

Delhi Electricity Regulatory Commission
Viniyamak Bhawan, 'C' Block, Shivalik, Malviya Nagar, New Delhi-110017

No. F.11 (812)/DERC/2012-13/

Petition No. 23 /2012

In the matter of: Petition seeking adoption of generic tariff for generation of electricity from tail end grid 55.2 kWp Solar PV Project at TPDDL RG-23 Grid Rohini in Delhi.

Tata Power Distribution Company Ltd.
Formerly known as NDPL
Through its: Sr. General Manager
33kV Sub Station Building
Hudson lane
Delhi 110 009

Coram:

**Sh. P.D. Sudhakar, Chairman, Sh. Shyam Wadhera, Member &
Sh. J.P. Singh, Member**

ORDER

(Date of Order: 14.11.2013)

1. Tata Power Delhi Distribution Limited (TPDDL) has submitted a Petition before the Commission seeking adoption of generic tariff for generation of electricity from tail end grid interactive 55.2 kWp Solar PV Project at TPDDL RG-23 Grid Rohini in Delhi.
2. The Petitioner has submitted that the plant has been selected under the Ministry of New & Renewable Energy MNRE scheme of "*Tail-End Grid -Connected Demonstration Program*". Accordingly, petitioner is entitled to receive a subsidy or Central Financial Assistance (CFA) from Ministry of New and Renewable Energy under above mentioned scheme.
3. The hearing for the admission of the Petition was held on 12.07.2012 and was admitted.
4. The matter was further heard on 04.09.2012 and during the hearing, various issues were raised and TPDDL was asked to submit information on actual Capital Cost, MNRE Subsidy, Energy accounting mechanism etc.
5. TPDDL submitted the reply to the queries vide communication dated 26.10.2012 .
6. The last hearing was held on 16.7.2013 where Commission took note of the information submitted by the Petitioner.
7. TPDDL submitted the information to the other queries raised by the Commission vide communication dated 12.9.2013.

8. Determination of Tariff for Solar PV

The Commission has decided to adopt actual costs and normative operating parameters for those projects which have been commissioned before 8th January 2013, when the Commission issued DERC (Terms and Conditions for determination of tariff for grid connected Solar PV Projects) Regulations 2013 as given in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009 for the purpose of tariff determination in respect of such solar projects which have received capital subsidy from MNRE under its "*Tail-End Grid -Connected Demonstration Program*". Various

parameters adopted by the Commission for the purpose of tariff determination are discussed below:

1. Capital cost:

Petitioner’s Submission

The Petitioner has submitted that plant has been selected under the Ministry of New & Renewable Energy MNRE scheme of *"Tail-End Grid -Connected Demonstration Program"*. Accordingly, petitioner is entitled to receive a subsidy or Central Financial Assistance (CFA) from Ministry of New and Renewable Energy under above mentioned scheme. Accordingly, the petitioner is entitled for subsidy of Rs 38.95 Lacs for this project. The normative Capital Cost as per CERC Order dated 26.4.2010 in Petition No. 53/2010 is Rs. 1690 Lakh/ MW.

Table 1 Petitioners Submission

| | |
|--|---------------------------|
| Normative Capital Cost as specified in CERC Order dated 26.4.2010 | Rs. 1690 Lakhs/ MW |
| Capital cost for 52.2 kW Plant as per above norms | Rs. 93.29 Lakh |
| Subsidy availed | Rs 38.95 Lakh |
| Capital Cost after subsidy | Rs. 54.34 Lakh |

Commission’s decision:

The Commission vide order dated 24.04.2012 had directed petitioner to file the information on actual Capital Cost, MNRE Subsidy and to indicate where it is reflected in the accounts. While the Petitioner has submitted statement of accounts as at 31 March 2012 and Auditors Certificate certifying that the capital expenditure incurred included in gross block of fixed assets as at 30 September, 2012 aggregating to Rs 79.31 lacs and capital grants received up to 30 September, 2012 aggregating to Rs 35.58 lacs for the Solar project is in accordance with the books of account and related records. The Petitioner is yet to indicate where the capital expenditure is reflected in the audited accounts. The Petitioner also has to establish that the capital expenditure on the solar plant has been excluded from the capital base for the distribution assets.

The Commission has examined the audited books of accounts of TPDDL for FY 2010-11 and it is observed that there is no disclosure regarding various solar plants in capital assets. Pending the receipt of details which link the auditor’s certificates to the audited accounts, the tariff is being fixed provisionally considering a capital cost of Rs. 11 crores per MW. For finalization of tariff at actual capital cost, the licensee shall show where the capital cost has been reflected in the audited accounts of the company and establish that these costs have been removed from the capital base of the distribution business. In view of the above, the capital cost approved by the Commission is given in table below:

Table 2 Capital cost taken by the Commission

| | |
|--|----------------|
| Provisional Cost of the Project | Rs. 60.72 Lakh |
| Subsidy availed | Rs 38.95 Lakh |
| Provisional Capital Cost after subsidy | Rs. 21.77 Lakh |

2. Debt Equity Ratio

Petitioner’s Submission

The Petitioner has considered debt equity ratio of 70:30 as specified in CERC RE Tariff Regulations 2009. It is stated in the Regulations that if the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.

Table 3 Petitioners Submission for Debt Equity Ratio

| | |
|------------------------------|----------------|
| Capital Cost after subsidy | Rs. 54.34 Lakh |
| Debt (70% of Capital Cost) | Rs. 38.04 Lakh |
| Equity (30% of Capital Cost) | Rs.16.30 Lakh |

Commission’s decision:

The Commission has analyzed the audited statement of the accounts for the project and it has been clarified from the Auditor’s Certificate - Note A-2 that the head office account primarily comprises equity, borrowings allocated to the project and is net of receivables. As per the auditor certificate head office account has a negative balance of Rs 27.72 lacs for this project. The Commission has considered the head office account shown in the balance sheet and it appears that there is no infusion of equity. However, the Petitioner would have to establish the capital cost as well as the equity infusion in the project for determination of final tariff.

As per in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009, funding of the solar project, the following provisions shall apply:-

*“If the equity actually deployed is more than 30% of the capital cost, equity in excess of 30% shall be treated as normative loan.
Provided that where equity actually deployed is less than 30% of the capital cost, the actual equity shall be considered for determination of tariff:
Provided further that the equity invested in foreign currency shall be designated in Indian rupees on the date of each investment”*

The Commission has considered the project as 100% debt funded in line with CERC Regulations 2009. In view of the above, the allowed capital cost is given in table below:

Table 3 Debt Equity Ratio allowed by the Commission

| | |
|--|----------------|
| Provisional Project Capital Cost after subsidy | Rs. 21.77 Lakh |
| Debt (100% of Capital Cost) | Rs. 21.77 Lakh |
| Equity (0% of Capital Cost) | Rs.0 Lakh |

3. Return on Equity

Petitioner's Submission

The Petitioner has requested to consider the Return on Equity as per the Clause (1) of Regulation 16 of the CERC RE Regulations 2009 that provides

“ The value base for the equity shall be 30% of the capital cost for generic tariff determination and as per the Clause (2) of the said regulation that stipulates the normative return on equity as under:

- Pre-tax 19% per annum for the first 10 years, and*
- Pre-tax 24% per annum from the 11th year onwards.”*

Commission's decision:

The Commission has not considered Return on Equity as per the norms specified in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009.

4. Rate of Interest on loan Capital

Petitioner's Submission

The Petitioner has submitted to consider the normative Interest on loan capital specified in the in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009 as below:

- Loan tenure of 10 years.
- Average long term prime lending rate (LTPLR) of State Bank of India (SBI) prevalent during the previous year plus 150 basis points.

Commission's decision:

The Commission vide order dated 7.2.2013 had directed the petitioner to furnish details about actual rate of interest on the monies borrowed by the Petitioner. The petitioner has not submitted any details regarding rate of interest and loan availed. The Commission has considered the Average Rate of Interest of **10.17%** as approved in Tariff Order of TPDDL dated **31.07.2013 for FY 2011-12** in absence of any specific loan details; as the project has attained COD on 31st March 2012 for the purpose of rate of interest on the normative loan.

5. Depreciation and Useful plant life

Petitioner's Submission

The Petitioner has considered the normative depreciation as specified in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009 as below:

“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 tenure and period beyond loan tenure over useful life

computed on 'Straight Line Method'. The depreciation rate for the first 10 years of the Tariff Period shall be 7% per annum and the remaining depreciation shall be spread over the remaining useful life of the project from 11th year onwards.

Depreciation shall be chargeable from the first year of commercial operation.

Provided that in case of commercial operation of the asset for part of the year, depreciation shall be charged on pro rata basis."

Commission's decision:

As per CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009, depreciation has been allowed upto 90% of the project cost.

6. Operation and maintenance expenses

Petitioner's Submission

The Petitioner has considered the normative O&M Expense as specified in CERC Order dated 26.4.2010 in Petition No. 53/2010 as below

- a. The normative O&M Expenses is Rs.9.5 Lakh/MW for FY 2010-11 with escalation factor of 5.72% p.a.

Commission's decision:

The Commission has considered the Operation and maintenance expenses of Rs. 9.5 Lakh/ MW with escalation factor of 5.72% p.a as per the norms specified in CERC Order dated 26.4.2010.

7. Working Capital

Petitioner's Submission

The Petitioner has submitted that the working capital is computed as per the norms specified in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009 as stated below

- *Operation & Maintenance expenses for one month;*
- *Receivables equivalent to 2 (Two) months of energy charges for sale of electricity calculated on the normative CUF;*
- *Maintenance spare @ 15% of operation and maintenance expenses.*

Commission's decision

The Commission has computed working capital as per the norms specified in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009.

Formula for calculation of Working Capital considered by the Commission

= (15% x O&M + O&M/12 (Operation & Maintenance expenses for one month) + 2/12 (Receivables equivalent to 2 (Two) months of energy charges) x Annual Fixed Cost) x Rate of Interest on Working Capital.

8. Interest on Working Capital

Petitioner's Submission

The Petitioner has submitted to consider the normative rate of Interest on working capital @ 12.87 as specified in CERC Order dated 26.4.2010 in Petition No. 53/2010 as below:

"Interest on Working Capital shall be equal to interest rate equivalent to average State Bank of India short term PLR during the previous year plus 100 basis point."

Commission’s decision

The Commission has considered the actual rate of Interest on working capital of TPDDL calculated in Tariff Order 2013-14 for the year 2011-12 for allowing rate of interest on debt in carrying cost and the same is considered @ 11.43%.

9. Capacity Utilization Factor(CUF)

Petitioner’s Submission

The Petitioner has submitted to consider capacity utilization factor of 19% as specified in CERC RE tariff Regulations 2009. TPDDL has submitted the details of actual CUF achieved for its solar plants vide letter dated 12.9.2013 for the consideration of the Commission.

Commission’s decision

The Commission has considered the capacity utilization factor of 19% as per the norms specified in CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009. In case the Petitioner seeks any relaxation with respect to the capacity utilization factor, it shall provide details regarding output guaranteed by the bidder and penalties imposed for not meeting such guarantees, including the consequential impact on the cost of the plant. The CUF shall be reviewed after 5 years based on the performance vis-a-vis the guaranteed output along with contractual remedies enforced by the Petitioner.

10. Discount Rate

Petitioner’s Submission

The Petitioner has considered **Discount Rate @ 15.83%** as per the CERC RE Regulations 2009 .

Commission’s decision

The Commission has considered CERC (Terms and Conditions for Tariff determination from renewable Energy Sources) Regulations 2009 for determination of discount rate. The discount factor is equal to the weighted average cost of the capital on the basis of actual debt: equity ratio (100:0). Interest Rate considered for the loan component (i.e. 100%) of Capital Cost is @ 10.17% (as explained at Para 8.4). For equity component (i.e. 0%) rate of Return on Equity (ROE) for the first ten (10) years is 19% and for 11th year onward till useful life of the RE project the rate is 24%. Based on these rates, the weighted average of rate of ROE has been calculated which is around 22%.The discount rate is the Weighted Average Cost of Capital (WACC) as calculated below:

$$\begin{aligned} \text{WACC} &= \frac{\text{weight of debt} \times \text{interest rate on loan} + \text{weight of equity} \times \text{average rate of ROE}}{100} \\ \text{Rate of ROE} &= \text{Weighted average of Return on Equity} = \frac{(19 \times 10 + 24 \times 15)}{(10 + 15)} = 22\% \\ \text{Hence, Discount Rate considered} &= \text{WACC} = \frac{100 \times 10.17 + 30 \times 0}{100} = 10.17\% \end{aligned}$$

11. Levelized Tariff

Petitioner’s Submission

The Petitioner has determined the Tariff as per above submitted parameters that all are in-accordance with the normative parameters of CERC and Tariff determined for the plant as submitted by the Petitioner is equal to Rs. 10.79/- per unit.

Commission’s decision

The Commission has considered all the assumptions and norms as discussed above for tariff determination of the 55.2 kWp Solar PV Project at TPDDL RG-23 Grid Rohini in Delhi. The tariff is being fixed provisionally considering a normative capital cost of Rs. 11 crores per MW in the absence of actual capital cost and actual subsidy received (ref. para. 8.1). In order to finalize the tariff, the licensee shall show where the costs have been reflected in the audited accounts of the company and that these costs have been removed from the capital base of the distribution business. The levelized Tariff for 55.2 kWp Solar PV Project at TPDDL RG-23 Grid Rohini in Delhi has been determined provisionally at Rs 3.56/- per unit for 25 years from the date of commissioning. The detailed tariff calculation sheet is attached as annexure- I.

Ordered Accordingly

**Sd/-
(J. P. Singh)
MEMBER**

**Sd/-
(Shyam Wadhera)
MEMBER**

**Sd/-
(P. D. Sudhakar)
CHAIRMAN**

| |
|---|
| <p align="center">25 Year Levelized Tariff</p> <p align="center">55.2 KW- Grid Interactive Solar Photovoltaic Plant-RG 23</p> |
|---|

| Assumptions | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------|--------|--------|----------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Rating of the Plant | | | 0.0552 | MW | | | | | | | | | | | | | | | | | | | | | | |
| Project Cost | | | 0.2177 | Rs. Crores | | | | | | | | | | | | | | | | | | | | | | |
| Debt | | | 1.00 | 0.2177 | | | | | | | | | | | | | | | | | | | | | | |
| Equity | | | 0.00 | 0.0000 | | | | | | | | | | | | | | | | | | | | | | |
| Rate of Interest on loan | | | 10.17% | Actual rate of Interest of TPDDL | | | | | | | | | | | | | | | | | | | | | | |
| Return on Equity | | | 19.00% | 24.00% | | | | | | | | | | | | | | | | | | | | | | |
| Tax Rate | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Loan Repayment Period | | | 10.00 | Years | | | | | | | | | | | | | | | | | | | | | | |
| Depreciation | | | 9.00% | 0.00% | | | | | | | | | | | | | | | | | | | | | | |
| O&M Cost | | | 0.0951 | INR Crores/MW | | | | | | | | | | | | | | | | | | | | | | |
| Interest on Working Capital | | | 11.43% | Actual rate of Interest of TPDDL | | | | | | | | | | | | | | | | | | | | | | |
| Rate of Return considered for Levelised Tariff | | | 10.17% | WACC | | | | | | | | | | | | | | | | | | | | | | |
| Escalation (O& M) | | | 0.0572 | 1.06 | | | | | | | | | | | | | | | | | | | | | | |
| PLF | | | 19.00% | | | | | | | | | | | | | | | | | | | | | | | |
| Years | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Interest on Loan Capital | | 0.0211 | 0.0192 | 0.0172 | 0.0152 | 0.0132 | 0.0112 | 0.0092 | 0.0072 | 0.0052 | 0.0032 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0022 |
| Depreciation | | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0196 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Cumulative Depreciation | | 0.0196 | 0.0392 | 0.0588 | 0.0784 | 0.0980 | 0.1176 | 0.1372 | 0.1567 | 0.1763 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 |
| Cumulative Repayment | | 0.0196 | 0.0392 | 0.0588 | 0.0784 | 0.0980 | 0.1176 | 0.1372 | 0.1567 | 0.1763 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 | 0.1959 |
| Loan o/s at the end | | 0.1981 | 0.1785 | 0.1589 | 0.1393 | 0.1197 | 0.1001 | 0.0805 | 0.0610 | 0.0414 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 | 0.0218 |
| Return on Equity | | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| O&M Expenses | | 0.0053 | 0.0056 | 0.0059 | 0.0062 | 0.0066 | 0.0069 | 0.0073 | 0.0078 | 0.0082 | 0.0087 | 0.0092 | 0.0097 | 0.0102 | 0.0108 | 0.0114 | 0.0121 | 0.0128 | 0.0135 | 0.0143 | 0.0151 | 0.0160 | 0.0169 | 0.0179 | 0.0189 | 0.0200 |
| Interest on Working Capital | | 0.0010 | 0.0010 | 0.0010 | 0.0010 | 0.0009 | 0.0009 | 0.0009 | 0.0009 | 0.0008 | 0.0008 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0006 | 0.0006 | 0.0006 | 0.0007 | 0.0007 | 0.0007 | 0.0007 | 0.0008 | 0.0008 | 0.0009 | 0.0009 |
| Annual Fixed Cost | | 0.0470 | 0.0453 | 0.0436 | 0.0419 | 0.0403 | 0.0386 | 0.0370 | 0.0354 | 0.0339 | 0.0323 | 0.0118 | 0.0124 | 0.0130 | 0.0136 | 0.0142 | 0.0149 | 0.0156 | 0.0164 | 0.0172 | 0.0181 | 0.0190 | 0.0199 | 0.0209 | 0.0220 | 0.0231 |
| Units Generated in the year (MUs) | | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 | 0.0919 |
| Unit Cost (Rs / Unit) | | 5.1184 | 4.9315 | 4.7466 | 4.5637 | 4.3831 | 4.2047 | 4.0288 | 3.8555 | 3.6849 | 3.5172 | 1.2892 | 1.3489 | 1.4120 | 1.4787 | 1.5492 | 1.6238 | 1.7026 | 1.7859 | 1.8740 | 1.9672 | 2.0657 | 2.1698 | 2.2798 | 2.3962 | 2.5192 |
| Discounting Factor | | 1.0000 | 0.9077 | 0.8239 | 0.7478 | 0.6788 | 0.6161 | 0.5593 | 0.5076 | 0.4608 | 0.4182 | 0.3796 | 0.3446 | 0.3128 | 0.2839 | 0.2577 | 0.2339 | 0.2123 | 0.1927 | 0.1749 | 0.1588 | 0.1441 | 0.1308 | 0.1187 | 0.1078 | 0.0978 |
| Discounted Tariff | | 5.1184 | 4.4763 | 3.9107 | 3.4129 | 2.9753 | 2.5907 | 2.2532 | 1.9572 | 1.6979 | 1.4711 | 0.4894 | 0.4648 | 0.4416 | 0.4198 | 0.3992 | 0.3798 | 0.3615 | 0.3442 | 0.3278 | 0.3123 | 0.2977 | 0.2838 | 0.2707 | 0.2583 | 0.2465 |
| Levelized Tariff/Unit | 3.56 | | | | | | | | | | | | | | | | | | | | | | | | | |

Cost@11Cr/MW

Subsidy

0.3895