

Before
The Hon'ble Jharkhand State Electricity
Regulatory Commission, Ranchi



Petition
for

Determination of Feed In-Tariff for sale of Solar Power to JBVNL by Farmers/cooperatives/Panchayats/other Developers who would set up Decentralised Ground Mounted Grid-connected Solar Power Plants of capacities ranging between 0.5 – 2.0 MW in their barren lands under the 'Kisan Urja Suraksha Evam Utthan Mahabhiyan' (KUSUM) Scheme launched by the Ministry of New and Renewable Energy (MNRE), Govt. of India.



Submitted By
Jharkhand Bijli Vitran Nigam Limited
(JBVNL)
Dhurwa, HEC, Ranchi

Before the Hon'ble Jharkhand State Electricity Regulatory Commission, Ranchi

Filing Number: _____

Case Number: _____

IN THE MATTER OF:

Application under S. 86(1)(a) for determination of Feed In-Tariff for sale of Solar Power to JBVNL/DISCOMs by Farmers/cooperatives/Panchayats/other Developers who would set up Decentralised Ground Mounted Grid-connected Solar Power Plants of capacities ranging between 0.5 – 2.0 MW in their barren lands under the 'Kisan Urja Suraksha Evam Utthan Mahabhiyan' (KUSUM) Scheme launched by the Ministry of New and Renewable Energy (MNRE), Govt. of India.

AND IN THE MATTER OF:

Jharkhand Bijli Vitran Nigam Limited (hereinafter referred to as "JBVNL", or "erstwhile JSEB -Distribution function" which shall mean for the purpose of this Petition the "Licensee" or "Petitioner") having its registered office at HEC, Dhurwa, Ranchi

The Petitioner respectfully submits hereunder:

1. The erstwhile Jharkhand State Electricity Board ("Board" or "JSEB") was a statutory body constituted under Section 5 of the Electricity (Supply) Act, 1948 and was engaged in electricity generation, transmission, distribution and related activities in the State of Jharkhand.
2. Jharkhand Urja Vikas Nigam Ltd. (herein after to be referred to as "JUVNL" or "the Holding company") has been incorporated under Indian Companies Act, 1956 pursuant to decision of Government of Jharkhand to reorganize erstwhile Jharkhand State Electricity Board (herein after referred to as "JSEB"). The Petitioner submits that the said reorganization of the JSEB has been done by Government of Jharkhand pursuant to "Part XIII – Reorganization of Board" read with section 131 of the Electricity Act 2003. The Holding company has been incorporated on 16th September 2013 with the Registrar of Companies, Jharkhand, Ranchi and has obtained Certificate of Commencement of Business on 12th November 2013.
3. Jharkhand Bijli Vitran Nigam Ltd. (herein after to be referred to as "JBVNL" or "the Petitioner" or erstwhile "JSEB-Distribution function" has been incorporated on 23rd October 2013 with the Registrar of Companies, Jharkhand, Ranchi and has obtained Certificate of Commencement of Business on 28th November 2013. The Petitioner is a Company constituted under the provisions of Government of Jharkhand, General

Resolution as notified by transfer scheme vide notification no. 8, dated 6th January 2014. The Distribution Company - Jharkhand Bijli Vitran Nigam Ltd. is duly registered with the Registrar of Companies, Ranchi on 23rd October 2013

4. The present Petition is being filed by JBVNL before the Hon'ble Commission under section 62 (1) (a) and section 86(1) (a) of Electricity Act,2003 for approval of Feed In-Tariff for sale of Solar Power to JBVNL/DISCOMs by Farmers/cooperatives/Panchayats/other Developers who would set up Decentralised Ground Mounted Grid-connected Solar Power Plants of capacities ranging between 0.5 – 2.0 MW in their barren lands under the 'Kisan Urja Suraksha Evam Utthan Mahabhiyan' (KUSUM) Scheme launched by the Ministry of New and Renewable Energy (MNRE), Govt. of India

Jharkhand Bijli Vitran Nigam Limited

Petitioner

Ranchi

Dated:

Determination of pre-fixed levellised tariff for sale of power from power projects set up under Component-A and rate for purchase of excess power from solarised agriculture pumps under Component-C of the PM KUSUM Scheme of GoI to the State Discoms.

Background:

- 1 As per part of Intended Nationally Determined Contributions (INDCs), India has committed to increase the share of installed capacity of electric power from non-fossil sources to 40% by 2030. Large Scale Solar power generation projects are also being installed to achieve the ambitious target of 100 GW of Solar Power generation by 2022.
- 2 Ministry of New and Renewable Energy has recently launched the guidelines for implementation of *Pradhan Mantri Kisan Urja Suraksha evam Uthan Mahabhiyan* Scheme (PM KUSUM) on 22nd July, 2019 covers the following components:
 - 2.1 Component A: Setting up of 10,000 MW of Decentralized Ground Mounted Grid Connected Solar Power plants of individual plant size upto 2 MW;
 - 2.2 Component-B: Installation of 17.50 Lakh Standalone Solar Powered Agriculture Pumps of individual capacity upto 7.5 HP; and
 - 2.3 Component-C: Solarisation of 10 Lakh Grid-Connected Agriculture Pumps of individual pump capacity upto 7.5 HP.
- 3 The Component-A and Component-C will be implemented initially on pilot mode for 1000 MW capacity and one lakh grid connected agriculture pumps respectively and Component-B will be implemented in full-fledged manner with total Central Government support of ₹ 19,036.5 Crore. After successful implementation of pilot project under Components-A and Component-C, the same shall be scaled up with necessary modifications based on the learning from the pilot phase with total Central Government support of ₹ 15,385.5 Crores. All three components of the scheme aim to add Solar capacity of 25,750 MW by 2022 with the total Central Financial Support of ₹ 34,422 crore.
- 4 The implementation mechanism under the said guidelines is as under:

Component A: Setting up of 10,000 MW of Decentralized Ground/Stilt Mounted Grid

Connected Solar or other Renewable Energy based Power Plants Component-A:

- i. Under Component-A, solar or other renewable energy-based power plants (REPP) of capacity 500 kW to 2 MW will be setup by individual farmers/ group of farmers/ cooperatives/ panchayats/ Farmer Producer Organisations (FPO)/Water User associations (WUA) hereinafter called Renewable Power Generator (RPG). However, States/DISCOMs may allow setting-up of solar or other renewable energy-based power plants of capacity less than 500 kW in specific cases. The REPP will be preferably installed within five km radius of the sub-stations in order to avoid high cost of sub-transmission lines and to reduce transmission losses.
- ii. The Distribution companies (DISCOMs) will notify sub-station wise surplus capacity which can be fed from such RE power plants to the Grid and shall invite applications from interested beneficiaries for setting up the renewable energy plants. The renewable power generated will be purchased by DISCOMs at a pre-fixed levellised tariff. In case, the aggregate capacity offered by Applicants is more than notified capacity for a particular sub-station, bidding route will be followed by DISCOMs to select Renewable Power generator and in such cases the pre-fixed levellised tariff will be the ceiling tariff for bidding. Selection of bidders will be based on the lowest tariff offered in the ascending order as quoted by the bidders in the closed bid or e-reverse auction as the case may be. A model PPA (Power Purchase Agreement) to be executed between RPG and DISCOMs has been prepared by MNRE. The duration of PPA will be 25 years from Commercial Operation Date (COD) of the project. The total energy purchased from these RE plants will be accounted for fulfilment of RPO by the DISCOM.
- iii. In case the farmers/ group of farmers/ cooperatives/ panchayats/ Farmer Producer Organisations (FPO)/ Water User associations (WUA) etc. are not able to arrange equity required for setting up the REPP, they can opt for developing the REPP through developer(s) or even through local DISCOM, which will be considered as RPG in this case. In such a case, the land owner 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 per acre of land area. The farmer(s) may opt for payment of lease rent directly in their bank account by the DISCOM, from the payment due to the developer. A model Land Lease Agreement to facilitate the beneficiaries has also been prepared by MNRE. However, the terms of Land Lease Agreement may be finalised on mutual consent of concerned parties.

- iv. The REPP under the scheme would be implemented primarily on Barren / uncultivable land. Agricultural land is also permitted under the scheme provided that solar plants are installed in stilt fashion (i.e. raised structure for installation of Solar panels) and with adequate spacing between panel rows for ensuring that farming activity is not affected. The RPG would be free to adopt any renewable energy source or technology while responding to the bid. However, in case of cultivable land with solar plants, the same may be installed on stilts, so that the farmers continue to cultivate the land, apart from getting the benefit of lease rent. In such a case DISCOM may also float bids (in case of specific substations) where setting up of solar projects on stilts may be mandatorily required, and bids for energy tariff invited accordingly.
- v. DISCOM shall assess and notify RE generation capacity that can be injected in to all 33/11 kV or 66/11 kV or 110/11 kV sub-station of rural areas and place such notification on its website for information of all stakeholders. To facilitate farmers willing to lease out their land for development of RE plants near above notified substation(s), as per provisions of this scheme, DISCOM may also place list of such farmers on their website. However, the leasing of land of any farmers will be a bi-partite agreement between the farmer and the developer and DISCOM will not be held responsible for failure in getting the land leased out to a developer. To meet additional demand DISCOM will augment the capacity of sub-station under IPDS or any other scheme.
- vi. DISCOM or any agency authorized by the DISCOM shall invite 33/11 kV or 66/11 kV or 110/11 kV sub-station wise EoI from RPG to participate in selection process for development of decentralised renewable power plants. The RPG shall submit their interest against the EoI as per the schedule notified by DISCOM. An RPG will not be allowed to apply for more than one renewable power plant for a particular 33/11 kV sub-station.
- vii. REPP of capacity up to 2 MW may be connected at 11 kV side of substation and the selected RPG will be responsible for laying of dedicated 11 kV line from REPP to sub-station, construction of bay and related switchgear at sub-station where the plant is connected to the grid and metering is done.
- viii. For selection of REPP, the total aggregate capacity of the eligible applications received is to be evaluated. In case, the total aggregate capacity of eligible applications received for a particular sub-station is less than or equal to the capacity notified for connectivity at the sub-station, LoA will be awarded to all eligible applicants for procurement of renewable power at a pre-fixed levelised tariff. In case the total aggregate capacity of eligible application received for a particular sub-station is more

than the capacity notified for connectivity at the sub-station, then DISCOM or any agency authorized by the DISCOM shall invite Bids from all these applicants. All eligible applicants will have to submit tariff bids within a prescribed time. Selection of bidders will be based on the lowest tariff offered in the ascending order as quoted by the bidders in the closed bid or e-reverse auction as the case may be. LoA will be awarded to all successful bidders.

- ix. A copy of standard Power Purchase Agreement to be executed between the DISCOM and the RPG shall be provided by DISCOM along with invitation for submission of EoI. The model PPA agreement shall be as provided by MNRE.
- x. The PPA shall be for a period of 25 years from the date of COD. The DISCOM will be obliged to buy the entire power from RPG within the contract capacity.
- xi. MNRE will provide Procurement Based Incentive (PBI) to the DISCOMs @ 40 paise/kWh or Rs.6.60 lakhs/MW/year, whichever is lower, for buying solar/ other renewable power under this scheme. The PBI will be given to the DISCOMs for a period of five years from the Commercial Operation Date of the plant. Therefore, the total PBI that shall be payable to DISCOMs will be Rs. 33 Lakh per MW.
- xii. The total energy purchased from these RE plants will be accounted for fulfilment of RPO by the DISCOM.

Component B: Installation of 17.50 Lakh Stand-alone Solar Pumps:

Under this Component, individual farmers will be supported to install standalone solar Agriculture pumps of capacity up to 7.5 HP for replacement of existing diesel Agriculture pumps / irrigation systems in off-grid areas, where grid supply is not available.

Component C: Solarisation of 10 Lakh Grid Connected Agriculture Pumps:

- i. Under this Component, individual farmers having grid connected agriculture pump will be supported to solarise pumps. Solar PV capacity up to two times of pump capacity in kW is allowed under the scheme. However, State may specify lower solar PV capacity in kW, which in any case shall be not be less than pump capacity in HP e.g. for 2 HP pump it will not be less than 2 kW. The farmer will be able to use the generated solar power to meet the irrigation needs and the excess solar power will be sold to DISCOMs.

5 The Allocation of capacity under different components are as follows:

| Component | Scope | Executing Agency/Nodal agency | Allocation |
|-----------|---|-----------------------------------|---|
| A | Installation of Small RE Plants of capacity from 0.5 MW to 2 MW | Jharkhand Bijili Vitran Nigam Ltd | 10 MW Ministry of New and Renewable Energy order dated 14.01.2020 (annexure –I) on request of JBVNL vide letter no: 1378 dated: 20.11.2019 |
| B | Installation of Standalone Solar Pumps | JREDA | 10000 |
| C | Solarisation of grid connected pumps | JREDA | 2000 |

Pre-determined Levellized tariff for Component-A:

- 6 In order to carry out execution of the PM-KUSUM scheme it is imperative to obtain approval of Pre-Determined Levellized tariff for the energy from grid mounted solar power from Hon'ble JSERC.
- 7 JSERC (Determination of Tariff for Procurement of Power from Solar PV Power Project and Solar Thermal Power Project) Regulations, 2015 provides norms including Capital Cost, CUF, Auxiliary Energy consumption, O&M expenses shall be determined on the basis of prevalent market trend. The broad guidelines of the relevant regulations have been perused and are given below:

Capacity Utilization Factor:

- 8 *The Capacity utilisation factor for Solar PV project shall be 19%. Provided that the Commission may deviate from above norm in case of project specific tariff determination.*

Life of Plant:

- 9 *The life of plant for Solar PV project whose commercial operation date falls within the control period of these Regulations shall be 25 years.*

Debt Equity Ratio:

- 10 *Accordingly, for generic tariff, to be determined suo-motu, the debt equity ratio shall be 70:30.*

Term of loan and Interest on long term debt:

- 11 *For the purpose of determination of tariff, loan tenure of 12 years shall be considered. For the purpose of computation of tariff the normative interest rate on long term loan shall be considered as average State Bank of India (SBI) Base rate prevalent during the first six months of the previous year plus 300 basis points*

Depreciation:

- 12 *The value base for the purpose of depreciation shall be the Capital Cost of the asset admitted by the Commission. 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. Depreciation per annum shall be based on 'Differential Depreciation Approach' over loan period beyond loan tenure over useful life computed on Straight Line Method'. The depreciation rate for the first 12 years of the Tariff Period shall be 5.83% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 13th year onwards.*

Operation and Maintenance expenses:

- 13 *O&M expenses shall be Rs 11.88 Lacs/MW for the 1st year of Control Period. Normative O&M expenses allowed at the commencement of the Control Period under these Regulations shall be escalated at the rate of 5.72% per annum.*

Working capital requirement and interest on working capital

20. *Operation & Maintenance expenses for one month*
21. *Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF*
22. *Maintenance spares @ 15% of Operation and Maintenance expenses.*
23. *Interest on Working Capital shall be at interest rate equivalent to the average State Bank of India Base Rate prevalent during the first six months of the previous year plus 350 basis points.*

Return on equity:-

24. *The value base for the equity shall be 30% of the capital cost or actual equity (in case of project specific tariff determination as determined under Regulation 4.23)*
25. *The return on equity considered by the Commission in these regulations shall be: (i) 20% per annum for the first 10 years. (ii) 24% per annum 11th years onwards.*

Capital Cost:-

- a. *The capital cost of a solar PV power project primarily consists of the cost of Photo Voltaic modules, balance of plant equipment, power conditioning equipment, taxes and duties, cost of inter-connection, civil works, land including leasehold lands and erection & commissioning.*
- b. *The normative capital cost for Solar PV projects shall be Rs 605.85 lacs/MW for FY 2015-16. Provided that the Commission may deviate from the above norm in case of project specific tariff determination in pursuance of Regulation 4.4.*
- c. *It is important to note that with the advancement in the technology of the solar PV based installations and associated economies of scale, the capital cost for Solar PV installations would also decrease in the near future. Therefore the benchmark capital cost of Solar PV projects may be reviewed annually by the Commission.*

Discount Factor:-

- a. Regulations 10 (2) of Hon'ble CERC specify methodology to calculate discount factor for the purpose of levelised tariff computation as under:
- b. Accordingly, the discount factor considered for this exercise is equal to the post tax weighted average cost of capital on the basis of normative debt: equity ratio (70:30) proposed in the Regulations.
- c. Accordingly, the discount factor considered for this exercise is equal to the post tax weighted average cost of capital on the basis of normative debt: equity ratio (70:30) proposed in the Regulations. Considering the normative debt equity ratio and weighted average of the post-tax rates for debt and equity component, the discount factor is calculated. Interest Rate considered for the loan component (i.e.70 %) of capital cost is 10.41 %. For equity component (i.e. 30 %), rate of Return on Equity (ROE) is considered at post tax rate of 14 %. The discount factor derived by this method for all technologies is 9.65 % $((10.41\% \times 0.70 \times (1 - 25.16\%)) + (14.0\% \times 0.30))$ (Income tax rate @ 25.16% (22% IT rate+ 10% surcharge +4% Health and Education cess).
- 14 The aforesaid regulations from the learned commission was adapted and it is observed that with advancement in technology and continuous improvement in the efficiency of the solar modules including capability to generate power even in diffused sunlight, the CUF has also

witnessed improvement. Hence, for the limited purpose of working out levelized tariff in the present Order, a CUF of 20% is considered.

- 15 The most important parameter impacting the levelized tariff is the project cost which as per Ld. JSERC RE Regulations has to be aligned with the market trend. The capital cost for FY 2015-16 was Rs. 605.85 lakhs/MW. The cost solar panel is linked with the international price at the prevalent INR : USD exchange rate. However, as of now good quality solar module manufacturing capacities have come up in India as well and the same is available at a competitive rate. Hence, under 'Make in India' campaign the same needs to be promoted.
- 16 Pre-fixed levelized tariff determined by a few SERCs in India has been perused. The Ld. SERC of Rajasthan vide its Order dated 06.09.2019 (draft Order) has considered Capital Cost of Rs. 3.40 Crore / MW largely based on the Solar Tariff notified by the Ld. SERCs of Karnataka and Tamil Nadu for the FY 2019-20. The Ld. KERC has considered Capital Cost of Rs. 3.40 Crore / MW while SERCs of Tamil Nadu has considered Capital Cost of Rs. 3.35 Crore / MW.
- 17 The Capital Cost of such projects especially cost of modules, inverter and civil work may not vary significantly across the country. Further, as the relevant Orders of the Ld. KERC and Ld. RERC are more recent, the Capital Cost, for this purpose is taken at Rs. 3.40 Crore / MW.
- 18 The Central Electricity Regulatory Commission's Regulations on Terms and Conditions of determination of Tariff from Renewable Energy (RE) sources, 2017 specify determination of O&M expenses in a Project specific case based on prevailing market information. As per O&M rates approved by Ld. KERC, Ld. TNERC and Ld. RERC the O&M cost is taken as 4.50 Lakhs/MW, 4.69 Lakhs/MW and 4.5 Lakhs/MW.
- 19 Hon'ble CERC in its RE Tariff regulations dt.17.4.2017 has specified Return on Equity of 14% to be grossed up with prevailing MAT on 1st of April of previous year and in its RE tariff order of 2019-2020 has considered RoE of 17.60% after grossing up with average MAT of 20.46% prevailing on 1st of April 2018.
- 20 The petitioner prays to the Hon'ble commission to consider the following changes in the JSERC (Determination of Tariff for Procurement of Power from Solar PV Power Project and Solar Thermal Power Project) Regulations, 2015:

| Sl.No. | Tariff Design Components | As per the regulation | Proposed as per regulations and market scenario |
|--------|--------------------------|-----------------------|---|
| 1 | Capital cost | 605.85 Lakhs/MW | 340 Lakhs/MW |

| Sl.No. | Tariff Design Components | As per the regulation | Proposed as per regulations and market scenario |
|--------|--------------------------|--|---|
| 2 | O&M cost | 11.88 Lakhs/MW | 4.50 Lakhs/MW |
| 3 | Return on Equity | 20% for first 10 years and subsequently by 24% | 14% post tax and 17.60% pre-tax (grossed up with MAT) |
| 4 | CUF | 19% | 20% |
| 5 | Calculated Tariff | Rs. 4.25/ Kwh | Rs. 3.09/ Kwh |

- 21 The solar tariff as per the tariff design laid out in Hon'ble JSERC (Determination of Tariff for Procurement of Power from Solar PV Power Project and Solar Thermal Power Project) Regulations, 2015 comes out to be Rs. 4.25/ Kwh and calculations of which is attached as annexure II for the kind consideration of the commission. The solar tariff computed with reference to the determinants listed above works as per the changes in the tariff design out to 3.09 per unit without accelerated depreciation benefit and calculations of which is attached as annexure III for kind consideration of the commission. In case accelerated depreciation the tariff comes around 2.86 per unit.
- 22 Benchmarking of the calculated tariff was carried out with the tariff approved for PM-KUSUM scheme in the state of Haryana, Orissa and Rajasthan.

| | Haryana | Orissa | Rajasthan | JSERC,2015 | Proposed |
|-----------------|---------|--|-----------|------------|----------|
| Tariff(Rs/Unit) | 3.11 | 3.40 for first 5 years and 3.08 subsequently | 3.14 | 4.24 | 3.09 |

Prayer

- 23 It is humble prayer of the JBVNL that:
- 23.1 Hon'ble commission may please admit the petition
- 23.2 Hon'ble commission may take note the of PM-KUSUM program formulated by MNRE, GOI vide office memorandum number (F. No: 32/645/2017- SPV Division) dated 22/07/2019.

- 23.3 Hon'ble commission may allow changes in the tariff design for calculation of tariff for procurement of power from Renewable energy power plants as constructed under PM-KUSUM scheme.
- 23.4 Hon'ble commission may allow rate of Rs. 3.09 per unit for purchase of power Renewable energy Power Plant (REPP) constructed under PM-KUSUM component A.
- 23.5 Pass such other and other orders as may be deemed fit and proper in the fact and circumstance of the case.
- 23.6 The Petitioners crave leave to reserve its right to add, alter, amend / modify the memo of the petition and make further submission as and when required.