

**BEFORE THE HON'BLE MADHYA PRADESH ELECTRICITY  
REGULATORY COMMISSION**

Petition No: \_\_\_\_\_ of 2024

**IN THE MATTER OF:**

**Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL)**

Urja Bhawan,  
Bhopal, Madhya Pradesh

...Petitioner 1

**Madhya Pradesh Power Management Company Limited,**

Shakti Bhawan, PO Vidyutnagar, Rampur,  
Jabalpur – 482008

... Respondent 1

**Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited,**

“Nishtha Parisar”, Bijlee Nagar,  
Govindpura, Bhopal - 462023

... Respondent 2

**Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited,**

GPH Compound, Polo Ground,  
Indore – 452001

...Respondent 3

**Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company Limited,**

Shakti Bhawan, PO Vidyutnagar, Rampur,  
Jabalpur – 482008

... Respondent 4

## INDEX

<b>S. No.</b>	<b>Particulars</b>	<b>Annexure</b>	<b>Page</b>
1.	Petition under section 86(1)(e), section 61(h) of the Electricity Act, 2003 for determination of Pre-fixed levelized tariff for sale of power from decentralized Solar Power Plants having capacity of five hundred (500) kW to two (2) MW or such other capacity as per notification of Govt. of India, to be set up under Component-A.		01-21
2.	Affidavit in support of Petition		22
3.	MNRE order designating MPUVNL as the State Implementing Agency (SIA).	Annexure I	23
4.	Daily order of Hon'ble commission dated 7 Feb. 2024.	Annexure II	24
5.	Tariff calculation under instant petition	Annexure III	25

**BEFORE THE HON'BLE MADHYA PRADESH ELECTRICITY  
REGULATORY COMMISSION**

Petition No: \_\_\_\_\_ of 2024

**IN THE MATTER OF:**

Petition under section 86(1)(e), section 61(h) of the Electricity Act, 2003 for determination of Pre-fixed levelized tariff for sale of power from decentralized Solar Power Plants having capacity of five hundred (500) kW to two (2) MW or such other capacity as per notification of Govt. of India, to be set up under Component-A of the Pradhan Mantri Kisan Urja Surakhsha evam Utthan Mahabhiyan (PM KUSUM) Scheme introduced by Government of India (GoI).

**AND**

**IN THE MATTER OF:**

**Madhya Pradesh Urja Vikas Nigam Limited (MPUVNL)**  
Urja Bhawan,  
Bhopal, Madhya Pradesh

**...Petitioner 1**

**Madhya Pradesh Power Management Company Limited,**  
Shakti Bhawan, PO Vidyutnagar, Rampur,  
Jabalpur – 482008

**... Respondent 1**

**Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited,**  
“Nishtha Parisar”, Bijlee Nagar,  
Govindpura, Bhopal - 462023 **... Respondent 2**

**Madhya Pradesh Paschim Kshetra Vidyut Vitaran Company Limited,**  
GPH Compound, Polo Ground,  
Indore – 452001 **...Respondent 3**

**Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company Limited,**  
Shakti Bhawan, PO Vidyutnagar, Rampur,  
Jabalpur – 482008 **... Respondent 4**

**PETITION FOR DETERMINATION OF PRE-FIXED LEVELIZED TRAIFF FOR SALE OF POWER FROM DECENTRALIZED SOLAR POWER PLANTS HAVING CAPACITY OF FIVE HUNDRED (500) KW TO TWO (2) MW OR SUCH OTHER CAPACITY AS PER NOTIFICATION OF GOVT. OF INDIA, TO BE SET UP UNDER COMPONENT-A OF THE PRADHAN MANTRI KISAN URJA SURAKHSHA EVAM UTTHAN MAHABHIYAN (PM KUSUM) SCHEME INTRODUCED BY GOVERNMENT OF INDIA (GOI).**

**Prayers**

Thus, the Petitioner humbly prays before the Hon'ble Commission to consider this petition and pass necessary orders on the following:

- 1. Take the accompanying petition on record and treat it as complete.*
- 2. Considering the facts and circumstances mentioned in the petition, the Hon'ble commission may be pleased to determine the Pre-fixed levelized tariff of Rs. 3.22 per unit for sale of power from decentralized solar power plants to the state DISCOMs under Component A of PM KUSUM Scheme.*
- 3. The pre-fixed levelized tariff determined shall remain valid till one year from the notification of the Order. However, in view of changing market dynamics, it may be reviewed suo-motu by Hon'ble Commission or on an application filed by Petitioner in the interest of scheme implementation, in similar manner as being taken up by Hon'ble Himachal Pradesh Electricity Regulatory Commission (HPERC) for last a few years.*
- 4. Condone any inadvertent omissions/ errors/ shortcomings/ delays and permit the petitioners to add/ change/ modify/ alter this filing and make further submissions as may be required at a later stage.*

*5. Pass such an Order as the Hon'ble Commission deems fit and proper as per the facts and circumstances of the case.*

**MOST RESPECTFULLY SHOWETH:**

1. Ministry of New and Renewable Energy (MNRE) launched the guidelines for implementation of Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM KUSUM) Scheme on 22<sup>nd</sup> July 2019. These guidelines have been amended from time to time till date (recent amendment to guidelines issued on 17 January 2024).
2. This scheme has provision for the decentralized ground mounted grid connected renewable energy plants, standalone solar powered agriculture pumps and solarization of grid connected agriculture pumps.
3. MNRE has designated MPUVNL as the State Implementing Agency (SIA) vide letter No: F.No. 32/54/2018 – SPV Division, dated 26<sup>th</sup> November 2019 for implementation of Component A of PM KUSUM Scheme in the state of Madhya Pradesh attached as **Annexure I**. MNRE allocates targets to SIA for every year on regular basis and, SIA is responsible for implementation of projects within the defined timeframe.
4. For successful implementation of the scheme, a pre-fixed levelized tariff needs to be determined. Accordingly, Hon'ble Commission had issued order dated 16.02.2021, in the matter of petition no. 50/2020, determining pre-fixed levelized tariff for a 3-year control period. Subsequently, in view of experience and market dynamics in implementation of component A of PM KUSUM Scheme, petition no.

29/2023 was filed for revision of above tariff. However, Hon'ble Commission, while disposing off the above petition, directed the Petitioner to file appropriate petition for determination of pre-fixed levelized tariff for next control period. Hence, MPUVNL filed a petition no. NIL dated 30 January 2024 for determination of pre-fixed levelized tariff for sale of power from decentralized Solar Power Plants having capacity of five hundred (500) kW to two (2) MW or such other capacity as per notification of Govt. of India, to be set up under Component-A of the PM KUSUM Scheme to the MPPMCL / DISCOMs of the state for next control period as per prayers and considerations herein this petition.

5. In the above petition no. NIL dated 30 January 2024, the project cost of projects under Component-A of PM KUSUM Scheme was aligned to that of Hon'ble Himachal Pradesh Electricity Regulatory Commission (HPERC). It was so taken in line with directions of this Hon'ble Commission in petition no. 29/ 2023, which declined to rely on upon the claims and counter claims of petitioner and respondents because reports published in magazines/ websites can not be made a basis of determining capital cost of solar modules:

*“ ..... Even the claim of Respondent is based on a report published in PV Magazine. Petitioner in his rejoinder tried to counter the claim of Respondent based on another report published in the same PV Magazine and submitted data sourced from some websites. **Commission observed that the reports published in magazines/ websites cannot be made a basis of determining capital cost of solar modules [emphasis added]** and Commission does not rely upon the claims and*

*counter claims of petitioner and respondents based on such reports alone*". [para 18 of order of Hon'ble MPERC dated 09.10.2023 in matter of petition 29/2023];

6. However, it is decided to file this revised petition as agreeable to Respondent 1.

#### **A. Background of Component A of PM KUSUM Scheme:**

1. MNRE has given the target of two hundred (200) MW vide order dated 18 May 2022 and hundred (100) MW vide order dated 28 June 2023 for installation of Decentralized Renewable Energy Power Plant (REPP) of capacity five hundred (500) kW to two (2) MW or such other capacity as per notification of Govt. of India.
2. Such REPP will be setup by individual farmers/ group of farmers/ cooperatives/ panchayats/ Farmer Producer Organizations (FPO)/Water User associations (WUA) or project developer hereinafter called Renewable Power Generator (RPG).
3. The REPP will preferably be installed within five (5) km radius of the sub-stations identified by the DISCOMs in order to avoid high cost of sub-transmission lines and to reduce transmission losses.
4. The identified list of sub-stations is being notified and updated on the website of SIA from time to time.
5. In case the farmers/ group of farmers/ cooperatives/ panchayats/ FPO/ WUA etc. are not able to arrange equity required for setting up the REPP, they can opt for developing the REPP through project developer.



In such a case, the landowner will get lease rent as mutually agreed between the parties. The lease rent may be in terms of Rs per year per acre of land or in terms of Rs per unit energy generated.

6. The REPP under the scheme would be implemented primarily on barren land or such other lands as prescribed in relevant guidelines for Component-A of PM KUSUM Scheme from time to time.

#### **B. Implementation of Component A of PM KUSUM Scheme:**

1. DISCOM shall assess and notify RE generation capacity that can be injected in to all DISCOM sub-station in the state and place such notification on the website of SIA for information of all stakeholders.
2. To facilitate farmers willing to lease out their land for development of RE plants preferably within five (5) km of radius of the notified substation(s), as per provisions of this scheme, list of such farmers received through online EoI is being placed by SIA on their website. However, the leasing of land of any farmers will be a bi-partite agreement between the farmer and the project developer and DISCOM/ SIA will not be held responsible for failure in getting the land leased out to the RPG.
3. SIA is inviting DISCOM sub-station wise proposal from RPG to participate in appropriately designed transparent selection process for development of decentralized renewable power plants. The RPG shall submit their proposal as per relevant process and procedure notified by SIA from time to time. An RPG will not be allowed to apply for more than one REPP for a particular DISCOM sub-station.
4. REPP of capacity from 500 kW up to two (2) MW, or such other capacity as per notification of Govt. of India, to be connected at eleven (11) kV or thirty three (33) kV side of DISCOM sub-station,

- or such other voltage level in accordance with MNRE Guidelines, and the selected RPG will be responsible for laying of such dedicated line from REPP to such sub-station, construction of bay and related switchgear at the sub-station where the REPP is connected to the grid and metering is done. To meet additional demand at a substation, DISCOM may augment the capacity of sub-station under any other scheme as appropriate.
5. Alternatively, RPG can get constructed such dedicated lines, bay(s) or related switchgear through DISCOM by paying the applicable cost and other charges. RPG will be responsible for maintaining such dedicated line from REPP to concerned sub-station.

### **C. General Principle**

#### **1. Control Period:**

- a. The tariff certainty is required for consistent progress and successful implementation of the scheme in the state.
- b. Hence, the Petitioner proposes the validity of the tariff determined by Hon'ble MPERC till one (1) year from the notification of this order. However, in view of changing market dynamics, it may be reviewed suo-motu by Hon'ble Commission or on an application filed by Petitioner in the interest of scheme implementation.

### **D. Project Specific Principles**

1. **Operational Parameters for determination of pre-fixed levelized tariff for REPPs:**
  - i **Useful Life of a REPP:**

a. Life of a REPP including evacuation system till substation is considered as 25 years, as per CERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulation 2020 dated 23<sup>rd</sup> June 2020 (CERC RE Tariff Regulation 2020).

**ii Capacity Utilization Factor (CUF):**

a. CUF of a REPP is a site-specific parameter. Madhya Pradesh is one of the largest States in India and solar irradiance varies from one place to another considerably. Hence, it is necessary to consider the CUF which will represent the State as a whole.

b. During the discussion held at the time of filing of petition no. 50/2020, it was suggested by MPPMCL that average CUF achieved from large scale ground mounted solar projects located in Rewa is 21% per annum.

c. Therefore, as per above mentioned fact CUF of 21% per annum is considered over the useful life of an REPP without considering any system degradation.

**iii Auxiliary Consumption:**

a. CERC RE Tariff Regulation 2020 mentions that for the project specific tariff, maximum Auxiliary consumption would be 0.75% Hence, it is considered as 0.75% of the total energy generated per annum for the calculation of pre-fixed levelized tariff.

**2. Financial Parameters for determination of pre-fixed levelized tariff for REPPs:**

**i Debt Equity Ratio:**

a. Based on the CERC RE Tariff Regulation 2020 and MPERC (Terms and condition for Tariff determination of energy from

Renewable Energy Sources) Regulation 2017, Debt Equity ratio is considered as 70:30.

**ii Capital Cost:**

- a. Like with any product and its price life cycle, the pricing dynamics for solar system is evolving and unpredictable. Further, despite continuous evolution in Renewable Energy Technologies, a host of critical factors (like demand-supply gap, import dependency and un-economies of scale and nature of stakeholders) add differentiated dynamics to projects envisaged under PM KUSUM Scheme. Hence, it is pertinent to apply reasonableness and considered capital cost, as per the prevailing market dynamics, to arrive at pre-fixed levelized tariff for projects under component A of PM KUSUM Scheme.
- b. On reviewing of progress in case of Component C of PM KUSUM Scheme (where INR 1.05 crore/ MW subsidy is provided from GoI) and latest tariff order passed by Himachal Pradesh Electricity Regulatory Commission (HPERC) for small scale solar projects on 4 November 2023, the Petitioner is of considered view to adopt the latest capital cost of the project as per market dynamics should be considered to determine pre-fixed levelized tariff for new control period. Accordingly, a petition was filed on 30 January 2024, which was admitted by Hon'ble Commission held motion hearing on 6 February 2024 and passed daily order in the matter dated 7 February 2024 (**Annexure II**). The same was marked to Respondent 1 by Hon'ble Commission vide e mail from Secretary of the Commission dated 7 February 2024 and

further communicated by the Petitioner to Respondent 1 vide e mail dated 12.02.2024.

- c. A few rounds of discussion were held with MPPMCL since then to device methodology agreeable to Respondent 1 on capital cost of projects under Component-C of PM KUSUM Scheme. Accordingly, following approach for determination of capital cost was agreeable to Respondent 1:

<b>Cost breakup</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
Cost of solar module in international market as per India-RE-Navigator for month of Dec-2023	Cents USD/ Wp		11.1
	INR/ Wp	83.22 (USD to INR)	9.24
Overheads from port to site	%		2.3%
Cost of solar module (at site)	INR/ Wp		9.45
Cost of solar module	INR Lakh /MW		94.50
Overload	INR Lakh /MW	10.00%	103.95
Impact of BCD (basic customs duty)	INR Lakh /MW	40.00%	41.58
Cost of solar module after BCD	INR Lakh /MW		145.53
Inverter	INR Lakh /MW		44.03
BOS	INR Lakh /MW		95.95
Capital cost before taxes and other expenses	INR Lakh /MW		<b>285.51</b>
GST for 70% of capital cost	INR Lakh /MW	12%	23.98
GST for 30% of capital cost	INR Lakh /MW	18%	15.42

<b>Cost breakup</b>	<b>Unit</b>	<b>Rate</b>	<b>Amount</b>
Total capital cost after SGD/BCD and GST	INR Lakh /MW		<b>324.91</b>
Cost of Constructing 11 kV Transmission line (5 KM)	INR Lakh /KM	3.21	16.05
Cost of Developing 11 kV Bay and related switchgear	INR Lakh	6.96	6.96
Total Capital Cost including Transmission line and related switchgear	INR Lakh /MW		<b>347.92</b>

d. Therefore, as projects under Component A of PM KUSUM Scheme set in Madhya Pradesh are 0.5 MW to 2 MW on agricultural lands, above capital cost agreeable to Respondent 1 was decided to be considered for the purpose of determination of pre-fixed levelized tariff under this revised petition i.e. INR 347.92 lakh/ MW.

**iii Interest and Tenure of Loan:**

- a. Interest rate for both deposits and loans keep on changing with advent time. Moreover, basis submissions of documents submitted by developers, it is noted by the Petitioner that the lending rate of solar projects are in the range of 10.50% to 11.45%. So, the petitioner here relies on the latest regulation published by Hon'ble CERC. i.e. CERC RE Tariff Regulation 2020 for Interest and Tenure of Loan.
- b. As per CERC RE Tariff Regulation 2020, *“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”.*

Below mentioned table shows the SBI MCLR rate (one-year tenor) of last available six months.

**Table: MCLR Rate of SBI**

Month	SBI MCLR rate (one-year tenor)
September 2023	8.55%
August 2023	8.55%
July 2023	8.55%
June 2023	8.50%
May 2023	8.50%
April 2023	8.50%
Average of 6 months	<b>8.53%</b>

- c. So, Interest on Loan is considered as 10.53% (8.53% + 2.00 %) per annum.
- d. It is to be noted that the loan tenure for solar projects is in the range of 8 to 20 years for solar projects as provided by CERC’s Explanatory Memorandum on Draft CERC (Terms and Condition for Tariff Determination from RE Sources) Regulation, 2020 (“CERC RE Tariff Regulation EM”). So, in line with the current market trends and as per CERC RE Tariff Regulation 2020, the tenure of loan is considered as 15 years for tariff computation.

#### iv Return on Equity (RoE):

- a. The Return on Equity tariff component in essence, is provided such that the RPG is able to get reasonable returns after recovery of all applicable cost components. It is imperative that the return on equity is commensurate to the risks associated with RE projects under considerations.
- b. Petitioner has relied on CERC RE Tariff Regulation 2020 for the same.

*As per CERC RE Tariff Regulation 2020, "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".*

- c. Latest available MAT rate is 15% plus applicable surcharge (7%) and Health and Education Cess (4%).
- d. Latest Corporate Tax applicable is 25% for domestic company, plus applicable surcharge (7%) and Health and Education Cess (4%).
- e. Hence Pre-tax RoE for first 20 years considered for the determination of tariff is as given below:

Applicable MAT	= 15% * 1.07 * 1.04
	= 16.69%
Pre-tax RoE	= Base Rate / (1- tax rate)
	= 14% / (1 – 16.69%)
	= 16.81%



- f. Pre-tax RoE for the remaining Useful Life considered for the determination of tariff is as given below.

$$\begin{aligned}\text{Applicable Corporate Tax Rate} &= 25\% * 1.07 * 1.04 \\ &= 27.82\% \\ \text{Pre-tax RoE} &= \text{Base Rate} / (1 - \text{tax rate}) \\ &= 14\% / (1 - 27.82\%) \\ &= 19.40\%\end{aligned}$$

**v Discount Rate:**

- a. As per CERC RE Tariff regulation 2020, *“for the purpose of pre-fixed levelized tariff computation, discount factor equivalent to post-tax weighted average cost of capital shall be considered”*.
- b. Calculation of the same is given below.

$$\begin{aligned}\text{Discount Rate} &= [(\text{Debt component} \times \text{Interest on debt}) \times \\ &\quad (1 - \text{Corporate Tax})] + \\ &\quad (\text{Equity component} \times \text{RoE}) \\ &= [(70\% \times 10.53\%) \times (1 - 27.82\%)] + (30\% \\ &\quad \times 14\%) \\ &= 9.52\%\end{aligned}$$

Hence, Discount Rate is considered as 9.52% per annum.

**vi Depreciation:**

- a. Depreciation is utilized to meet the debt repayment. As per CERC RE Tariff Regulation 2020, the Salvage value of the asset shall be considered as 10% and depreciation shall be allowed up to maximum of 90% of the Capital Cost of the asset.
- b. Hence, 70% of the capital cost of asset shall be depreciated up to the loan tenure and 20% of the capital cost of asset shall be depreciated over the remaining Useful Life of the Project.

- c. So, Depreciation up to the loan tenure is considered as 4.67% per annum and depreciation after the loan repayment tenure is considered as 2.00% per annum.

**vii Interest on Working Capital:**

- a. As we have appealed in earlier provisos, interest rate for both deposits and loans keep on changing with change in time. Hence, petitioner is relied on methodology given for calculating the interest on working capital in latest regulation of CERC i.e. CERC RE Tariff Regulation 2020.
- b. As per CERC RE Tariff Regulation 2020, *“normative interest rate of three hundred 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 shall be considered”*.
- c. As mentioned in the table above under clause (b) of main clause (iii), Average of SBI MCLR (one-year tenor) of last six month (from April 2023 to September 2023) is 8.53%.
- d. So, for the computation of pre-fixed levelized tariff, the Petitioner has considered the Interest on Working Capital as 12.03% (8.53% + 3.50%) per annum.

**viii Operation and Maintenance Cost and escalation:**

- a. The operation and maintenance expenses comprise of manpower expenses, insurance expenses, spares and repairs, consumables and other expenses. Moreover, the expense of manpower keeps on increasing and O&M of a REPP is more of services related work.

- b. O&M cost of the project is site specific parameter. Hence, as per MPERC (Terms and condition for Tariff determination of energy from Renewable Energy Sources) Regulation 2017, O&M cost is considered as Rs. 7 Lakh / MW.
- c. However, escalation in O&M cost is required to meet the escalation in prices in future years. We have considered the escalation of 3.84% per annum on O&M expense, as given in CERC RE Tariff Regulation 2020, from second year to meet the increased operational expenses.

**ix Working Capital:**

- a. As per MPERC (Terms and condition for Tariff determination of energy from Renewable Energy Sources) Regulation 2017, the working capital is comprised of following components:

O&M Cost	1 Month
Maintenance Spare	15% of O&M Cost
Receivables	2 Months of energy charges for sale of electricity, calculated on the normative CUF.

**x Lease Rent to be paid to farmers and its escalation.**

- a. The word “Utthan Mahabhiyan” in “Pradhan Mantri Kisan Urja Surakhsha evam Utthan Mahabhiyan” specifies the sole purpose of the scheme, which is to increase the income of farmers. The farmers having barren land which does not generate any income to the farmers, such land be can leased to RPG. By doing so, farmer can earn income from it.

- b. Since, the guidelines for component A of PM KUSUM has provision to provide land to RPG on lease basis, it is necessary that farmer should get the lease rent in 25 years which must be equivalent to the current procurement cost of the land under the policy.
- c. As the Petitioner has adopted project capex aligned with order of Hon'ble HPERC dated 4 November 2023, which includes cost of land/ land lease for project, for the purpose of instant Petition, exclusive provision for the same has not been made. However, considering land requirement for one (1) MW to be around two (2) hectares, it is assessed that a farmer may get land cost which may yield or be equivalent to a reasonable annual lease rent, with provision for reasonable annual escalation in it from second year.
3. Above mentioned parameters as explained in Part D, are briefed in the table mentioned below for ready reference of the Hon'ble Commission.

Life of a plant	25 years
CUF	21%
Auxiliary Consumption	0.75%
Debt Equity Ratio	70:30
Capital Cost	Rs 347.92 Lakh / MW
Loan Tenure	15 years
Interest on Loan	10.53%

Pre-tax RoE till 20 Years	16.81%
Pre-tax RoE for remaining Useful Life of REPP	19.40%
Discount Rate	9.52%
Salvage Value of Asset	10%
Depreciation up to loan period (remaining value to be spread equally over the remaining life of the project)	4.67%
Interest on Working Capital	12.03%
O&M cost (3.84% escalation from second year)	Rs. 7 Lakh / MW

With above mentioned parameters the pre-fixed levelized tariff under this revised petition is determined as Rs. 3.22 / kWh. Detailed calculation of the same is attached in the **Annexure III**.