केन्द्रीय विद्युत विनियामक आयोग
CENTRAL ELECTRICITY REGULATORY COMMISSION

नई दिल्ली
NEW DELHI

याचिका संख्या./ Petition No. 346/GT/2023

कोरम/ Coram:

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

आदेश दिनांक/ Date of Order: 23rd March, 2025

IN THE MATTER OF:

Petition 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 "CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020" for determination of levelized tariff for "10 MW Solar Photo Voltaic Power Project" at Koderma Thermal Power Station, Koderma, Jharkhand.

AND IN THE MATTER OF:

Damodar Valley Corporation
DVC Towers, VIP Road
Kolkata -700054

……..Petitioner

Versus

1. West Bengal State Electricity Distribution Company Limited
   Vidvut Bhavan, 7th Floor, 'C' Block
   Kolkata-700091
2. Jharkhand Bijli Vitran Nigam Limited
   Engineering Building, HEC, Dhurwa
   Ranchi- 834004

……Respondents

Parties Present: Shri Venkatesh, Advocate, DVC
Shri Punyam Bhutani, Advocate, DVC
Shri Bharath Gangadharan, Advocate, DVC
Shri Nihal Bhardwaj Advocate, DVC
Shri Mohit Gupta, Advocate, DVC
Shri Kartikay Trivedi, Advocate, DVC

Shri Ms. Manu Tiwari, Advocate, DVC
Shri Shivam Kumar, Advocate, DVC
Shri Harsh Vardhan, Advocate, DVC
Shri Kshitij Pandey, Advocate, DVC

आदेश/ ORDER

1. The Petitioner, Damodar Valley Corporation (DVC), is a multi-functional organization established to manage the generation and supply of electricity. DVC, as a distribution licensee, supplies power to its Firm consumers located in the valley area situated in the State of West Bengal and Jharkhand. As per the guidelines of the West Bengal Electricity Regulatory Commission (WBERC) & Jharkhand State Electricity Regulatory Commission (JSERC), DVC has a commitment to compliance with Solar Renewable Purchase Obligation (RPO) as well as non-solar RPO. In view of this vision for the fulfilment of RPO as well as moving towards the achievement of the long-term vision of India for Net Zero, DVC has planned to set up Solar Photo Voltaic Plants within the DVC command area.

2. The Respondents, West Bengal State Electricity Distribution Company Limited (WBEDCL) and Jharkhand Bijli Vitran Nigam Limited (JBVNL) are the Distribution Companies of West Bengal and Jharkhand respectively, incorporated to carry out distribution of electricity.

3. DVC has set up a Solar PV Power Project of 10 MW capacity at Koderma Thermal Power Station (KTPS), situated in Jharkhand, to supply the energy generated from this project to its existing firm consumers both in West Bengal and Jharkhand. The project was commissioned on 01.03.2024. The Petitioner filed the present Petition under CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2020 (RE Tariff Regulations, 2020) for the determination of levelized tariff for the 10 MW Solar Photo Voltaic Power Project at KTPS.

4. DVC has made the following prayers:
   (a) Determine and approve the levelized tariff for 10 MW Solar Photo Voltaic power project at Koderma Thermal Power Station (KTPS) to facilitate recovery of proposed tariff from firm consumers situated in DVC command area through distribution tariff to be approved by JSERC & WBERC or through bundling with thermal power for sale to beneficiaries or through any other mode of sale.
   (b) Allow recovery of fee & charges as applicable (i.e. SLDC Charges, Tariff filing fees, implication of any changes on tax & duties etc.).
   (c) Allow the prayer of DVC to approach before the Commission for module degradation factor, if it actually occurs in future.
   (d) Issue any other order as deemed fit in such case.

Submission by the Petitioner, DVC

5. The Petitioner submitted the following:
   (i) The Work Order to set up a 10 MW Solar PV Power Project at KTPS was awarded to the successful bidder, M/s Braithwaite & Co. Limited, selected through a transparent bidding

process of e-tendering through CPP (Central Public Procurement) Portal followed by reverse auction. Details of the bidding process were submitted as follows:

Name of Project	10 MW Solar PV Project
Type of Bidding	Domestic Competitive Bidding (DCB)
Mode of Tendering	e-tendering through CPP Portal followed by reverse auction
Date of Invitation for Bids	24.06.2022
Date of Technical Bid Opening	12.08.2022
Number of bidders participated	Five (05)
Shortlisted for price bid	Three (03)
Date of Price bid opening / Reverse Auction	05.09.2022
Name of the Successful bidder (L1 bidder after closure of reverse auction)	M/s Braithwaite & Co. Limited

(ii) Initially, the Scheduled Commercial Operation Date (SCOD) date was on 13.07.2023, which was 9 months from the date of issuance of Letter of Award (LOA). However, it was further extended to 30.10.2023 and the said Project was subsequently commissioned on 01.03.2024.

(iii) The EPC cost was discovered through the bidding process of e-tendering through the CPP Portal followed by reverse auction, while other parameters like Preliminary Cost, Project Management Cost, Contingency Cost, etc., were considered on a lumpsum basis. Total project EPC cost (including GST) amounts to Rs. 6948 Lakh. IDC was considered based on actual payment done so far to the Contractor, M/s. Braithwaite & Co. Limited.

(iv) The parameters related to the subject project used in the calculation of the tariff were submitted, along with a request for the Commission to determine and approve the levelized tariff of Rs. 4.62/kWh for the 10 MW Solar Photovoltaic Power Project at KTPS.

(v) The tariff determined by the Commission is proposed to be recovered from the firm consumers through Aggregate Revenue Requirement (ARR). The solar PV power so produced would primarily be utilised for fulfilment of RPO. Any excess power left thereafter, DVC may decide to sell the power to its beneficiaries through bundling with thermal power or through any other mode of sale

(vi) The Petitioner also requested that any levies, taxes, duties, SLDC charges, or other costs imposed on DVC, including fees paid to the Commission in this Petition and publication expenses (if any), will be charged additionally to DVC beneficiaries or electricity consumers.

Hearing held on 29.04.2024

6. The Petition was admitted, and the Commission directed the Petitioner to submit additional information, which includes the rationale for choosing a project-specific tariff, financing details (Debt Equity Ratio, loan terms, repayment schedule), and the competitiveness of the proposed tariff compared to market rates. The Petitioner was asked to submit documents such as RfS, DPR, bid details, project status considering the extended COD, and capital cost as well as IDC calculations impacting the levelized tariff. Further, explanations were requested for the high tariff of Rs 4.62/kWh, the mechanism for excess

power sale and consent from beneficiaries, details of tariff petition publication and stakeholder responses, as well as the project's CUF and Generation Statement from COD onwards.

Submissions on behalf of the Petitioner, DVC in compliance with ROP dated 29.04.2024

7. In compliance with the direction of the Commission during the hearing dated 29.04.2024, the Petition submitted the following:

(i) The project-specific tariff under Section 62 of the Electricity Act, 2003, was chosen over competitive bidding under Section 63 due to the project's small capacity (10 MW) and investment value below ₹100 crore. Moreover, the solar power generated from the project is primarily intended for internal consumption by DVC and to meet regulatory obligations like RPO, RGO, or RE bundling with thermal generation, necessitating a tariff structure aligned with these specific usage needs.

(ii) The project's SCOD was initially 30.10.2023 but was extended to 31.03.2024 upon request by M/s. Braithwaite & Company Limited (EPC Contractor). The project achieved COD within the extended timeline, with COD declared on 01.03.2024.

(iii) Detailed data of computation of IDC is based on actual payment to the contractor from 11th January 2023 till 16th February 2024, and the detailed break-up of the capital cost of Rs. 7234.86 Lakh has been provided. The calculated tariff for the 10 MW(AC) grid connected ground mounted solar PV power project computed is Rs. 4.70/kWh.

(iv) No subsidy/ incentive has been received for this project from the Central Government or the State Government by DVC.

(v) The Project Financing (Debt Equity Ratio 80:20) has been considered as per the Sanction order dated 21.12.2022. The actual loan interest rate as per the loan agreement with the Punjab and Singh Bank has been considered as 8.30% (Repo Rate + 1.80%). Additionally, the rate of borrowing of working capital is taken on the normative basis as per the RE Tariff Regulations, 2020, as 12.10%.

(vi) The project was awarded through a transparent, competitive bidding process with a reverse auction, where sufficient competition was ensured and due diligence was conducted by comparing similar capacity plants in the Eastern Region. The price trends of GDAM and GTAM prices showed that GDAM prices (up to June 2024) were slightly lower than GTAM prices (up to April 2024), ranging from Rs 5.365/kWh to Rs 5.95/kWh. The proposed tariff of Rs 4.70/kWh for the solar plant is economically favourable in this context. Further, the project being connected with DVC T&D System, there are no applicable 'Withdrawal Loss' and 'Transmission Charges'. Considering the Transmission charge being Rs 1/Unit and withdrawal loss in the range of 2 to 3%, the proposed tariff is competitive. Currently, DVC procures 40 MW of solar power from NTPC at a rate of approx. Rs 10 per unit, which is higher than the levelized tariff proposed in this petition.

(vii) The higher tariff for the 10 MW Solar PV KTPS project was influenced by several factors. The project's higher CUF required more modules and systems to maximize land use efficiency, which led to increased initial costs. Additionally, the scattered nature of the land required extensive resources for establishment, raising infrastructure

costs. Despite these challenges, the proposed tariff is still significantly lower than DVC's current procurement rate of Rs. 9.35/kWh from NTPC's Unchahar Solar PV project. The Commission's generic tariff of Rs. 9.35/kWh for FY 2012-13 and Rs. 6.99/kWh for 2x10 MW (AC) NLCIL solar PV power project with 8MWhr BESS (battery energy storage system) at Attam Pahad and Dolly Gunj Sites at South Andaman further emphasized the competitiveness of DVC's proposed tariff.

(viii) The Ministry of Power (MoP) issued a comprehensive scheme on 12.04.2022 for flexibility in the generation and scheduling of thermal/hydro power stations through bundling with renewable energy and storage power. However, an amendment on 28.09.2022 removed certain redundant procedures to expedite implementation. Specifically, para 9.2 and 9.4.3, which required consent from the beneficiaries and the submission of the proposed bundling mixes, were deleted. Under the revised framework, it is stipulated that consent from beneficiaries is not required as long as the generator is able to supply electricity to the procurer/beneficiary at a price equal to or less than that laid down in the existing PPA.

(ix) The detailed generation and CUF data for each day since the COD of 01.03.2024 covering the months of March and April 2024 have been submitted, which showed an average CUF of 23.86% for March 2024 and 23.53% for April 2024.

(x) The present Petition was uploaded on the DVC website for the General Public, including all the consumers /stakeholders. No comments were obtained. The gist of the tariff petition was not published in the newspapers due to the significant publication cost, which could increase the unit cost for end consumers. However, if directed by the Commission, the Petitioner will publish the gist in the newspapers.

Hearing held on 11.07.2024

8. During the course of the hearing, the learned counsel for the Petitioner requested permission to publish the tariff claim in newspapers for comments from other consumer beneficiaries in the DVC command area. The Commission allowed this and directed the Petitioner to file proof of the same on the affidavit after the publication.
9. The Commission also directed the Petitioner to submit additional information, which includes a detailed break-up of EPC costs and reasons for the increase from Rs 69.48 Crore to Rs.69.86 Crore, copies of contract agreements, explanations for the delay in SCOD and its impact on costs, factors influencing the tariff increase, the actual rate of borrowing for working capital, the AC/DC ratio with rationale, note on RPO obligations and compliance, due diligence with comparative analysis with similar capacity plants in the Eastern Region and comments on the request to sell excess power through bundling with thermal power.

Submissions on behalf of the Petitioner, DVC on 05.08.2024 in compliance of ROP dated 11.07.2024

10. In compliance with the direction of the Commission during the hearing dated 11.07.2024, the Petition submitted the following:

(i) DVC clarified that the EPC cost remained at Rs 69.48 Crores and a calculation error led to a perceived increase to Rs 69.86 Crores due to double counting of tax. The revised

calculation was resubmitted to reflect the accurate EPC expenses and requested the Commission to consider the corrected amount as Rs.69.48 Crores.

(ii) Explanation for SCOD delay: The SCOD for the project was originally 13.07.2023. However, due to a series of challenges and unforeseen delays, the SCOD was extended to 31.03.2024. This extension was primarily attributed to revisions in the Solar Array layout due to the rocky nature of the land, delays in the supply and installation of critical equipment, and the necessary commissioning and testing activities. Consequently, the project incurred additional costs, including increased Interest During Construction (IDC). Further, as per the terms and conditions of the contract, there is a contractual provision in imposing a penalty for liquidated damages on the EPC contractor limited to a maximum of 5% on account of the delay. This provision was kept within the contract to enforce accountability and adherence to the contract's schedule. However, the contractual settlement with the EPC Contractor was not yet completed and hence, we are unable to submit the liquidated damages amount to be imposed on the EPC Contractor on account of delay. IDC accumulates over an extended period until the project becomes operational and starts generating revenue, thereby impacting the overall cost of the project. Further delay could also result in additional costs related to project management, supervision, and potential escalation of material and labour costs due to the extended project duration.

(iii) The tariff increased from Rs. 4.62/kWh to Rs. 4.70/kWh was mainly driven by two factors: Firstly, a significant rise in normative IDC from Rs. 45.2 Lakh to Rs. 161.4 Lakh due to the extension of the construction timeline, delays in equipment supply and revisions in project layout. Secondly, an increase in the project management cost, also referred to as Overhead Cost, from Rs. 34.74 Lakh to Rs. 84.34 Lakh due to complexities and challenges encountered during the project, such as multiple revisions of the Solar Array layout and extended timelines for equipment installation and commissioning. The corrected levelized tariff, after revisions, is Rs. 4.68/kWh.

(iv) Rate of Borrowing for Working Capital: The Petitioner submitted that it had arranged a multiple number of Short-Term loan arrangements with different banks. The Rate of interest currently ranges from 6.98% to 7.35% for STL/WCDL (Working Capital Demand Loan), whereas the Rate of Cash credit ranges from 8.25% to 8.70%.

(v) DC/AC Ratio and its Rationale: DC/AC ratio for the project is 130% based on the climatic characteristics of the project location, such as sunlight intensity, temperature, and weather patterns. 1.3 DC/AC ratio helps maintain the designed AC output and CUF by ensuring that inverters are optimally utilized even during periods of lower sunlight. Additionally, this ratio minimizes system losses from factors like shading, soiling, and temperature derating, ultimately enhancing the efficiency and reliability of the solar power system. Furthermore, it improves project economics by maximizing energy yield and optimizing inverter usage, leading to a Lower Levelized Cost of Energy. By having more solar panels for the same inverter capacity, the overall cost per unit of energy produced is reduced, providing better financial returns and making the project more competitive in the market.

(vi) RPO compliance status for the past three years has been provided as directed by the Commission. The information submitted by the DVC shows a shortfall in RPO compliance in FY 2021-22 and FY2022-23 for solar for distribution business in Jharkhand and West Bengal. For FY 2023-24, the DVC has fulfilled RPO compliance. The information submitted by the Petitioner is as follows:

FY 2021-22		Jharkhand		West Bengal	
		Solar	Non-Solar	Solar	Non-Solar
RPO Target	**(MU)**	823.40	823.40	397.423	883.16
RPO Fulfilment	**(MU)**	249.14	191.594	82.042	218.392
Total Target	**(MU)**	2927.39			
Total RPO Fulfilment	**(MU)**	741.169			

FY 2022-23		Jharkhand		West Bengal	
		Solar	Non-Solar	Solar	Non-Solar
RPO Target	**(MU)**	1222.53	1205.07	702.92	2037.60
RPO Fulfilment	**(MU)**	1066.54	1279.96	569.17	1152.98
Total Target	**(MU)**	5168.12			
Total RPO Fulfilment	**(MU)**	4068.65			

FY 2023-24		Jharkhand		West Bengal	
		Solar	Non-Solar	Solar	Non-Solar
RPO Target	**(MU)**	1421.35	1403.89	561.20	1028.90
RPO Fulfilment	**(MU)**	1421.68	1404.18	561.37	1029.12
Total Target	**(MU)**	4415.34			
Total RPO Fulfilment	**(MU)**	4416.35			

(vii) The Petitioner, before awarding the LOA to the successful bidder, had gone through the due diligence process after comparing the LOA value issued by WBSEDCL for a similar capacity project.

(viii) Excess Power Sales and RE Bundling: Initially, the Petitioner envisaged that it might sell the excess solar power to the beneficiaries through the RE-bundling scheme of the Ministry of Power, Govt. of India. However, it was realised that the entire solar power to be generated from the Project would be utilised in meeting the Petitioner's solar RPO obligation and providing power to the firm consumers in its command area. MNRE came out with more stringent norms for the DISCOMs towards meeting their RPO in order to give more emphasis to the renewable energy sector. Therefore, considering the stringent target set by the Regulators, the entire power shall be utilised in meeting RPO obligation only and the chances of selling to beneficiaries through RE bundling at this stage seem remote.

Hearing held on 30.09.2024

11. During the course of the hearing, the learned counsel for the Petitioner submitted that though the Commission vide ROP dated 11.07.2024 permitted the paper publication of

the tariff petition, the Petitioner had sent individual e-mails to all the customers of the project but received no response. Accordingly, the learned counsel prayed that the service through e-mail may be accepted. Further, no representative of the Respondent was present despite notice. The Commission directed the Petitioner to file an affidavit with regard to such service of e-mails. Subject to this, the order was reserved.

Affidavit on behalf of the Petitioner in compliance with ROP dated 30.09.2024

12. In compliance with the Commission's direction, the Petitioner submitted the Affidavit, which included the emails sent to the customers on 28.09.2024, informing them and providing a copy of the present petition. Additionally, the Petitioner also submitted the newspaper publications to invite comments from the stakeholders. The Petitioner also requested that the publication expense and filing fees be borne separately by the beneficiaries of the Project.

Analysis and Decision

13. We have heard the learned counsels of parties and have carefully perused the records.
14. The determination of project-specific tariff is governed by 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."

15. 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%:

……..

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%;

……."

Tariff Design

16. Regulation 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."

17. Accordingly, the Commission shall determine the project-specific tariff of the Petitioner's (DVC) project as a single-part tariff considering the year of commissioning of the project. However, before proceeding to determine the tariff, the Commission would like to deal with the question about the Petitioner's decision to opt for project-specific tariff under Section 62 over competitive bidding under Section 63 of the Electricity Act, 2003. In response to the specific query of the Commission in this regard, the Petitioner has submitted that Section 62 project-specific tariff was chosen due to the project's small capacity (10 MW) and investment value of less than Rs.100 crore. Moreover, the solar power generated from the project is intended for internal consumption by DVC and to meet regulatory obligations like RPO and RGO necessitating a tariff structure aligned with these specific usage needs. The Commission has noted the justification but would advise the Petitioner to seriously explore the option of competitive bidding before opting for project-specific tariffs in the future. Now, we would deal with the tariff determination for the Petitioner's project in the instant case.

Debt-Equity Ratio

18. DVC submitted a Debt-Equity Ratio of 80:20 for the purpose of computation of tariff. The Project Financing is considered as per the approved Sanction order dated 21.12.2022.
19. 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."

20. The Commission notes that the Petitioner has considered the debt-equity ratio as 80:20. As per Regulation 13 of the RE Tariff Regulations, 2020, where the equity actually deployed is less than 30% of the capital cost, the actual equity needs to be considered for determination of tariff. The Petitioner has also submitted the revised sanction order dt. 21.02.2022, in which the financing pattern of debt-equity ratio as 80:20 has been approved. Accordingly, in terms of Regulation 13 of the RE Tariff Regulations, the Commission has decided to consider the debt-equity ratio of 80:20 for tariff determination of the said project.

Return on Equity

21. DVC has claimed a Return on Equity of 18.709 % by grossing up the normative return on equity of 14% with the applicable corporate tax rate. The Petitioner submitted that DVC has exercised the option u/s 115BAA of the Income Tax Act, 1961, from the Assessment Year 2020-21 onwards. DVC submitted that Section 115BAA of the Income Tax Act states that domestic companies have the option to pay Tax @ 22% plus Surcharge of 10% & Cess of 4% (Effective Tax Rate = 25.168 %). Hence, the above tax rate, i.e., 25.168 % has been considered for the purpose of computation of tariff by the Petitioner. The rate of Income tax has been adopted as 25.168% {22% (corporate tax) * 1.10 (surcharge) * 1.04 (education Cess)}. Accordingly, the Petitioner has computed the Rate of Return as 18.71% (i.e., 14% / (1 - 25.168%) for the entire tariff period (25 years).

22. 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."

23. As per Regulation 16 of the RE Tariff Regulations, the 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.

24. For the FY 2023-24, the MAT rate was 15%, and accordingly, the effective MAT rate (including a 12% surcharge and 4% Health and Education cess) works out to 17.472%. The Commission has adopted normative values of MAT and Corporate Tax. As per the RE Tariff Regulations, 2020, the normative ROE of 14% has been grossed up by MAT rate of 17.472%, which yields the Return on Equity Rate of 16.96% for the first 20 years and for the remaining tariff period, it is grossed up by the corporate tax rate of 34.94% (30% Income Tax rate+ 12% surcharge +4% Health and Education cess) which yields the ROE of 21.52%. The Commission has adopted a similar approach while dealing with petitions under project-specific tariffs. Accordingly, the same has been considered for the purpose of tariff determination.

Interest on Loan Capital

25. DVC has submitted that the actual rate of interest on loan capital as 8.3 % has been considered for the purpose of computation of tariff. In response to the specific query regarding financing of the project, DVC has submitted an approved Sanction Agreement Order dt 26.07.2023 from the Punjab and Singh Bank (PSB) Bank. DVC has also annexed a copy of the Loan Sanction Agreement with PSB for a Term Loan of Rs. 672 Crore to be utilised for capital expenditure to set up Renewable Energy projects, including ground mounted solar PV plants. Clause 4 of the Agreement mentioned the rate of borrowing of a loan as 8.30% per annum. As per Clause 6 of the Agreement, the loan shall be repaid in 40 (Forty) equal quarterly instalments in April, July, October, and January each year. Accordingly, the Petitioner has considered the interest on loan capital as 8.3% in tariff determination.

26. 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."

27. Regulation 7 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."

28. The Commission notes that the Petitioner has submitted the actual loan documentation, which showed an interest rate of 8.30 %, while the normative interest on the loan is calculated as 10.15%. The normative loan is determined by adding the 200 basis points to the average SBI MCLR (one-year tenor) prevalent during the last available six months.

29. The Commission also noted that as per the monthly data of MCLR for the last available six months (prior to the COD (i.e., 01.03.2024) of the project) from the State Bank of India and the average MCLR is shown in following table:

Effective Date	**One Year Tenor MCLR Rates**
01.09.2023 to 14.10.2023	8.55%
15.10.2023 to 14.11.2023	8.55%
15.11.2023 to 14.12.2023	8.55%
15.12.2023 to 14.01.2024	8.65%
15.01.2024 to 14.02.2024	8.65%
15.02.2024 to 01.03.2024	8.65%
Avg. for last Available 6 months	**8.59%**

This makes the normative interest on loan for FY 2023-24 as 10.59% (8.59% + 200 basis point).

30. As provided in Regulation 7 (b) of the RE Tariff Regulations 2020, financial parameters specified in the Regulations are ceiling norms. Accordingly, the Commission decides to consider the actual interest on loan provided by DVC by the Petitioner as 8.30 % p.a for the determination of tariff.

31. Further, the Commission also observes that while the tenure of the loan period is 10 years with 3 year moratorium period, the Petitioner has considered the repayment of the loan

from the first year of the commercial operation of the project as per Regulation 14(2) (c) of the RE Tariff Regulations. The Commission accepts the proposed methodology adopted by the Petitioner. Accordingly, the interest on the loan has been calculated by considering loan repayment equal to the annual depreciation allowed for the project while determining the tariff calculation as proposed by the Petitioner.

Depreciation

32. DVC has claimed the 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%.

33. 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."*

34. According to Clause (b) of Regulation 7 of the RE Tariff Regulations, the financial norms, except for capital cost, shall be the ceiling norms for determining the project-specific tariff. Accordingly, the salvage value of the asset is considered 10%, and depreciation is allowed up to 90% of the capital cost. Further, the Commission has considered depreciation at 4.67% for the first 15 years and 2% for the remaining period spread over the useful life of the project as proposed by the Petitioner.

Interest on Working Capital

35. DVC has considered the interest on working capital as 12.01% in terms of Regulation 17(1) (4) of the RE Tariff Regulations. The Petitioner has considered the average of the State Bank of India (SBI) MCLR (1 Year Tenor) for six months (from 15.09.2023 till 15.02.2024) as 8.51% and has taken an additional 350 basis points as per the RE Tariff Regulations, 2020 to arrive at the interest on working capital as 12.10% for tariff determination purpose.
36. DVC claimed the interest on working capital considering the last available six months

average State Bank of India (SBI) MCLR (1 Year Tenor) of 8.51% plus 350 basis points i.e.12.01%.

37. 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.*

38. 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 01.03.2024, the normative interest on working capital works out to be 11.59% (i.e., 8.59 % plus 350 basis points).

39. 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.

40. Upon the specific query on the interest on working capital, DVC submitted that it has arranged multiple Short-Term loan arrangements with different banks. The Rate of interest currently ranges from 6.98% to 7.35% for STL/WCDL, whereas the Rate of Cash credit ranges from 8.25% to 8.70%. As financial parameters specified in the Regulations are ceiling norms for project-specific tariff determination, the Commission has decided to consider the average rate of interest of 7.84% (average of 6.98% and 8.70%) as interest on working capital, based on the Petitioner's submission on short term loan arrangements instead of the normative rate of interest on working capital.

Discount Factor

41. DVC has considered the discount factor as 7.77% equivalent to the Post tax weighted average cost of capital [{(8.30% x 0.80) x (1 – 25.168%)} + (14.0% x0.20)] for the computation for levelized tariff.

42. 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."

43. The Commission observes that for computing the discount factor, DVC has considered an effective corporate tax rate of 25.168%, being the domestic company that has exercised the option under Section115BAA of the Income Tax Act, 1961. As explained in the context of Return on Equity, the Commission follows the normative corporate tax rate instead of individual effective tax for determination of tariff. The Commission notes that the discount factor as per the RE Tariff Regulations should be equal to the post-tax weighted average cost of capital on the basis of the debt: equity ratio specified in the Regulations. Considering the debt-equity ratio (80:20) 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.80 %) of capital cost is 8.30 %. For the equity component (i.e., 20 %), 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). The discount factor derived as per the Regulation 10(2) works out to 7.12% [(8.30 % x 0.80 x (1 – 34.94%)) + (14.0% x 0.20)]. Accordingly, the Commission allows the discount rate of 7.12% in the instant case.

Capital Cost of the Project

44. DVC has submitted the capital cost for the 10 MW Solar PV Power Plant as Rs. 7097.38 Lakh in the original petition and subsequently updated the capital cost as Rs 7196.60 Lakh in view of the COD of the project on 01.03.2024.

45. Further, in its submission in compliance with the ROP, the Petitioner revised the EPC cost for the project to Rs. 6986.2 Lakh from Rs. 6948 Lakh. However, the Petitioner later clarified that the apparent increase of the EPC cost to Rs. 6986.2 Lakh was due to a calculation error caused by double counting of tax. There has been no actual increase in the EPC cost, which remains at Rs. 6948 Lakh for the said project.

46. The Petitioner claimed that the Capital Cost includes the EPC cost of Rs. 694.80 Lakh (including GST), which was discovered through a transparent bidding process of e-tendering through the CPP Portal followed by reverse auction (RA).

Contracts		**Contract Price (Excluding GST)**	**GST Price**	**Total Price (Including GST)**
First Contract (Erection and commissioning)	Rs. Lakh	56,78,89,329.43	7,64,14,695.03	**64,43,04,024.46**
Second Contract (Service Cost)	Rs. Lakh	4,27,93,398.95	77,02,811.81	**5,04,96,210.76**
Total EPC Cost	**Rs Lakh**	**61,06,82,728.38**	**8,41,17,506.84**	**69,48,00,235.22**

47. DVC has considered other parameters like Preliminary Cost, Project Management Cost, Contingency Cost, etc., on a lumpsum basis while submitting the Petition. Subsequently, with the commissioning of the project on 01.03.2024, the DVC revised the Project Management Cost from an initial estimate of Rs 34.74 Lakhs to Rs. 84.34 Lakhs (i.e., 143% increase) and Interest During Construction (IDC) cost from an initial estimate of Rs. 45.2 Lakhs to 161.4 Lakhs (i.e., 247% increase). The Petitioner submitted that the SCOD of the Project was extended from 13.07.2023 to 01.03.2024 (delay of 232 days), resulting in increased IDC costs. IDC accumulated over the extended period until the project becomes operational and starts generating revenue, thereby impacting the overall cost of the project. Further, no subsidy/ incentive has been received for this project from the Central Government or the State Government by DVC.

48. In response to the query on explaining the reasons for the higher cost, the Petitioner has submitted that the project has been awarded through a transparent bidding process with reverse auction, and the awarded value was found to be competitive, reflecting the project's viability within the market. It was claimed that the project's higher Capacity Utilization Factor (CUF) necessitated an increase in the number of modules and associated systems, and available land plots for the solar project were scattered, which resulted in increased costs associated with cable interconnections and other infrastructure requirements. The Petitioner has claimed that while the project's costs may appear higher due to these factors, each decision was carefully considered to ensure the project's long-term viability and sustainability.
49. DVC has further submitted that the proposed tariff of Rs. 4.68 per unit from the said project would be lower than the current procurement rate of Rs. 9.13 per unit from NTPC's Unchahar Solar PV project. DVC also submitted that the proposed tariff would be significantly lower than the generic order issued by this Commission in Petition No. 35/2012 for solar PV project as Rs. 9.35 for FY 2012-13. DVC further claimed that the weighted average price of the G-DAM till June 2024 is around Rs. 5.365 per unit which is higher than the tariff proposed by the Petitioner in this instance case.

Year	**E1**	**MCP**
2024 **(till June)**	5367.75	5365.16
Summary	E1	MCP
RTC	5027.29	5025.30
Evening	6402.91	6412.75
Day	3877.48	3861.02
Night	4668.95	4670.39
Morning	5603.14	5602.73

50. The Petitioner has submitted a copy of the Letter of Award (LOA) issued by the WBSEDCL for setting up a 10MW (AC) Solar PV plant in the Jhargram District of West Bengal.

51. Further, in response to the reasons behind the delayed execution of the project, the Petitioner has submitted that the SCOD of the project was delayed by 232 days due to a series of challenges and unforeseen delays. It was submitted that the project was initially divided into four different plots, and the Solar Array layout was prepared and submitted by the EPC contractor accordingly. However, to better utilize the land and plant facilities, the layout was revised to three plots. Due to the rocky nature of all three selected plots, the Solar Array had to be revised multiple times. According to the Petitioner, this continuous revision consumed significant time and resulted in substantial delays to the project schedule. The Petitioner also submitted that the project faced delays in the supply of major equipment such as Solar PV Modules, Inverters, MVA Transformer, SCADA, metering arrangements etc., which resulted in subsequent execution of the installation.

52. The Petitioner, in its submission, has mentioned that to address these delays and enforce contractual compliance, the Petitioner imposed liquidated damages on the EPC contractor. As per the terms and conditions of the contract, there is a contractual provision in imposing a penalty for liquidated damages on the EPC contractor limited to a maximum of 5% on account of the delay. This provision has been kept within the contract to enforce accountability and adherence to the contract's schedule. However, the contractual settlement with the EPC Contractor has not yet been completed. As a result, the Petitioner has not submitted any details regarding the LD amount to be imposed on the EPC Contractor

53. The Petitioner submitted that the revised cost had been considered based on actual payment done so far to the Contractor, M/s. Braithwaite & Co. Limited. The break-up of Capital Cost provided by the Petitioner initially with the Petition and subsequently revised with the Commissioning of the Project is provided in the table below:

Table :- Beak up of the Capital Cost proposed by the Petitioner

Particulars	Unit	Initially with the Petition	Revised with COD of the Project
Preliminary Cost @0.50 % of EPC Cost	Rs. Lakhs / MW	3.47	0.29
Land Cost- Leasehold	Rs. Lakhs / MW	0	0.00
Land Cost- Freehold	Rs. Lakhs / MW	0	0.00
EPC Cost (as per LOA)	Rs. Lakhs / MW	694.80	694.80
Infrastructure Cost	Rs. Lakhs / MW	0	0.00
Project Management @0.50 % of EPC Cost	Rs. Lakhs / MW	3.47	8.43
Contingency @0.50 % of EPC Cost	Rs. Lakhs / MW	3.47	0.00
IDC - Based on actual payment done so far	Rs. Lakhs / MW	4.52	16.14
Total Capital Cost per MW	Rs. Lakhs / MW	709.74	719.67
Total Capital Cost of the Project	**Rs. Lakhs**	**7097.38**	**7196.70**

54. Regulation 12 and Regulation 46 of the Renewable Tariff Regulations, 2020 providea as under:

"Chapter 2: Financial Principles

……

12. Capital Cost

Norms for capital cost, as specified in relevant chapters of these regulations, shall be inclusive of land cost, pre-development expenses, all capital work including plant & machinery, civil work, erection, commissioning, financing cost, interest during construction, and evacuation infrastructure up to inter-connection point.

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."

55. The Commission observes that the Petitioner has claimed a Capital Cost of Rs 7196.70 Lakh for 10 MW of Ground mounted solar PV Project which comes to Rs.719.67 Lakh per MW. The Commission observed that the capital cost for solar PV projects, granted by various financial institutions in India in the year FY 2023-24 ranges from Rs 3.5 Crore to 4.5 crore per MW. Further, Karnataka Electricity Regulatory Commission (KERC) while determining the benchmark tariff for MW size solar PV project for FY2023-24 vide its order dt. 01.06.2023 have considered the capital cost of Rs 4.00 Crore per MW for Solar PV ground mounted projects. Based on analysis of the data received from various financial institutions while finalising the RE Tariff Regulations 2024 and generic tariff issued by the State Regulatory Commissions for MW-size solar Projects, the Commission finds that the capital cost claimed by the petitioner is on the higher side.

56. The Commission noted that the response submitted by the Petitioner in response to the query on the due diligence performed by the Petitioner is not adequate. The Petitioner's claim that the increase in the number of modules and associated systems was meant to achieve higher CUF from the said project, which contributed to higher initial costs. The Commission observes that the DC/AC ratio, as submitted by the Petitioner, is 1.3. The current market practice shows a much higher DC/AC ratio being followed by Solar Developers for higher CUF, but it has not caused any substantive increase in the capital cost of solar PV projects for other projects, and the levelized tariff has remained way below the tariff proposed by the Petitioner in this petition. The NTPC's Unchahar Solar PV project, which was referred by the Petitioner, was commissioned in 2013 and the Commission's generic Order, referred by the Petitioner, was also for solar PV projects commissioned in FY 2012-13. The tariff approved in FY2012-13 can't be compared with the Petitioner's project, which was commissioned in FY2023-24. Further, higher rates in the GDAM or G-TAM in the Power exchange reflect the price of electricity based on the

demand-supply of the short-term market. Though the prices do reflect the market reality, they cannot be compared with the long-term contract of 25 years, such as in this instant case. Though Petitioner's claim of saving on the 'transmission charges' and 'withdrawal losses' on account of the project being connected to DVC's T&D network is acceptable, the proposed tariff of Rs 4.68 per unit is definitely on the higher side.

57. The Petitioner, as a part of due diligence, has submitted a copy of the LOA issued by WBEDCL for a 10MW solar PV project in West Bengal. After comparing the price discovered in this referred LOA with that of the Petitioner's, the Commission observed that the price discovered in the Petitioner's project is 25% higher than that of the referred LOA of WSEDCL for a similar-sized project. Hence, the Commission is not satisfied with the quality of due diligence from the Petitioner while approving such a high cost through EPC contract.

LOA Contracts (Excluding GST)		**WSEDCL Project of 10MW**	**Petitioner Project of 10 MW**
		Price	**Price**
First Contract (Erection and commissioning)	Rs. Lakh	43,76,86,843.56	56,78,89,329.43
Second Contract (Service Cost)	Rs. Lakh	5,22,56,965.70	4,27,93,398.95
Total EPC Cost (1 and 2)	Rs Lakh	**48,99,43,809.26**	**61,06,82,728.38**

58. The Petitioner has attributed the delay in commissioning of the project to various factors such as revision in Solar Arrey layout, rocky nature of land, scattered land, etc. The Commission believes that all these factors were already known to the parties, and in fact, the DPR for the project submitted by the Petitioner envisaged that bidders should visit the plant site to get the idea of terrain and land before submitting the bid. The same cannot now be cited as the reason for the delay in the execution of the project. Other reasons for the delay, such as the supply of major equipment as mentioned by the Petitioner, are also well within the control of the parties and, hence, cannot be accepted without any valid reason. The Petitioner has also claimed that in order to address these delays and enforce contractual compliance, the Petitioner has imposed liquidated damages (LD) on the EPC contractor. The Petitioner, however, could not submit the data regarding the LD amount as a contractual settlement with the EPC contractor has not been completed till the last hearing before the Commission.

59. The Commission is of the view that the inefficiency of the EPC contractor or the Petitioner should not burden the firm consumers of the DVC. Hence, the Commission has considered the deduction of 5% of the EPC cost, i.e., Rs. 347.40 Lakh from the Capital Cost of the Project, as per the provision of the PPA. Further, the Commission observes that the Petitioner has proposed an increase in the Project Management Cost (overhead

expenses) from the initial estimate of Rs 34.74 Lakhs to Rs. 84.34 Lakhs (143%) on account of the delay in the commissioning of the project. The Commission has decided to disallow the costs associated with Project Management being overhead expenses as claimed by the Petitioner. Further, the Commission is not inclined to allow the Petitioner's claim of an increase in Interest During Construction (IDC) cost from an initial estimate of Rs. 45.2 Lakhs to 161.4 Lakhs (i.e., 247% increase) as this is on account of the delay in execution of the project and has to be settled between the Petitioner and the EPC contractor. The consumer cannot be made to bear the cost of inefficiency in project execution by the contractor. Therefore, the Commission is allowing the IDC of Rs 45.2 Lakh as submitted by the Petitioner initially with the Petition, as these are based on the actual payment done to the EPC contractor with the expected date of commissioning without any liquidated damage.

60. Accordingly, the following table provides the approved cost by the Commission under different heads as against those claimed by the Petitioner:

Sl No	Particulars	Unit	Amount as claimed by the Petitioner	As approved by the Commission (Rs. Lakh)
1	Preliminary Cost	Rs. Lakh / MW	0.29	0.29
2	Land Cost- Leasehold	Rs. Lakh / MW	0.00	0.00
3	Land Cost- Freehold	Rs. Lakh / MW	0.00	0.00
4	EPC Cost (as per LOA)	Rs. Lakh / MW	694.80	660.06
5	Infrastructure Cost	Rs. Lakh / MW	0.00	0.00
6	Project Management (Over Head)	Rs. Lakh / MW	8.43	0.00
7	Contingency	Rs. Lakh / MW	0.00	0.00
8	IDC - Computed based on actual payment	Rs. Lakh / MW	16.14	4.52
9	Total Capital Cost per MW	Rs. Lakh / MW	719.67	664.87
10	**Total Capital Cost of the Project**	**Rs. Lakh**	**7196.70**	**6648.70**

61. Based on the approved cost of the project, the Commission approves the Capital Cost of the project as Rs 6648.70 Lakh for the 10MW Solar PV Project at Kodarma, Jharkhand.

Capacity Utilisation Factor (CUF)

62. DVC has submitted that for the purpose of tariff computation for the 10 MW project, a CUF of 22.50 % has been considered at the ex-bus level. The Petitioner, in response to the query, has submitted that the DC/AC ratio for the project is 1.3, which was chosen based on the climatic characteristics of the project location, such as sunlight intensity, temperature, and weather pattern. According to the Petitioner, a DC/AC ratio of 1.3 would

help maintain the CUF of 22.50% by ensuring that inverters are optimally utilized even during periods of lower sunlight. Further, DVC, in compliance with the ROP dt. 20.05.2024 has submitted the data on two-month generation. It has been submitted that the project has achieved a monthly CUF of 23.86% and 23.53% during March 2024 and April 2024.

63. 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%:

……"

64. The Commission has observed that the CUF considered by the Petitioner is higher than the minimum CUF of 21% as specified in Regulation 47 of the RE Tariff Regulations 2020. The Commission also noted the DC/AC ratio of 1.3 submitted by the Petitioner for optimum utilisation of inverters during the period of lower sunlight. The Commission notes that the project CUF achieved for two months subsequent to the commissioning date. It is observed that the CUF of 22.50% is in line with the norms specified in Regulation 47 of the RE Tariff Regulations 2020 for Solar PV Projects, and therefore, the Commission approves the CUF of 22.50%.

Auxiliary Consumption

65. DVC has submitted that Auxiliary Consumption has not been considered as energy to be generated at CUF and has been considered at an ex-bus level only.

66. 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%.

67. The Commission notes that Regulation 49 of the RE Tariff Regulations provides a maximum of 0.75% as auxiliary consumption for the Solar PV Project. The Petitioner has not considered auxiliary consumption for tariff determination purposes and hence has been approved by the Commission as proposed by the Petitioner.

Module Degradation Factor

68. DVC has submitted that, as per industry practice, the module degradation factor is 0.7 %. But, at present, it has not considered the module degradation factor for the calculation of tariff with a prayer that DVC may be allowed liberty to approach the Commission for tariff modification if module degradation actually occurs in the future.

69. The Commission notes that the RE Tariff Regulations 2020 do not provide any norms for the module degradation factor. As submitted by the Petitioner, the module degradation factor has not been considered for the determination of Tariff. Accordingly, the Commission has decided to determine the tariff without factoring in any model degradation factor.

Operation and Maintenance Expenses

70. DVC has submitted that a separate O&M Contract has been awarded to M/s Braithwaite & Co. Limited for 10 years without any year-wise escalation, which has been discovered through the same competitive bidding process. So, for the purpose of computation of tariff, O&M cost for the 1st 10 years has been kept the same as per LOA, and from the 11th year onwards escalation @ 3.84 % per annum based on the 10th year has been considered in line with RE Tariff Regulations,2020, for the purpose of computation of tariff.

71. Regulation 75 of the RE Tariff Regulations 2020 states as under:

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

48.Operation and Maintenance expenses

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

72. Regulation 19 of the RE Tariff Regulations 2020 states as under:

"19. Operation and Maintenance Expenses

……

(2) Normative O&M expenses allowed during the 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."

73. The Commission notes that the Petitioner has awarded the contract to the EPC contractor, namely M/s M/s Braithwaite & Co. Limited, for 10 years without any escalation for ten (10) years, which has been discovered through the same competitive bidding process. The contract price discovered in the competitive bidding process for O&M Price, including the GST for the first ten years, is reproduced below:

Operation and Maintanance Contract	Price	GST (18%)	Total Price
First Year	69,77,882.41	12,56,018.83	82,33,901.24
Second Year	69,77,882.41	12,56,018.83	82,33,901.24
Third Year	69,77,882.41	12,56,018.83	82,33,901.24
Fourth Year	69,77,882.41	12,56,018.83	82,33,901.24
Fifth Year	69,77,882.41	12,56,018.83	82,33,901.24
Sizxth Year	69,77,882.41	12,56,018.83	82,33,901.24
Seventh Year	69,77,882.41	12,56,018.83	82,33,901.24
Eight Year	69,77,882.41	12,56,018.83	82,33,901.24
Ninth Year	69,77,882.41	12,56,018.83	82,33,901.24
Tenth Year	69,77,882.41	12,56,018.83	82,33,901.24
Grand Total	**6,97,78,824.10**	**1,25,60,188.30**	**8,23,39,012.40**

74. The Commission notes that the O&M Cost of Rs 82.339 lakh (i.e., 8.234 lakh per MW) for the first ten years is as per the contract. Further, for O & M Costs beyond ten years, the Petitioner has considered an escalation of 3.84% as per the RE Tariff Regulations, 2020. As explained earlier, since the commissioning of the Project is scheduled in the control period of the RE Tariff Regulations, 2020, as per Regulation 19 of the RE Tariff Regulations, 2020, O &M expenses need to be escalated at the rate of 3.84% per annum for the tariff period. Accordingly, the Commission approves the Operation and Maintenance expenses with an escalation of 3.84% applicable on the O&M expenses after the 10th year onwards.

Issue of Bundling with Thermal Power:

75. The Petitioner initially contemplated selling the excess solar power generated from the project to its beneficiaries under the scheme by the Ministry of Power on 'flexibility in generation and scheduling of Thermal/Hydropower Stations through bundling with renewable energy and Storage Power.' However, in a later submission, the Petitioner stated that the entire solar power generated would be required to fulfil its solar RPO obligations and to provide power to its firm consumers within its command area, thereby making the possibility of selling excess power through RE bundling unlikely. The Commission has noted the submission of the Petitioner.

76. The following table provides a summary of various parameters approved by the Commission for the determination of the 10MW Ground Mounted Solar PV Project at Kodarma Jharkhand:

S. No	Details	Units	As submitted by Petitioner/ DVC	As computed by the Commission
1	**Capacity**	MW	10	10
2	**Capital Cost**			
	Preliminary Cost	Rs. Lakh/MW	0.29	NA
	Land Cost- Leasehold	Rs. Lakh/MW	0.00	0.00
	Land Cost- Freehold	Rs. Lakh/MW	0.00	0.00
	EPC Cost (As per LOA)	Rs. Lakh/MW	694.80	660.06
	Infrastructure Cost	Rs. Lakh/MW	0.00	0.00
	Project Management (Over Head)	Rs. Lakh/MW	8.43	NA
	Contingency	Rs. Lakh/MW	0.00	NA
	IDC - Computed Based on Actual Payment	Rs. Lakh/MW	16.14	4.52
	Total Capital Cost	Rs. Lakh/MW	719.67	664.87
	Total Capital Cost	Rs Lakh	7196.70	664.87
3	**Debt**	%	80	80
4	**Equity**	%	20	20
5	**Loan Tenure**	Years	15	15
6	**Project Useful Life**	Years	25	25
7	**Interest on Loan**	%	8.30	8.30
8	**Depreciation**			
	Salvage Value	%	10%	10%
	Rate (For 1st 13 Years)	%	4.67	4.67
	Rate (For Remaining Life)		Balance useful life	Balance useful life
9	**ROE**	%	14	14
10	**Mat Rate %**	%	-	17.47
11	**O & M Expenses for first Ten (10) years**	Rs. Lakh/MW	8.23	8.23
12	**O&M Escalation Rate**	%	3.84	3.84
13	**Interest on WC %**	%	12.01	7.84
14	**CUF**	%	22.50	22.50
15	**Aux Power Consumption**	%	0	0
16	**WACC -Discount Factor**	%	7.77	7.12

77. Based on the parameters, assumptions, and methodology outlined in the earlier paragraphs for the 10 MW Solar PV Project, the levelized tariff works out to be Rs. 4.20 per kWh, as in Annexure I.

78. Accordingly, the Commission approves the levelized tariff of Rs. 4.20/kWh as against the Petitioner's claim of Rs. 4.68/kWh. DVC is hereby directed to raise bills for the energy generated from the project on the basis of the tariff approved above.

79. The Petition No. 346/GT/2023 is disposed of in terms of the above.

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

Annexure-1

Parameters for 10 MW Solar Photo Voltaic Power Projects at KTPS					
Sl. No.	**Assumption Head**	**Sub-head**	**Sub-head (2)**	**Unit**	**Parameter**
1	Power Generation	Capacity	Installed Power Generation Capacity	MW	10.00
			Capacity Utilization Factor (CUF)	%	22.50
			Degradation Factor	%	0.00
			Auxiliary Power Consumption	%	0.00
			Useful Life	Years	25
2	Project Cost	Capital Cost	Normative Capital Cost	Rs. Lakh/ MW	664.87
			Capital Cost	Rs. Lakh	6648.70
			Capital Subsidy, if any	Rs. Lakh	0.00
			Net Capital Cost	Rs. Lakh	6648.70
3	Financial Assumption	Debt Equity	Tariff Period	Years	25
			Debt	%	80.00
			Equity	%	20.00
		Debt Component	Total debt amount	Rs. Lakh	5318.96
			Total equity amount	Rs. Lakh	1329.74
			Loan Amount	Rs. Lakh	5318.96
			Repayment Period (incl. moratorium)	Years	15.00
			Rate of Interest on Loan (Actual)	%	8.30
		Equity Component	Equity Amount	Rs. Lakh	1329.74
			Return on Equity (Post Tax)	% p.a.	14.00
			ROE for First 20 years	% p.a.	16.96
			Return on Equity after 20 years	% 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 Expenses p.a.	For the first 10 years as per LOA	Rs. Lakh	82.34
		Escalation Factor	For the first 10 years as per LOA	%	0.00
			Escalation for 11th year onwards considered based on 10th year	%	3.84
5	Working Capital	O&M Expenses		Month	1.00
		Maintenance Spares	% of O&M Expenses	%	15.00
		Receivables		Days	45.00
		Interest on Woking Capital		% per annum	7.84
6		Discount Rate	For calculation of levelised tariff	%	7.12

Determination of Tariff Components for 10 MW Solar Photo Voltaic Power Projects at KTPS																										
Units Generation	**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**
Installed Capacity	MW	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
Gross Generation	MU	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72
Gross Gen. without considering degradation loss	MU	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72
APC @ 0.0 %	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
Net Generation	MU	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72	19.72
Tariff Components (Fixed charge)	**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**
O&M Expenses	Rs Lakh	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	82.3	85.501	88.8	92.2	95.7	99.4	103.2	107.2	111.3	115.6	120.0	124.6	129.4	134.4	139.5	144.9
Depreciation	Rs Lakh	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	310.5	133.0	133.0	133.0	133.0	133.0	133.0	133.0	133.0	133.0	129.6
Interest on Term Loan	Rs Lakh	428.6	402.8	377.0	351.3	325.5	299.7	274.0	248.2	222.4	196.6	170.9	145.1	119.3	93.6	67.8	49.4	38.4	27.3	16.3	5.4	0.0	0.0	0.0	0.0	0.0
Interest on working capital	Rs Lakh	11.7	11.5	11.2	11.0	10.7	10.5	10.2	10.0	9.7	9.5	9.3	9.2	9.0	8.8	8.7	6.9	6.9	6.9	6.9	6.9	7.6	7.7	7.9	8.0	8.1
Return on Equity	Rs Lakh	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	225.6	286.2	286.2	286.2	286.2	286.2
Total Fixed Cost	Rs Lakh	1058.7	1032.7	1006.7	980.7	954.6	928.6	902.6	876.6	850.6	824.5	801.8	779.1	756.6	734.2	712.0	518.1	511.0	504.1	497.3	490.9	551.4	556.3	561.4	566.7	568.9
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	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.42	0.43	0.45	0.47	0.49	0.50	0.52	0.54	0.56	0.59	0.61	0.63	0.66	0.68	0.71	0.73
PU Depreciation	Rs /KWh	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	1.57	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.66
PU Interest on Term Loan	Rs /KWh	2.17	2.04	1.91	1.78	1.65	1.52	1.39	1.26	1.13	1.00	0.87	0.74	0.61	0.47	0.34	0.25	0.19	0.14	0.08	0.03	0.00	0.00	0.00	0.00	0.00
PU Interest on working capital	Rs /KWh	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.04	0.04	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
PU Return on Equity	Rs /KWh	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.45	1.45	1.45	1.45	1.45
PU Tariff Components	Rs /KWh	5.37	5.24	5.10	4.97	4.84	4.71	4.58	4.44	4.31	4.18	4.07	3.95	3.84	3.72	3.61	2.63	2.59	2.56	2.52	2.49	2.80	2.82	2.85	2.87	2.88
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	0.76	0.71	0.66	0.62	0.58	0.54	0.50	0.47	0.44	0.41	0.38	0.36	0.33	0.31	0.29	0.27	0.25	0.24	0.22	0.21	0.19
Discounted Tariff Component	Rs /KWh	5.37	4.89	4.45	4.05	3.68	3.34	3.03	2.75	2.49	2.25	2.04	1.85	1.68	1.52	1.38	0.94	0.86	0.79	0.73	0.67	0.71	0.67	0.63	0.59	0.55
Levelised Tariff	Rs /KWh	**4.20**																								