, the MAT rate was 15% and corporate tax was 30% accordingly, the effective MAT rate works out to be 17.47% (15% MAT rate + 12% surcharge + 4% Health and Education cess) and the effective Corporate Tax works out to be 34.94% (30% income Tax + 12% surcharge + 4% Health and Education cess). As per the RE Tariff Regulations, 2020 the normative ROE of 14% has been grossed up by MAT rate of 17.47% for the first 20 years which yields the Return on Equity Rate of 16.96% [i.e. 14% / (1-17.472%)] and for the remaining tariff period, it is grossed up by the corporate tax rate of 34.94% to arrive at ROE of 21.52% (14% / [1-34.94%] for the balance useful life after 20 years. Accordingly, the same has been considered for the purpose of tariff determination.

Interest on Loan

52. The Petitioner, NTPC, has considered the normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenor) prevalent during the last available six months. The Petitioner also submitted that as per the Suo-Motu Order in Petition No.14/SM/2022 for a generic tariff of RE Projects to be commissioned in FY 2022-23, the Commission has estimated the Interest Rate of 9.12% based on the available SBI MCLR rate of six months of 7.12%. Accordingly, the Petitioner has considered interest on loan as 9.12% while determining the tariff for the project.

53. Regulation 14 of the RE Tariff Regulations 2020 states as under:-

> ***"(1) Loan Tenure***
> *For determination of generic tariff and project specific tariff, loan tenure of 15 years shall be considered.*
> ***(2) Interest on Loan***
> *(a) The loans arrived at in the manner indicated in Regulation 13 shall be considered as gross normative loan for calculation for interest on loan. For project specific tariff, the normative loan outstanding as on 1st of April of every year shall be worked out by deducting the cumulative repayment up to 31st March of previous year from the gross normative loan.*
> *(b) For the purpose of computation of tariff, normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenor) prevalent during the last available six months shall be considered.*
> *(c) Notwithstanding any moratorium period availed by project developer, the repayment of loan shall be considered from the first year of commercial operation of the project and shall be equal to the annual depreciation allowed."*

54. Regulation 7(b) of the RE Tariff Regulations 2020 states as under:

"7. Project Specific tariff

……………..

b) Financial and operational norms specified in these regulations, except for capital cost shall be the ceiling norms while determining the project specific tariff."

55. The Commission observes that in view of the lack of information on the project-specific loan, the normative interest rate of 9% was considered while determining the interim tariff order for the project in Petition No 341/GT/2019 dt. 09.05.2022. As mentioned earlier, the Petitioner has financed the project through various combinations of loans and bonds. The interest rates applicable for these long-term loans as provided by the Petitioner are provided below:

Sr. No	Source of Loan	Interest Type	Base Rate if Floating interest	Loan Allotted to Kayakulum Solar Project (Rs. Crore)	Moratorium Period (Years)	Repayment Period (Years)
1	Bank of India (BOI)-VA	Floating	5.65%	**17.50**	3	15
2	HDFC Bank Ltd. VI	Floating	7.65%	**15.00**	6	15
3	HDFC Bank Ltd. IX	Floating	5.95%	**4.00**	3	15
4	HDFCBank Ltd. X	Floating	5.83%	**40.00**	3	15
5	Bond Series-71	Fixed	6.29%	**17.45**	10.8	Bullet Repayment
6	Bond Series-73	Fixed	6.43%	**20**	10	Bullet Repayment
7	Bond Series-74	Fixed	6.87%	**48.5**	15	Bullet Repayment
8	Bond Series-75	Fixed	6.69%	**41.2**	10	Bullet Repayment
9	Bond Series-76	Fixed	6.74%	**48.3**	10.3	Bullet Repayment

56. The Commission observes that the loan arranged from the Bond series are with fixed interest rate while the loan from the Banks are of floating type and hence while taking the weighted average, the Commission has added 200 basis points in respect of the loans arranged with the floating interest, while the interests on bond series are taken as provided by the Petitioner. Accordingly, the weighted average of the interest on loan for the Project works out to be 7.13%.

57. The Commission notes that the average State Bank of India MCLR for the last available six months (prior to the COD (i.e., 26.06.2022) of the project) as per the monthly data available in the public domain (as shown in the table below) works out to 7.12%. Accordingly, the normative interest on loan works out to be 10.12% (i.e., 7.12% + 200 basis points).

Effective Date	One (1) Year Tenor MCLR rates
01.01.2022 to 14.02.2022	7.00%
15.02.2022 to 14.03.2022	7.00%
15.03.2022 to 14.04.2022	7.00%
15.04.2022 to 14.05.2022	7.10%
15.05.2022 to 14.06.2022	7.20%
15.06.2022 to 26.06.2022	7.40%
Avg. for last Available 6 months	**7.12%**

58. The Commission notes that according to Clause (b) of Regulation 7 of RE Tariff Regulations 2020, the financial norms, except for capital cost, shall be the ceiling norms for determining the project-specific tariff. Accordingly, the Commission has considered the interest rate of loan as 7.13% for the determination of tariff.

Depreciation

59. The Petitioner, NTPC, has claimed depreciation as 4.67% for the first 15 years of the project life and the remaining depreciation of 2% spread over the useful life of the project. The salvage value of the asset has been considered as 10%.

60. Regulation 15 of RE Tariff Regulations 2020 states as under:

> ***"15. Depreciation***
> *(1) The value base for the purpose of depreciation shall be the capital cost of the project admitted by the Commission. The salvage value of the project shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the capital cost of the project:*
>
> *Provided that, no depreciation shall be allowed to the extent of grant or capital subsidy received for the project.*
>
> *(2) Depreciation rate of 4.67% per annum shall be considered for the first 15 years and remaining depreciation shall be evenly spread during remaining Useful Life of the project.*
>
> *(3) Depreciation shall be computed from the first year of commercial operation:*
> *Provided that, for determination of project specific tariff, in case of commercial operation of the project for part of the year, depreciation shall be computed on pro rata basis."*

61. As mentioned earlier, the Petitioner has financed the project through various combinations of loans, and the repayment period of most of these loans is 15 years, including the moratorium period. Accordingly, as per the data submitted by the Petitioner and in terms of Regulation 15 of the RE Tariff Regulations, 2020, the Commission approves the depreciation at 4.67% for the first 15 years and the remaining depreciation of 2% spread over the useful life of the

project. Depreciation is allowed up to 90% of the capital cost with the salvage value of the asset as 10%.

<u>Interest on Working Capital</u>

62. The Petitioner, NTPC, has considered the normative interest rate of two hundred (200) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenor) prevalent during the last available six months. The Petitioner also submitted that as per the Suo-Motu Order in Petition No.14/SM/2022 for a generic tariff of RE Projects to be commissioned in FY 2022-23, the Commission has estimated the interest on working capital of 10.62% based on the available SBI MCLR rate of six months of 7.12%. Accordingly, the Petitioner has considered normative interest on working capital as 10.62 % while determining the tariff for the project.

63. Regulation 17 of the RE Tariff Regulations 2020 states as under:

    "17. Interest on Working Capital

    (1) The Working Capital requirement in respect of wind power projects, small hydro projects, solar PV power projects, floating solar projects, solar thermal power projects, and renewable energy with storage projects shall be computed in accordance with the following:

    a) Operation and Maintenance expenses for one month;

    b) Receivables equivalent to 45 days of tariff for sale of electricity calculated on normative Capacity Utilisation Factor or Plant Load Factor, as the case may be; and

    c) Maintenance spares equivalent to 15% of Operation and Maintenance expenses.

    ……………………………..

    (4) Interest on Working Capital shall be at interest rate equivalent to the normative interest rate of three hundred and fifty (350) basis points above the average State Bank of India Marginal Cost of Funds based Lending Rate (MCLR) (one-year tenor) prevalent during the last available six months.

64. As per the RE Tariff Regulations, interest on working capital needs to be computed as the average of the State Bank of India MCLR (One Year Tenor) prevalent during the last available six months plus 350 basis points. Considering the COD of the Project on 26.06.2022, the normative interest on working capital works out to be 12.62% (i.e., the Average SBI MCLR of the last six months is 7.12% + 350 basis points).

65. The Commission observes that the Petitioner has not submitted any actual interest on working capital documentation and instead has preferred to consider a normative interest rate for working capital as per the RE Tariff Regulations.

66. In response to the specific query, the Petitioner has submitted details of different loans arranged by the Petitioner and the allotted amount to the said project from the loan drawn by the Petitioner. As explained in the section on 'Interest on Loan' earlier, the weighted average

rate of interest works out to be 7.13%.

67. The Commission notes that according to Clause (b) of Regulation 7 of RE Tariff Regulations 2020, the financial norms, except for capital cost, shall be the ceiling norms for determining the project specific tariff. Accordingly, in the absence of the information on actual interest on working capital, the Commission has considered the rate of interest on working capital as the same as that of the interest on loan of 7.13% for the determination of tariff for the project.

Discount Factor

68. The Respondent, NTPC, has considered the discount factor as 8.35% equivalent to the post-tax weighted average cost of capital {(9.12% x 0.70) x (1 – 34.94%)} + (14.0% x0.30)] for the computation for levelized tariff.

69. The Respondent, KSEBL, submitted that the discount factor may be computed with a debt-equity ratio of 100:0 as the Petitioner has not infused any equity in this project.

70. Regulation 10 (2) of the RE Tariff Regulations 2020 provides as under:

    "10 Tariff Design

    (2) For the purpose of levelized tariff computation, discount factor equivalent to post-tax weighted average cost of capital shall be considered."

71. The Commission observes that the Petitioner has considered a normative interest on loan while calculating the discount factor.

72. Considering the debt-equity ratio (70:30) and the weighted average of the post-tax rates for debt and equity components, the discount factor is calculated. The actual Interest Rate considered for the loan component (i.e.70%) of capital is 7.13%. For the equity component (i.e., 30 %), the rate of Return on Equity (ROE) is considered at a post-tax rate of 14 %. The Commission has considered the normative corporate tax rate as 34.94% (30% Income Tax rate+ 12% surcharge +4% Health and Education cess). Accordingly, the discount factor works out as 7.45% [(7.13 % x 0.70 x (1 – 34.94%)) + (14.0% x 0.30)]. Accordingly, the Commission allows the discount rate of 7.45% in the instant case.

Capital Cost of the Project, Delay in execution of the Project and Motorable Road and Security-Related Work

Capital Cost

73. The Petitioner, NTPC, has submitted that the Capital cost for 92 MW of Floating Solar PV Project as Rs. 457.18 Crore as per the audited balance sheet of the Project. The Petitioner also submitted the detailed balance sheet of the project as on the date of commercial operation.
74. The detailed capital cost submitted by the Petitioner is as under:

Units (Rs Crore)	Value	Contract Cap	IEDC	IDC
92 MW Project	4,57.18	4,39.89	4.48	12.81

75. The Respondent has argued that the Petitioner has not submitted the Board approval for the investment of the project. Instead, it furnished an overall balance sheet of Rajiv Gandhi CCPP without any documentary evidence or invoices to substantiate the Capital cost paid for this 92 MW plant. The Respondent also commented on some anomalies on the balance sheet submitted by the Petitioner. The Respondent has argued that the Petitioner has failed to demonstrate or establish the proof for incurring the Capital Cost as well as the prudency of the Capital Cost.

76. Regulation 46 of the RE Tariff Regulations 2020 provides as under:

    Chapter 7: Parameters for solar PV power projects, solar thermal power projects and floating solar projects

    46. Capital Cost

    The Commission shall determine only project specific capital cost considering the prevailing market trends.

77. The Commission has gone through the Project balance sheet as on the date of commissioning of the project as submitted by the Petitioner. The Commission observes that though the balance sheet provides a financial statement on Assets and the status of equity and liabilities of the said project, the Petitioner has not submitted the audited certificates of the detailed break-up of the Capital cost. The detailed calculation of the IDC and IEDC also could not be traced out in the balance sheet. However, the Commission notes that the detailed notes attached to the audited balance sheet do justify the capital cost of Rs 457.18 Crore with the following breakup of the Capital Cost.

Asset	Amount (Rs.)	IEDC (Rs.)	IDC (Rs.)
Project Cost of 22 MW	1,13,56,96,354.85	1,58,43,508.72	3,82,19,508.13
Project Cost of 70 MW	3,16,17,39,558.38	2,55,31,543.34	8,29,22,631.77
Common Facilities for 70MW & 22MW	25,67,09,335.83	29,49,300.93	62,73,917.67
CMCS Building Common for 70 MW and 22 MW	1,77,45,320.40	5,40,361.65	6,84,958.75
Total Capital Cost	**4,57,18,90,569.46**	**4,48,64,714.64**	**12,81,01,016.32**

78. The Commission also notes that the Capital Cost considered for 92 MW of the Floating solar PV project in the interim tariff order dt 09.05.2022 in Petition No. 341/GT/2019 was of Rs. 518.76 Crore by the Commission including the additional infrastructure cost of Rs.50.77 Crore for motorable road for 70MW Project. The Commission notes that the revised cost submitted by the Petitioner is significantly lower than the cost considered in the interim tariff order.

	Capital Cost (Rs. Crore)	Capital Cost per MW (Rs Crore per MW)
As considered in the Interim Tariff Order in Petition No. 341/GT/2019	518.76	5.64
Proposed by the Petitioner in the Instant Petition	457.219	4.97

Delay in the Execution of the Project

79. The Petitioner has submitted that the project has been delayed by 19 months from the date of the Scheduled Commercial Operation Date **('SCOD')** i.e. 23.11.2020 with regard to First Phase (22 MW) and 13 months from the date of SCOD i.e. 23.05.2021 with regard to Second Phase (70 MW). According to the Petitioner, the said delay was mainly caused on account of the COVID-19 pandemic, intervention of local union leaders, disruption in the supply of modules, delay in the grant of connectivity, and suspension of the approved metering scheme, which was beyond the control of the Petitioner.
80. Delay due to Covid Pandemic: The Petitioner has argued in order to prevent the spread of Covid-19, the Government of India (GoI) put the entire country under lockdown with effect from 25.03.2020, which was later extended multiple times until 01.06.2020, when the unlocking of the lockdown in a phased manner started. But the lockdown led to fear psychosis among the workers/ laborers who left the site out of fear for their lives. According to the Petitioner, the non-availability of a required number of Skilled/Semi-skilled laborers hampered the smooth progress of work and caused a direct disruption in completing the construction activities of balance facilities. The Petitioner has submitted that various supplies of materials/ equipment to be supplied from within and outside the country were affected due to the pandemic. It was also submitted that MNRE, vide its office memorandum dated 13.08.2020, granted a 5-month blanket extension to RE projects due to the first wave of Covid. MNRE, further through an Office Memorandum dated 12.05.2021, granted a 76-day time extension for RE projects due to the second wave of COVID-19. The Petitioner has submitted that the COVID-19 pandemic created enormous devastative effects on the commercial and economic environment in the country, and the Writ Courts of India have consistently held that the COVID-19 pandemic is a *force majeure* event after considering and recognising the devastating impact the pandemic had on the economy and the different actors involved. The Petitioner has also submitted that the supply of solar Modules was delayed due to disruption in the supply chain of Solar modules.
81. Delay due to Intervention of Local Union Leader: The Petitioner has stated that the project was also hindered due to frequent intervention of the local union leaders since they were constantly raising unreasonable demands with regard to workers working from other States, payment of unloading charges, etc. Furthermore, the executives of NTPC were manhandled and were kept hostage by the local union members in lieu of the demands raised by them. The Petitioner also submitted copies of multiple letters written to appropriate authorities to address the issue. The Petitioner also submitted that the Petitioner had to approach the High Court of Kerala for Police Protection the Ingress and Egress of Men and Material for the execution of the Project.
82. Delay in grant of connectivity: The Petitioner has attributed delay for the period of February 2020 to November 2020 on account of delay in the grant of connectivity. According to the Petitioner, the request for grid connectivity was made on 29.02.2020, which was only granted by CTUIL on 19.01.2021, following which the Connectivity Agreement was signed only on 18.12.2021.
83. Delay due to suspension of Approved Metering Scheme: The Petitioner claimed that the Respondent suspended the earlier approved metering scheme after readiness of 5MW of part

capacity of the Project and later agreed to the revised scheme of metering on 30.02.2022 only after various meetings. The Petitioner allocated delay from July 2021 to March 2022 on account of these revised metering schemes.

84. The Petitioner has accordingly submitted the IDC cost of Rs. 12.81 Crore and IEDC cost of 4.48 Crore and prayed for approval of the same.
85. Per Contra, the Respondent has submitted that the events referred by the Petitioner for delay in execution of the Project are Force Majeure events, and hence, the Force Majeure Clause under the agreement should be applicable. The Respondent has argued that in the event of a force majeure, neither party shall be liable for any claim for any loss and damages whatsoever arising due to a force majeure event. The Respondent quoted Article 10 of the Agreement as follows:

    "Article 10 Force Majeure: Neither Party shall be liable for any claim for any loss or damage whatsoever arising out of failure to carry out the terms of the Agreement to the extent that such a failure is due to Force Majeure Events, such as war, rebellion, mutiny, civil commotion, riot, strike lock out, force of nature, accident, act of God or terrorism or any other reasons beyond the control of concerned party. Any party claiming the benefit of this claim shall reasonably satisfy the other party of existence of such an event and given a written notice within a reasonable time to the other party to this effect. Generation/drawal of power shall be started as soon as practicable by the parties concerned after such eventuality has come to and end of ceased to exist."

86. The Respondent has argued that the cost related to Force majeure should be met through the insurance and any claim on cost incurred due to the delay in the commissioning of the project, including IDC, should not be allowed.
87. The Petitioner, in its reply, has argued that the issue of claiming the IDC & IEDC on account of the force majeure is no more res-integra on account of the passage of various Orders/ Judgments by this Commission, as well as by the Hon'ble Appellate Tribunal for Electricity. It was submitted that the Petitioner had no option but to incur additional IDC for the periods when the commissioning of the Project was delayed due to Force Majeure events as detailed in the petition. Such additional IDC, according to the Petitioner, is an additional expenditure as it is an outflow from the Petitioner to its lenders. This additional interest is an inevitable consequence of the delay caused due to Force Majeure events. Further, the Petitioner has submitted that the Respondent has agreed to the request of the Petitioner for an extension of SCOD and also claimed that the Respondent has provided a waiver of Liquidated Damages for the delay in Commissioning of the Project. Accordingly, the Petitioner has not deducted any Liquidated Damages from the EPC contractor for delay in execution of the Project.
88. After going through the submission of both the parties, the Commission is of the view that both parties have acknowledged the events due to which the project execution was delayed and have also agreed to the extension of SCOD of the project without any liquidated damages. In view of this, the Commission believes that the Petitioner is entitled to the IDC and IEDC qua the delay in the SCOD of the project. The Commission notes that the Petitioner has submitted the details regarding the IDC and IEDC, which were also verified with the balance sheet and other details provided by the Petitioner. Accordingly, the Commission approves the IDC of 12.81 Crore and IEDC of Rs. 4.48 Crore for the project.

Motorable Roal and Security-Related Work

89. The Petitioner had claimed additional expenditure of Rs. 50.77 Crore towards construction of 7 KM long motorable road to have access to waterbodies for 70 MW Phase-2 project and the same was allowed by the Commission in the interim tariff Order dt.09.05.2022 in Petition No. 341/GT/2019. According to the Petitioner, the 92 MW project is spread across three locations, namely 20 MW, 22 MW, and 50 MW water bodies. The area for the 22 MW is surrounded by a motorable road. Whereas the areas of 20 MW and 50 MW are not surrounded by land. Hence, earlier, the Petitioner had proposed to construct a motorable road around the 20 MW and 50 MW areas for a proper approach at an estimated cost of Rs. 50.77 Crores, as informed by the Irrigation Department of Kerala. It was argued by the Petitioner that the proposed bund with a motorable road was based on the site visit of the Superintending Engineer of the Irrigation Department of Kerala on 17.09.2020. According to the Petitioner, because the timelines of the construction of the bund and the project activities were overlapping, the Petitioner decided to complete the project activity and then take up the activity of the bund for the protection of the Floating Solar Plant. The bund would have prevented the towing of the boats, and there would not be sufficient space for the assembly of the Floaters on the Bund. In view of the above, the Petitioner has delayed the construction of the motorable road. However, the Petitioner has highlighted that the boundary of the floating solar plant needs to be demarcated to prevent illegal entry by the local fishermen. According to the Petitioner, in view of the incidents of theft and damage to the floating solar plant, the Deputy Superintendent of Policy of the Project Area has suggested the installation of CCTV cameras and other measures. The Petitioner has appointed a consultant to get the estimate of the work, and the report from the consultant is awaiting. Accordingly, the Petitioner has sought liberty to execute these works and the total cost to be incurred for the same be allowed to recover from a tariff on the mutually agreed methodology between the Petitioner and Respondent.
90. The Respondent on the issue of a motorable road has submitted that such a huge expenditure for road construction is unwarranted as the Petitioner's solar plant has access on three sides, and the fourth side is open to the backwater. The Respondent has further submitted that the proposed road would have been necessary during the construction of the floating solar plant for transporting men, machinery, and materials. However, the plant has been commissioned without the construction of a motorable road. The Respondent claimed that even after completing the project nearly two years ago , the Petitioner has not constructed the motorable road, and there is hardly any possibility of constructing the same in the future. Hence, the claim of the Petitioner to construct a motorable road may be rejected. Further, it was suggested that there are more economical solutions for the protection of the floating solar plant than the construction of the bund structure, which will hinder the natural flow of water, causing environmental issues. Accordingly, infrastructure cost that has not been executed by the Petitioner should not be included in the tariff calculation.
91. The Commission has gone through the submission of the parties. The Commission notes that the cost of a motorable road was considered while determining the interim tariff for the project vide Order in Petition No 341/GT/2019 on 09.05.2022 based on the submission of the Petitioners in that Petition.
92. The Commission had approved the infrastructure cost of Rs.50.77 Crore for 7 KM motorable

road for Phase-2 of 70 MW as per the estimation received from the Kerala Irrigation Department in its interim tariff Order dt 09.05.2022 in Petition No. 341/GT/2019. It was envisaged that this cost would be required for to access the water bodies and floating solar panels for Phase-2 of 70MW. However, as pointed out by the Respondent, even after two years of commissioning of the Project, the Petitioner has not built the infrastructure. In fact, the Petitioner, in its submission, has also accepted that the proposed infrastructure is yet to be built. The Petitioner has argued that the construction of the bund would have obstructed the installation of the floating solar plant and prevented the towing of the boats during the construction of the project. After going through the project balance sheet and other material by the Petitioner in the instant Petition, the Commission observes that the said infrastructure cost has not been considered in the Capital cost of the project. Instead, the Petitioner has sought liberty to execute the work in the future and requested that the total cost to be incurred for the same be allowed to recover from a tariff on a mutually agreed methodology between the Petitioner and Respondent.

93. While approving the interim tariff for the project vide Order dt 09.05.2022 in Petition No. 241/GT/2019, the Commission had envisaged the construction of a motorable road as critical for commissioning the project and hence was allowed. However, since the project has been commissioned and the road has not yet been constructed, the estimated cost on this count cannot be capitalised. Further, the Petitioner has not provided any details or timeline regarding the construction of the bund in the near future. Hence, the Commission decides not to allow such costs as part of the tariff determination process.
94. In view of the above, the capital cost approved by the Commission for the determination of tariff for 92 MW of the Floating Solar PV project is Rs. 457.19 Crore.

<u>Module Degradation Factor</u>

95. The Petitioner has requested to adopt a module degradation factor of 0.7% in calculating the annual generation for 25 years of the project. The Petitioner submitted that the module degradation had been the tender specification for the selection of the EPC contractor through competitive bidding. It was further submitted that the quoted EPC cost after considering a linear Module degradation of 0.7% per annum throughout the life of the project. The Petitioner has also submitted a technical paper published in the peer-reviewed Journal (*namely, Sustainable Energy, Grid and Networks*), in which a study was carried out on degradation analysis and impacts on feasibility study of floating solar power. It was concluded in the said paper that floating solar PV projects show higher degradation in the module as compared to the ground-mounted solar PV Project. Further, the Petitioner has also claimed that the said project is the first project in Back Water of Kerala with characteristics of high salinity and brackish.
96. The Petitioner has submitted that the RE Tariff Regulations, 2020, stipulate a minimum CUF of 19% for Floating Solar Projects. Hence, after considering the annual degradation of 0.7%/ per year, the CUF of the project for Phase-1 of 22 MW project and Phase-2 of 70 MW is 20.71 % and 22.47%, after 25 years, which is in line with the minimum CUF criteria of 19% as per the above CERC regulation. Accordingly, the Petitioner prayed for granting relaxation for the degradation factor of 0.7% for the Petitioner under Regulation 78 of RE Tariff

Regulations, 2020.

97. The Respondent, in its submission, has opposed the consideration of degradation by stating that no such provision is made in the RE Tariff Regulations, and the Commission has not considered any degradation factor while determining the interim tariff for the project.

98. The Commission notes that the RE Tariff Regulations, 2020, do not provide any norms for the module degradation factor. Further, the Commission has not considered the degradation factor in the interim tariff order issued for the said project vide Order dt.09.05.2022 in Petition No. 241/GT/2019. The Petitioner has envisaged the CUF of 26.735 for the 92 MW of the floating solar project, which is much higher than the minimum CUF of 19% specified by the Commission in the RE Tariff Regulations. The Commission also observes that the technical specification provided in the bid document also envisaged a minimum DC capacity of 29MWp for a Plant capacity of 22 MW and, similarly, a minimum DC capacity of 90 MWp for a plant capacity of 70MW. Accordingly, the Commission believes that the Petitioner has taken all required measures to maintain the generation within the agreed range of CUF from the project. The Commission is of the view that the Petitioner was aware that the RE Tariff Regulations, 2020, do not provide for any degradation factor, and the prudent business decision would be based on the existing regulatory provisions rather than on the assumption of relaxation of the provisions of the regulations. Moreover, the size of the project is not small enough, and for that matter, the site of the project is not in such difficult terrain or in such location having a proven history of low CUF as to justify relaxation of norms specified in the regulations. Hence, the Commission does not find any compelling reason to deviate from the provision of not considering the degradation factor while determining the tariff for a floating solar project.

99. The Commission, accordingly, has not considered any degradation factor while determining the tariff for the project.

<u>Capacity Utilisation Factor (CUF)</u>

100. The Petitioner has claimed the Capacity Utilization Factor (CUF) of 25.11% for Phase-I (22MW) and 27.24% for Phase-II (70MW) of the Kayakulam Floating Solar PV Project. The Petitioner has submitted the quoted annual generation submitted by the successful contractor M/s BHEL for 22 MW Phase-1 as 48.42 MU and Ms/ Tata Power Solar System Ltd for 70 MW phase-2 as 167.5 MU during the reverse auction based on reference global solar radiation at the project sites. This guaranteed annual generation under the reverse auction process has been considered for the computation of CUF of the projects as 25.55% for 22 MW Phase-1 and as 27.24% for 70 MW Phase-2 by the Petitioner while calculating the levelized tariff. It would be pertinent to mention that as per the power purchase agreement (PPA) signed between the Petitioner and the Respondent, the Petitioner is entitled to supply energy corresponding to a minimum CUF of 16% and a maximum CUF of 28% from the said project in a contract year to the Respondent.

101. Regulation 47 of the RE Tariff Regulations 2020 states as under:

"47. Capacity Utilisation Factor

The Commission shall only approve capacity utilisation factor for project specific tariff:

Provided that the minimum capacity utilization factor for solar PV power projects shall be 21%:

Provided further that the minimum capacity utilization factor for solar thermal power projects shall be 23%:

Provided also that the minimum capacity utilisation factor for floating solar projects shall be 19%."

102. As per the above Regulations, the capacity utilisation factor shall be approved by the Commission with a condition of a minimum capacity utilisation factor of 19% for floating solar projects. The Commission observes that the Petitioner has considered a CUF of 25.11% for Phase-1 of the 22 MW project and a CUF of 27.24% for Phase-2 of 70 MW after considering the solar radiation available on the respective sites. The Commission also notes that the Petitioner has signed a PPA with the Respondent corresponding to a minimum CUF of 16% and a maximum CUF of 28% in a contract year. The Petitioner, in response to the query from the Commission, has submitted monthly generation from the project with the following monthly CUF information:

MONTHS	Monthly CUF
Apr-24	29.56%
May-24	20.53%
Jun-24	20.63%
Jul-24	20.67%
Aug-24	25.14%
Sep-24	27.28%
Oct-24	23.66%
Nov-24	22.37%

103. Upon review of the monthly CUF submitted by the Petitioner, the CUF guaranteed by the successful bidders and provisions of the PPA, the Commission approves the CUF of 26.73% for the entire 92 MW floating Solar PV Project for the computation of project specific tariff.

<u>Operation and Maintenance Expenses</u>

104. The Petitioner submitted that the O&M of the projects after its commissioning for the first three years is included in the project cost, and the same is included in the scope of the EPC contractor. Therefore, the Petitioner has considered the O&M cost of the projects for the initial three years as NIL. Thereafter, the Petitioner has considered O&M cost at the rate of normative O&M expenses of Rs. 5 lakhs/MW due to Corrosive Saline Coastal Environment necessitating premature replacement of equipment with escalation at the rate of 3.84% per

annum as per Regulation 19 (2) of RE Tariff Regulations 2020.

105. The Respondent has argued that the O&M cost of Rs 3.5 lakh /MW/year, as approved by the Commission in the interim tariff order dt. 09.05.2022 in Petition No 341/GT/2019 is adequate and in accordance with the market trend. Accordingly, the Respondent requested that the Petitioner's claim of escalated cost for O &M be rejected.

106. The Petitioner, in its rejoinder, has argued that the hardships faced for maintaining the Floating Solar Plant in generating mode during the O&M phase are entirely different from that of the ground-mounted Solar Plants. Further, the Petitioner claimed that for a floating solar project, the O&M Cost is not only restricted to water cleaning of solar modules but also other components. According to the Petitioner, the cost of O&M of the Floating Solar Plant is higher than the O&M cost of the ground-mounted Solar Plants. The Petitioner has also submitted the copy of the O&M contract for 25 MW of the Petitioner's floating solar project at another site, wherein the O&M cost is Rs. 8 lakh per annum.

107. Regulation 48 of the RE Tariff Regulations 2020 specifies the norms of Operation and Maintenance expenses

" 48. Operation and Maintenance expenses
The Commission shall determine only project specific O&M expenses considering the prevailing market trends."

108. Regulation 19(2) of the RE Tariff Regulations 2020 states as under:

"19. Operation and Maintenance Expenses
…
(2) Normative O&M expenses allowed during first year of the Control Period i.e. financial year 2020-21 under these regulations shall be escalated at the rate of 3.84% per annum for the Tariff Period."

109. The Commission notes that in Petition No. 341/GT/2019 (Interim Order for the same project), dated 09.05.2022, it had approved the O&M expenses of Rs.3.5 lakh/ MW/ Year for both phase-1 of 22MW and phase-2 of 70 MW projects. The Petitioner has sought O&M expenses of Rs 5 lakh/MW/year. The Commission observes that the O&M cost quoted by the successful bidders works out to be Rs. 3.5/MW/year. The Commission finds that the Petitioner's request for Rs. 5 lakh per MW is not adequately substantiated with specific evidence of increased maintenance costs beyond the originally approved amount. Accordingly, the Commission finds no compelling justification to accept the claim of the Petitioner to allow O&M of Rs. 5 lakh/MW /year. The Commission believes that an escalation of 3.84% in the base rate of Rs. 3.5 lakh/ MW would be sufficient to arrive at the cost of O&M for the 4th year, and the cost of O&M so arrived for the 4th year can then be escalated at 3.84% per annum for the tariff period as per Regulation 19(2) of the RE Tariff Regulations, 2020. In view of this, the Commission approves the O&M cost of Rs 3.63 (i.e., 3.5 x (1+ 3.84%)) lakh/MW/year from the 4th year and an escalation rate of 3.84% per annum till the useful life of the project.

Auxiliary Consumption

110. The Petitioner, NTPC, submitted that it has adopted the Auxiliary consumption of 0.75 % for the purpose of tariff computation.

111. In response to the query by the Commission, the Petitioner submitted monthly auxiliary consumption for the project as follows:

MONTHS	TOTAL APC % OF PLANT
Apr-24	1.78%
May-24	1.92%
Jun-24	1.93%
Jul-24	1.91%
Aug-24	1.88%
Sep-24	2.02%
Oct-24	1.69%
Nov-24	1.87%

112. Regulation 49 of the RE Tariff Regulations 2020 states as under:

"49. Auxiliary Consumption

The Commission shall only approve auxiliary consumption for project specific tariff:

Provided that the maximum auxiliary consumption for solar PV power projects shall be 0.75%;

Provided further that the maximum auxiliary consumption for solar thermal power projects shall be 10%;

Provided also that the maximum auxiliary consumption for floating solar projects shall be 0.75%.

113. As per the above Regulation, a maximum of 0.75% of auxiliary consumption has been allowed for floating solar projects. The Commission observes that actual generation from the project for 10 months of FY 2024-25 shows that the average auxiliary power consumption (APC) for the project is 1.88%. However, the Petitioner has not requested for additional auxiliary consumption above the specified limit of 0.75% in the RE Tariff Regulations, 2020. Accordingly, the Commission has decided to consider auxiliary consumption of 0.75%

System Availability, Additional Transmission Loss

114. The Petitioner has submitted that Central Electricity Regulatory Commission (Terms and Conditions of Tariff) Regulations, 2019 specify a Normative Annual Transmission Availability factor of 98% for recovery of fixed cost. The Petitioner has argued that the Solar PV Project, consisting of Modules, Inverters, Inverter Transformers, Cables, Power Transformers, a Switchyard, etc., is a static system, analogous to a Transmission system. Hence, similar to the Transmission System, the Availability factor needs to be considered for

the Floating Solar PV system. Further, the Petitioner has also argued that the Petitioner's floating solar project is connected to the existing Gas Insulated Substation (GIS), which was commissioned in 1998 and has outlived the life of 25 years. Accordingly, the Petitioner has requested to consider system unavailability of 1.25% for the calculation of Annual generation for 25 years of the project life.

115. Per Contra, the Respondent, in its reply, has argued that the power generated from the project can be evacuated through five feeders and, hence, a strong backup network does exist. Accordingly, the system unavailability claim of the Petitioner is not sustainable.

116. The Commission observes that no specific details have been provided by the Petitioner for its claim of system unavailability of 1.25%. At the same time, there is no such provision in the RE Tariff Regulations, 2020, in this regard. Accordingly, the Commission has decided not to consider transmission loss for the purpose of tariff determination in the present petition.

117. A summary of the parameters approved by the Commission are as under:

S. No	Details	Units	As proposed by the Petitioner	As considered by the Commission
1	**Capacity**	MW	92	92
2	**Total Capital Cost**	Rs Lakh/MW	496.94	496.94
	Total Capital Cost	Rs Lakh	45718.48	45718.48
3	**Debt**	%	70	70
4	**Equity**	%	30	30
5	**Re payment Period**	Years	15	15
6	**Project Useful Life**	Years	25	25
7	**Interest on Loan**	%	9.12	7.13
8	**Depreciation**		4.67	4.67
	Salvage Value	%	90	90
9	**ROE Rate for 20 Yrs**	%	16.96(for 11 years)	16.96
	ROE Rate (For Remaining Life)	%	21.52	21.52
10	**MAT Rate**	%	17.47%	17.47%
11	**Corporate Rate**	%	34.94%	34.94%
	O & M Expenses from 4th Years onwards	Rs Lakh/MW	5	3.63
12		Rs. Lakh	460	334
	O&M Escalation Rate	%	3.84	3.84
13	**Interest on WC %**	%	10.62	7.13
14	**CUF**	%	26.73	26.73
15	**Aux Power Consumption**	%	0.75	0.75
16	**Degradation Factor**	%	0.7	0.00
17	**System Availability**	%	1.25	0.00
18	**WACC -Discount Rate**	%	8.35	7.45

118. Accordingly, the Commission approves the levelized tariff of Rs. 2.68/kWh as against the Petitioner's claim of Rs. 3.22/kWh and interim tariff of Rs. 2.94 /kWh. The Petitioner is hereby directed to raise bills for the energy generated from the project on the basis of the tariff approved above.

119. Petition No. 66/GT/2024 and Petition No. 357/MP/2023 are disposed of in terms of the above.

Sd/-	Sd/-	Sd/-
Shri Harish Dudani **Member**	**Shri Ramesh Babu. V** **Member**	**Jishnu Barua** **Chairperson**

Annexure-1

Assumption for determination of Tariff for 92 MW 92MW Floating Solar Photovolataic Plant at					
Sl. No.	**Assumption Head**	**Sub-head**	**Sub-head (2)**	**Unit**	**Parameters**
			Installed Power Generation Capacity	MW	92
			Capacity Utilization Factor (CUF)	%	26.73
			Degradation Factor	%	0.00
			System availabilty, additional Transmission Loss etc.	%	0.00
			Auxiliary Power Consumption	%	0.75
			Useful Life	Years	25
2	Project Cost	Capital Cost	Capital Cost	Rs. Lakh/ MW	496.94
			Net Capital Cost	Rs. Lakh	45718.91
3	Financial Assumption	Debt Equity	Tariff Period	Years	25.00
			Debt	%	70.00
			Equity	%	30.00
		Debt Component	Total debt amount	Rs. Lakh/MW	32003.23
			Total equity amount	Rs. Lakh/MW	13715.67
			Loan Amount	Rs. Lakh/MW	32003.23
			Moratorium Period	Years	0.00
			Repayment Period (incl. moratorium)	Years	15.00
			Rate of Interest on Loan	%	7.13
		Equity Component	Equity Amount	Rs. Lakh/MW	13715.67
			Return on Equity (Post Tax)	% p.a.	14.00
			No.of Years ROE is considerd under MAT	Years	20
			No.of Years ROE is considerd under Corporate Tax	Years	5
			ROE for First 20 years	% p.a.	16.96
			Return on Equity after 20th year	% p.a.	21.52
		Depreciation	Depreciation Rate for 1st 15 years	%	4.67
			Depreciation rate 16th year onwards	%	2.00
4	O& M Expenses	O&M Expense	O&M From 4th Year	Rs.Lakh/MW	3.63
			From 4th year	Rs. Lakh	334.36
		Escalation Factor	From 5th years onwards	%	3.84
5	Working Capital	O&M Expenses		Month	1
		Maintenance Spares	% of O&M Expenses	%	15
		Receivables		Days	45
		Interest on Woking Capital		% per annum	7.13
6		Discount Factor	For calculation of levelised tariff	%	7.45

Determination of Tariff Components for 92MW Floating Solar Photovolataic Plant at RGCCPP, Kayamkulam, Kerala																										
Units Generation	**Unit**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
Installed Capacity	MW	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Gross Generation	MU	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57
Degradation loss	MU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Generation after Degradation	MU	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57	215.57
System availabilty, additional Transmission Loss etc	MU	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aux Consumption	MU	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62	1.62
Net Generation	MU	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95	213.95
Tariff Components (Fixed charge)	**Unit**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**
O&M Expenses	Rs Lakh	0.0	0.0	0.0	334.4	347.20	360.54	374.38	388.76	403.69	419.19	435.28	452.00	469.36	487.38	506.09	525.53	545.71	566.66	588.42	611.02	634.48	658.85	684.15	710.42	737.70
Depreciation	Rs Lakh	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	2135.07	912.09	912.09	912.09	912.09	912.09	912.09	912.09	912.09	912.09	912.09
Interest on Term Loan	Rs Lakh	2205.72	2053.48	1901.25	1749.02	1596.79	1444.56	1292.33	1140.10	987.87	835.64	683.41	531.18	378.95	226.72	75.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest on working capital	Rs Lakh	59.13	57.78	56.43	63.66	62.64	61.63	60.63	59.65	58.69	57.73	56.80	55.87	54.97	54.08	53.22	42.20	42.72	43.26	43.82	44.40	50.54	51.17	51.81	52.49	53.19
Return on Equity	Rs Lakh	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2326.72	2951.60	2951.60	2951.60	2951.60	2951.60
Total Fixed Cost	Rs Lakh	6726.64	6573.06	6419.47	6608.84	6468.42	6328.52	6189.14	6050.30	5912.03	5774.35	5637.28	5500.84	5365.06	5229.97	5096.41	3806.54	3827.24	3848.73	3871.05	3894.23	4548.72	4573.71	4599.66	4626.60	4654.58
Per Unit Tariff components	**Unit**	**Yr-1**	**Yr-2**	**Yr-3**	**Yr-4**	**Yr-5**	**Yr-6**	**Yr-7**	**Yr-8**	**Yr-9**	**Yr-10**	**Yr-11**	**Yr-12**	**Yr-13**	**Yr-14**	**Yr-15**	**Yr-16**	**Yr-17**	**Yr-18**	**Yr-19**	**Yr-20**	**Yr-21**	**Yr-22**	**Yr-23**	**Yr-24**	**Yr-25**
PU O&M Expenses	Rs /KWh	0.00	0.00	0.00	0.16	0.16	0.17	0.17	0.18	0.19	0.20	0.20	0.21	0.22	0.23	0.24	0.25	0.26	0.26	0.28	0.29	0.30	0.31	0.32	0.33	0.34
PU Depreciation	Rs /KWh	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
PU Interest on Term Loan	Rs /KWh	1.03	0.96	0.89	0.82	0.75	0.68	0.60	0.53	0.46	0.39	0.32	0.25	0.18	0.11	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PU Interest on working capital	Rs /KWh	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
PU Return on Equity	Rs /KWh	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.38	1.38	1.38	1.38	1.38
PU Tariff Components	Rs /KWh	3.14	3.07	3.00	3.09	3.02	2.96	2.89	2.83	2.76	2.70	2.63	2.57	2.51	2.44	2.38	1.78	1.79	1.80	1.81	1.82	2.13	2.14	2.15	2.16	2.18
Levelised Tariff	**Unit**	**Yr-1**	**Yr-2**	**Yr-3**	**Yr-4**	**Yr-5**	**Yr-6**	**Yr-7**	**Yr-8**	**Yr-9**	**Yr-10**	**Yr-11**	**Yr-12**	**Yr-13**	**Yr-14**	**Yr-15**	**Yr-16**	**Yr-17**	**Yr-18**	**Yr-19**	**Yr-20**	**Yr-21**	**Yr-22**	**Yr-23**	**Yr-24**	**Yr-25**
Discount Factor		1.00	0.93	0.87	0.81	0.75	0.70	0.65	0.60	0.56	0.52	0.49	0.45	0.42	0.39	0.37	0.34	0.32	0.29	0.27	0.26	0.24	0.22	0.21	0.19	0.18
Discounted Tariff Component	Rs /KWh	3.14	2.86	2.60	2.49	2.27	2.07	1.88	1.71	1.56	1.41	1.28	1.17	1.06	0.96	0.87	0.61	0.57	0.53	0.50	0.46	0.51	0.47	0.44	0.41	0.39
Levelised Tariff	Rs /KWh	**2.68**																								