



ASSAM ELECTRICITY REGULATORY COMMISSION

FILE NO. AERC. 407/2013/Pt-I

PETITION NO. 10/2013 & 22/2014

ORDER SHEET

09.04.2015

Before the Assam Electricity Regulatory Commission

ASEB Campus, Dwarandhar,
G. S. Road, Sixth Mile, Guwahati – 781 022

Petition No. 10/2013 & 22/2014

Suryataap Energies and Infrastructure Pvt. Ltd. (SEIPL)

—— Petitioner

Assam Power Distribution Co. Ltd. (APDCL)

—— Respondent

In the matter of

Determination of tariff for sale of Power from 5 MW Grid Connected Solar PV Power Plant of SEIPL to APDCL to be set-up at IGC, Balipara, sonitpur district, Assam.

ORDER

1. BACKGROUND:

The Suryataap Energies and Infrastructure Pvt. Ltd. (SEIPL), New Delhi, a wholly owned subsidiary of Moser Baer Clean Energy (hereinafter referred to as the “petitioner”), filed a tariff petition of 02.01.2013 before the Commission along with DPR (December, 2012) for determination of generic tariff for its proposed 5 MW (2MW-PH-I, 3MW-PH-II) grid connected PV Solar Power Plant to be set-up at Boko, kamrup district, Assam under section 62 of Electricity Act, 2003 and the relevant regulations of AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012. A Power Purchase Agreement (PPA) was signed with APDCL on 03.11.2012 for sale of 5 MW power to APDCL.

A detailed power point presentation was made by the petitioner at AERC office on 15.03.2013 regarding implementation of the proposed 5 MW SPV plant

Additional submissions, inter-alia, indicating detailed break-up of capital cost were submitted on 02.05.2013. The comments on the petition was received from APDCL (hereinafter referred to as the “respondent”) on 29.04.2013. Also, the petitioner submitted the para wise reply on the comments of APDCL on 14.05.2013 wherein they informed that the site selection is not yet finalized for various reasons.

Meanwhile, after careful examination and consideration of the submissions of the petitioner, the Commission admitted the petition on

06.05.2013 and registered as petition no. 10/2013. However, the Commission could not initiate the proceedings due to non-finalization of the project site.

The petitioner subsequently submitted the additional information and documents including a revised DPR (September, 2013) on 15.11.2013 wherein they stated that a new project site (25 acres) at IGC, Balipara, Sonitpur has been finalized after discarding the earlier proposed site at Boko, kamrup due to high development cost and other difficulties. The new land has been provisionally allotted by AIDC on lease on payment of initial fees. The additional submission of the petitioner was forwarded to the respondent for their views and comments on 17.12.2013 in view of change of the project site. The reply from APDCL was awaited even after sending several reminders.

Meanwhile, the Commission could not proceed further on the petition due to considerable delay in acquisition of the land by the petitioner for want of execution of Land Lease Agreement on the ground that the time extension for commissioning of the project was not granted by the respondent as per the provision of the PPA as per the submission of the petitioner vide letter dated 23.06.2014. The Commission expressed concern on the development and directed the petitioner to file a supplementary submission with latest DPR because of considerable delay in implementing the project. In response, the petitioner, now wholly owned subsidiary of Hindustan Clean Energy Ltd. (formerly Moser Baer Clean Energy Ltd.) submitted a interlocutory petition of 08.08.2014 with revised DPR (August, 2014) incorporating the latest project cost along with relevant supporting documents and information for determination of project specific tariff for the proposed project seeking a project specific tariff of Rs. 13.45/kWh (without subsidy) and Rs. 11.72/kWh (with subsidy).

Project highlights:

Based on the above submission, the petitioner has proposed to set-up a grid connected 5 MW solar PV power project. As per the revised DPR, they have proposed to use Multi-Crystalline solar PV technology (Model JAP 6-60-260/3BB of JA solar make) which is cost effective and presently dominating 87% market share along with 4 x 1200 KW cap. central PV inverter (Model RPS1380 multiMPPT) of Bonfiglioli Vectron make.

Other salient technical specifications are

CUF	=	14.95%
Model rating	=	260 Wp
No. of Modules	=	19248
GHI	=	4.15
Net energy to be supplied to grid	=	6547 MWH

Consultancy service is provided by M/S. Lahmeyer International (India) Pvt. Ltd.

2. Legal and Regulatory framework:

- 2.1** Section 86(1) (e) of the Electricity Act 2003, mandates the State Electricity Regulatory Commissions to promote co-generation and

generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person.

- 2.2** The Electricity Act, 2003 also requires that the State Electricity Regulatory Commissions (SERCs) shall be guided by the tariff policy in specifying the terms and conditions for determination of tariff under section 61 of the Act.
- 2.3** Section 61 of the Act also provides that State Regulatory Commissions shall be guided by the principles and methodologies specified by the Central Commission for determination of tariff applicable to generating companies and transmission licensees.
- 2.4** The clause 5.12.2 of the National Electricity Policy provides, inter-alia, as under:
- “Considering the fact that it will take some time before non-conventional technologies compete, in terms of cost, with conventional sources, the Commission may determine an appropriate differential in prices to promote these technologies”.
- 2.5** Section 6.4 of the National Tariff Policy dealing with renewable energy sources of energy generation including co-generation, inter-alia, provides as under:
- “It will take some time before non-conventional technologies can compete with conventional sources in terms of cost of electricity. Therefore, procurement by distribution companies shall be done at preferential tariffs determined by the Appropriate Commission.”
- 2.6** The AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 was notified on 07.11.2012 which is in line with CERC (Terms and Conditions for tariff determination from Renewable Energy Sources) Regulations, 2012.

3. Hearing on the Petition:

After careful scrutiny and consideration of the submissions of the petitioner on the interlocutory petition, the Commission admitted the petition on 19.12.2014 and registered as petition no. 22/2014. As the subject matter is analogous, the Commission deems it appropriate to merge both the petitions (No. 10/2013 and No. 22/2014 as mentioned above) together and issued this tariff order.

The Commission issued public notice on 19.12.2014 inviting comments/suggestions from various stakeholders on or before 05.01.2015. The notice was published in six (6) newspapers on 20.12.2014.

The respondent filed an objection petition with para wise comments on the tariff petition on 02.01.2015. No other stake holders submitted any objections/suggestions on the tariff petition. The detailed observations of the petitioner on the comments of the respondent were received by the Commission on 20.01.2015.

The Commission fixed the hearing on 28.01.2015 on the above petition and issued notices to the parties accordingly.

The Commission took the hearing on 28.01.2015 as scheduled at the conference hall of the Commission's premises at Guwahati. Representatives from both the petitioner and respondent attended the hearing.

Initiating the hearing, Chairperson asked the petitioner SEIPL to make oral submission, if any on the tariff petition filed before the commission for their proposed 5 MW solar PV plant at Industrial Growth Centre, Balipara.

The petitioner during the oral submission, prayed before the commission for determination of project specific tariff as per the provision of AERC Regulations seeking approval of preferential tariff at Rs. 13.59/kWh (without subsidy) as per their petition for the proposed project.

They submitted their detailed justification for seeking higher tariff (Rs. 13.59/kWh) than that of generic tariff of CERC of Rs. 7.72/kWh for FY 2014-15 in terms of capital cost, CUF etc. They stated that the proposed land cost is higher than that of CERC as the cost of the proposed land is determined by the GOA as industrial land. Whereas CERC has fixed the norms for the land cost which is considered to be mostly barren or of no commercial use. Further, Annual Lease Rent on land has to be charged under O&M expenses as per the existing provision.

Regarding module cost, the petitioner pleaded to the Commission to consider 63 cents/watt @ Rs 62/USD against CERC norms of 59 cents/watt @ Rs. 62/USD for FY 2014-15 considering that a declining trend of the cost is not persisting for the last one and half year.

Similarly, the non-module cost shall also be higher than that approved by CERC for FY 2014-15 as Cables, Transformers mounting structures prices are increasing due to escalation at 5% per annum for cement, steel etc since 2011-12. Further, the petitioner pleaded to the commission to consider the cost of the power conditioning unit (PCU) at Rs. 65 Lakh/MW against that of CERC at Rs. 50 Lakh/MW taking into consideration of the fact that the PV inverter has to be replaced every 12 years. Regarding CUF, the petitioner requested commission to fix the CUF at 15% as per the tariff petition based on solar insolation level of 4.15 Kwh/m² /Day (Source-Solar GIS Data) though according to CERC Regulations it should be 19% for generic tariff determination of solar PV project. They further pleaded to the Commission for considering new norms of the Annual Module Degradation at 0.5% from the 4th year and AEC @ 0.25% for computation of tariff in line with other SERC's. Besides above, the petitioner pleaded to include the evacuation cost of Rs. 70 Lakh (Approx) in the Capital Cost beyond the interconnection point, if so decides by the Commission as the power would be supplied at Delivery point i.e. 33 KV S/S of APDCL as per the provision of PPA which is nearly 1 KM from the project site. Regarding availing subsidy benefit, if any, the petitioner informed that in case of availing subsidy i.e. 30% Capital Subsidy from Govt. Of Assam, they will approach the commission for revision of tariff to that extent accordingly. They further informed that they are not availing any Accelerated Depreciation benefit for the project

The respondent in their submission pleaded to Commission to fix the tariff at a reasonable rate safeguarding the consumer's interest. They

further appealed before the Commission that the petitioner should install higher capacity modules initially so as to meet the deficit of the power generation after 3 Years due to capacity degradation of the modules instead of allowing annual degradation. They also requested the Commission not to consider the auxiliary power consumption for computation of tariff as per the guidelines of CERC Regulations.

The Commission heard both the parties. The Commission stated that both the capital cost and CUF interalia need to be scrutinized in detail carefully before taking any decision on fixation of the tariff as per the provisions of AERC Regulations and accordingly requested the petitioner to submit the details of Non Modular Cost (Including Civil Works) with relevant supporting documents, if any estimated to be involved in the project within a week's time. In response, the petitioner submitted additional information vide their letter of 10.02.2015.

4. Determination of tariff:

The petitioner has prayed before the Commission for determination of project specific tariff seeking a levellised tariff of Rs.13.59/kWh (without subsidy) and Rs.11.72/kWh (with 30% capital subsidy on plant and machinery, if availed). The detailed tariff calculations are submitted in the specified formats 1.1 & 1.2 under Regulation 9.3 of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Source) Regulations, 2012 along with the tariff petition.

After careful scrutiny and analysis of the technical and financial data and information submitted by the petitioner and the material and information available on record, the Commission decided for determination of project specific tariff for the FY 2014-15 as per the terms and conditions of the AERC (Terms and Conditions for Tariff determination from Renewable Energy Source) Regulations, 2012 and the relevant terms and conditions of the AERC (Terms and Conditions for Determination of Tariff) Regulations, 2006.

The Commission deems it appropriate to adopt relevant operating and financial norms of CERC (Renewable Energy) generic tariff order dated 15.05.2014 in petition no. SM/253/2013 (Suo-Motu) for FY 2014-15 for determination of tariff for the reasons that the Commission has so far not issued any generic tariff order for RE projects and secondly the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012, is in line with CERC (Renewable Energy) Regulations, 2012 based on which the above CERC generic tariff order is notified.

4.1 Tariff structure:

A single part tariff shall be determined as per Regulation 10 of AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012.

4.2 Tariff design:

As per Regulations 7, 8 and 9.3 of the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 read with Regulation 11 of the same Regulations, a levellised discounted tariff shall be determined for the tariff period of 25 years from the date of commissioning of the project.

4.3 Operational and financial norms and parameters:

4.3.1 Operational norms:

4.3.1.1 Capacity Utilization Factor (CUF):

a) Submission of the petitioner:

- i) The petitioner has sought for deviation in the CUF norm as permitted under AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 for the project specific tariff. They stated that the CUF norms of 19% as specified in the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 is based on PAN India norm specified by CERC considering daily average Global radiation incident over India in the range of 4.3 kWh/m² to 5.8 kWh/m² and 300 clear sunny days as per MNRE Solar Radiation Hand Book, 2008. Whereas expected solar insolation level at the project site would be average 4.15 kWh/m²/day based on Global Horizontal irradiation (GHI) data of Solar GIS weather data source as per the DPR. They also submitted in comparison to other three weather data sources i.e. NASA, NREC, Meteonorm as mentioned in the DPR, the petitioner considered the solar GIS data as mentioned above to arrive at a CUF of 14.95% for availability of the data in hourly basis and hence better reliability.
- ii) They further submitted that a study was conducted through TERI on energy yield estimation of the project at the selected site which suggested a CUF of 15.68% based on GHI of 4.30 kWh/m²/day by interpolating actual ground measured data for seven months period (June 2014 to Dec 2014) of MNRE with the TMY data set of NREL RReDC for the first 5 months.
- iii) Based on the above facts, the petitioner considered CUF of 14.95% for computation of tariff.

b) Submission of the respondent:

Referring to the Statement of Objections & Reasons (SoR) of CERC (Renewable Energy) Regulations, 2012, the respondent stated that a study, carried out by CERC, reveals that the average CUF at more than 80% locations have been found to be more than 19% for such solar PV plant on thin film technology. Similarly, the average CUF at more than 50% locations have been found to be more than 19% for such solar PV plant on crystalline technology. On that basis the central Commission has adopted CUF @ 19% for such solar PV plant. The parent company of the Petitioner was also a respondent party to the said petition No. 353/SM/2013 (Suo-Motu) and therefore the petitioner is aware of the CUF norm. They stated that lowering of level of CUF on case to case basis would dilute the spirit of benchmark norms fixed by the Central Commission and also result availability of lesser committed solar energy that that would have been otherwise available at CUF @ 19% which in turn would

provide relaxation for the petitioner. Therefore, the Commission is prayed not to alter the CUF already fixed by CERC.

c) Commission's decision:

The CUF of a solar PV project mainly depends on solar radiation measured in kWh/m²/day and no. of clear sunny days. The Regulation 59 of the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 specifies that the Capacity Utilisation factor for Solar PV projects will be 19% and the Commission may deviate from the norms in case of project specific tariff determination.

The Commission has observed that the average solar radiation level on the basis of monthly Global Horizontal Irradiation (GHI) data at the project site as per the DPR is as under:

<u>Weather data source</u>		<u>Daily average value (GHI)</u> <u>(kWh/m²)</u>
NASA	-	4.58
NREL	-	4.56
Meteonorm	-	4.64
Solar GIS	-	4.15

In addition to the above data sources, the petitioner has also submitted that as per the study conducted through TERI based on actual ground measured data for seven months period, a daily average GHI value of 4.30 kWh/m² was arrived at. And as per the GHI value of 4.30 kWh/m²/day a CUF of 15.68% was arrived.

From the 5 sets of data, it is found that the daily average GHI value of the data sources varies from a minimum of 4.15 kWh/m² to a maximum 4.64 kWh/m². In this context, the Commission has noted that the petitioner has selected the minimum daily average GHI value of 4.15 kWh/m² based on solar GIS database for arriving at a CUF of 14.95% for the project due to its availability in hourly data format as stated in the DPR. The Commission further noted the submission of the petitioner that in absence of ground measured database for the proposed project site, the only way to predict the solar radiation is the realistic modeling (interpolation/projection/statistical analysis) based on the national/international databases. .

Considering all the facts mentioned above carefully, the Commission deems it appropriate that none of findings on average daily GHI can be neglected. Therefore, the Commission has decided to consider the average of the daily GHI value arrived by NASA, NREL, Meteonorm, Solar GIS and TERI mentioned above. After considering the average GHI value of 4.446 kWh/m² the Commission has arrived at a CUF of 16.21% (15.68/4.30 x 4.446). Hereby a CUF of 16.21% is approved for the project. .

4.3.1.2 Annual Module Degradation:

a) Submission of the petitioner:

The petitioner submitted that output capacity of solar panels reduces gradually over the life of the project. Therefore, they pleaded to the commission to consider module degradation of 0.5% per annum from 4th year onwards in line with CERC order in petition no. 242/SM/2012 (Suo-Motu) dated 28.02.2013 regarding determining benchmarking cost of solar project for FY 2013-14. To substantiate their submission, they have furnished the relevant extract of solar T.O.'s of GERC (Order No. 1/2012 dated 27.01.2012) and MPERC (Order No. SMP 25/2012 dated 01.08.2012) wherein both the ERC's have approved annual degradation @ 1% for solar PV plants.

The petitioner further stated that CERC has allowed Rs.11.29 lakh as additional 0.5% of module cost (i.e. 5 KW of module/MW) on notional basis every year after 4th year to 25th year of operation. They however suggested that the computation of tariff with reduced generation method from 4th year onward would be more practical and appropriate. In this context, they have referred to an order of GERC dated 07.07.2014 wherein the levelled generic tariff was calculated with reduced annual generation due to degradation in modules in case of solar plant as directed by APTEL in its Judgment dated 17.04.2013 in appeal no. 75 of 2012.

b) Submission of the respondent:

The respondent prayed before the Commission to consider module degradation of 0.5% as an additional module cost (not the energy generation) as reasonable compensation after 4th year on notional basis in line with CERC order dated 15.05.2014 in petition no. SM/353/2013 (Suo-Motu).

c) Commission's decision:

After considering all the facts as mentioned above carefully, the Commission deems it appropriate to consider annual module degradation of 0.5% after 4th year of useful life of the solar PV plant in line with CERC. Accordingly, the Commission decided to determine the tariff with reduced generation method which is in line with APTEL judgment mentioned above.

4.3.1.3 Auxiliary Energy Consumption (AEC):

a) Submission of the petitioner:

The petitioner has pleaded to the commission to allow AEC at 0.25% as proposed due to considerable consumption of energy in the auxiliaries of the solar PV plant specially the Transformer that would be in on position during night to avoid any generation loss.

To substantiate their contention, they furnished relevant extract of order no. 1/2012 dated 27.01.2012 and order no. SMP-25/2012 dated 01.08.2012 of GERC and MPERC respectively, wherein they allowed auxiliary consumption of 0.25% recognizing energy consumption in some auxiliary equipments of a solar PV plant.

b) Submission of the respondent:

The respondent pleaded to the Commission not to consider the auxiliary power consumption for computation of tariff as per the CERC guidelines.

c) Commission's decision:

The Commission has noted that the actual auxiliary consumption of 5 MW and 15 MW cap. Solar PV plants presently in operation in Tamilnadu and Gujrat are of the order of 1.84% (approx.) and 0.81% (approx.) respectively as per the data submitted by the petitioner.

The Commission has further observed that CERC has recognized auxiliary consumption in solar PV power plant vide its order dated 28.02.2013 in petition no. 242/SM/2012 (Suo-Motu) even though the same is not considered for determination of tariff.

Considering all the facts mentioned above carefully, the Commission has decided to allow AEC of 0.25% in computation of tariff as proposed by the petitioner.

4.3.2 Financial norms and parameter:

4.3.2.1 Capital cost:

a) Submission of the Petitioner:

The petitioner submitted that the benchmark capital cost for the solar PV projects in Assam is estimated to be higher by 10% - 15% than that determined by the Hon'ble CERC. The higher capital cost is primarily on account of land cost in Assam, depreciation of rupee against US dollar and increase in cost of cables, transformers and other equipments etc. at present compared to those considered by Hon'ble CERC while issuing the relevant tariff order. They further submitted that if a comparison is to be done for the purposes of the present proceedings, then the capital cost proposed by the petitioner can only be compared with the benchmark capital cost specified by Hon'ble CERC for FY 2013-14. They also furnished the detailed item wise break-up of the proposed capital cost of Rs. 948 lakh/MW to compare with the benchmark capital cost specified by CERC for FY 2013-14 and FY 2014-15 which are Rs.797 lakh/MW and Rs.691.09 lakh/MW respectively with justification for consideration of each component of capital cost as under:

i) Land cost:

The petitioner submitted that the cost of land in Assam is higher than that allowed by Hon'ble CERC (i.e. Rs.16.8 lakhs/MW for 2013-14 and Rs.25 lakh/ MW for 2014-15) and this being Government land, major part of this cost has been determined by the State Government. Moreover, the petitioner shall be required to pay annual lease rent and other charges, which were not considered by CERC

Based on the Land Management Rules, 2010 and allotment letter issued by AIDC, the petitioner furnished the detailed cost break-up towards development and acquisition of land as well as annual lease rent charge as under:

1. Land cost:

a) One time allotment charge	=	Rs. 157.86 lakh
b) Stamp duty and registration charge	=	Rs. 38.87 lakh
c) Land development cost by the petitioner	=	Rs. 165.70 lakh
	=	Rs. 362.43 Lakh i.e. Rs. 72 lakh/MW

2. Annual Lease Rent:

a) Service charges	=	Rs. 4.55 lakh
b) Ground rent	=	Rs. 1.02 lakh
c) Special maintenance charge	=	Rs. 2.19 lakh
Plus: Service tax @ 12.36%	=	Rs. 0.96 lakh
Total		= Rs. 8.72 Lakh i.e. Rs. 1.74 lakh/MW

In addition to above, the petitioner informed that annual escalation of 10% will be applicable but the effective escalation rate would be 33.10% (approx.) considering revision of above rates every 3 years as per provision of AIDC.

Regarding acquisition of land at a higher cost in industrial area, the petitioner contended that they faced extreme hurdles in acquiring either Govt. or private land in Bongaigaon and Kamrup district for more than a year which in turn delayed the entire process of development of the project. In view of above, they felt that a Govt. land on lease would be the most feasible option for acquiring of land in Assam and finally they could manage to acquire a plot of industrial land at IDC, Balipara, suitable for the proposed project.

b) Submission of the respondent:

The respondent stated that CERC has fixed normative land cost @ Rs. 25 lakh/MW and there is no reason to deviate from the provisions of regulations framed by the central Commission in a subjective manner. They submitted that the petitioner, inspite of knowing the facts the CERC rates are considered for use of land which are mostly barren and of no commercial use, they opts for industrial land at their own interest.

c) Commission's decision:

The Commission noted with concern the difficulty of acquiring land required for a solar PV project in the state of Assam. The Commission also examined in details all the relevant documents and information related to land cost as submitted by the petitioner.

Furthermore, the Commission considered the Schedule of Rates of APWD (Roads) for FY 2013-14 with escalation of 5% for approving at some of the components of land such as Jungle Cutting, Soil Cutting, Soil Filling etc.

Considering all the facts as mentioned above carefully and since the cost of the said land is determined by the state Govt., the Commission

decided to allow the following land cost as a part of capital cost of the project based on the relevant Govt. documents submitted by the petitioner.

- 1) Land acquisition cost Rs. 266.76 Lakh i.e. Rs. 53.35 lakh/MW including the cost of approach road. The break-up of the approved cost is shown in the table below:

Particular	Proposed (Rs. Lakh)	Approved (Rs. Lakh)
One Time Allotment Charge	157.86	157.86
Stamp duty and registration charge	38.87	27.91
Land development cost	165.70	80.98
Total	362.43	266.76

- 2) Regarding Annual Rent/Recurring Cost, the Commission has taken into consideration of the AIDC rule while approving the cost pertaining to various recurring charges. Furthermore, based on the market information it is understood during the past 10 years the ground rent has not been revised, the Service charge was recently been revised. Therefore, Commission has decided not to allow escalation at this point of time; however in future in case of revision of charges the developer may approach the Commission. The approved Annual Rent/Recurring Cost is shown in the following table:

Particular	Proposed (Rs. Lakh)	Approved (Rs. Lakh)	Formula
Service Charge	4.55	4.55	3% of Development Charge/year
Ground Rent	1.02	1.01	Rs.1000/1000mt ² /year
Special Maintenance Charge	2.18	2.18	18paise/mt ² /month
Total Annual Rent	7.75	7.75	
Service Tax	0.96	0.96	12.36% of Total Annual Rent
Total Annual Rent after Service Tax	8.72	8.71	

The annual rent/recurring cost will be charged under the head of O & M Expenses as per the existing provisions.

- ii) Module cost:

- a) Submission of the petitioner:

The petitioner submitted that CERC considered module price as 0.59 USD/Wp (although the prevailing average price of crystalline and thin film price was found to be stable at the previous level of around 0.63USD/Wp) with Rs.62/USD conversion rate to arrive at module cost of Rs. 365.80 lakh/MW for FY 2014-15 expecting declining trend in prevailing price. They stated that the module cost considered by CERC is on lower side and is not aligned with the current market rates. They stated that as per the prevailing prices, the estimated cost of modules for their project has been proposed to be Rs. 3.91 Crore/MW considering an expected module price of USD 0.63/Wp with currency conversion rate of Rs. 62/USD. They

also furnish average spot price of solar PV module (source PV insight report) as on 14.01.2015 as under:

	<u>Average cost</u> <u>(tax excluded)</u>
1. Poly-crystalline	- 0.614 cent/watt
2. Thin film	- 0.636 cent/watt
3. Average of both	- 0.625 cent/watt

The petitioner therefore pleaded to the Commission to approve PV module cost at Rs. 391 lakh/MW (63 cents/watt @ Rs. 62/USD) although CERC fixed Rs. 365.80 lakh/MW (0.59 cent/watt @ Rs. 62/USD) as average PV module cost considering that a declining trend of the cost is not persisting since the previous revision by CERC.

b) Submission of the respondent:

The respondent submitted that under para 8.0 of CERC order dated 15.05.2014 in petition no. SM/353/2012 (Suo-Motu) on benchmarking of capital cost norm for solar PV project, the CERC has explained the basis of fixation of module cost @ Rs. 365.80 lakh/MW. It may be seen that the Commission has fixed the rates/norms on the basis of opinions of stake holders as well as existing trend of market. The Commission may kindly examine the relevant CERC orders.

c) Commission's decision:

The Commission has noted the submissions of both the petitioner and respondent carefully and decided to allow average PV module cost with polysilicon crystalline technology of J.A. solar make (to be used by the petitioner) as per the spot price of 08.04.2015 (Source: PV insight report) as **Rs. 362.58 Lakh/MW** (USD 0.584 /Watt @ Rs. 62.09/USD).

iii) Non- module cost:

a) Submission of the petitioner:

The petitioner submitted that the non-module cost considered by Hon'ble CERC for FY 2014-15 for some of the components is on a lower side and is not realistic even when compared with the costs allowed in previous years. Hence, the petitioner has sought realistic estimated cost for the non-module cost components under total capital cost. The petitioner furnished the approved benched mark capital cost of non-modular cost components since FY 2011-12 approved by CERC and stated that CERC has drastically reduced the cost of non-moduler components for FY 2014-15 in comparison to the previous years since FY 2011-12 on the basis of submission of one or two project developers rejecting the claim of higher cost by all others.

They further stated that cables, transformers, mounting structure prices are increasing due to escalation at 5% for cement, steel etc. since FY2011-12.

In view of above, they pleaded to the Commission to consider the rate proposed as under:

Non-module cost/MW:

1. Civil and General works	=	Rs. 95.00 lakh/MW
2. Mounting structure	=	Rs.108.00 lakh/MW
3. Power conditioning unit	=	Rs. 65.00 lakh/MW
4. Cables and transformer	=	Rs. 108.00 lakh/MW
Total	=	Rs. 376.00 lakh/MW

b) Submission of the respondent:

The respondent submitted that CERC vide order dated 15.05.2014 in petition no. SM/253/2013 (Suo-Motu) has elaborately explained in the relevant para, the basis of fixation of normative cost towards various non-module cost components like civil works, mounting structure, power conditioning unit etc. Basically, it is seen that CERC has fixed the norms of non-module cost after hearing of views of different stake holders and considering that market price of such items are being decreased day by day. They also stated that presently RE power market is changing day by day because of tremendous improvement of RE technologies due to undertaken of continuous R&D activities.

c) Commission's decision:

The views and submissions of both the petitioner and respondent have been noted by the Commission carefully. The Commission has also observed that CERC vide the order dated 15.05.2014 significantly reduced the normative cost of non-module components for FY 2014-15 in comparison to that of previous years (FY 2011-12 to FY 2013-14) after considering views of few stake holders.

The Commission further examined the current prices of non-module component of other solar PV projects of Gujrat (50MW) and Punjab (30 MW) based on the additional information submitted by the petitioner on 10.02.2015 as directed by the Commission.

In view of the above and taking into consideration of increased cost of cables, transformers and other equipments, specially high transportation and labour cost in the state of Assam, the Commission decided to allow 15% increase in the normative cost on non-modular cost components approved by CERC for FY 2014-15 as under:

Non-module cost (in Rs. Lakh/MW):

Item	Proposed	Approved
1. Civil and general works	95.00	69.00
2. Mounting structure	108.00	57.50
3. Power conditioning unit	65.00	57.50
4. Evacuation cost upto the inter connection point (cables and transformer)	108.00	69.00
Total	376.00	253.00

iv) Evacuation cost beyond inter-connection point:

a) Submission of the petitioner:

The petitioner submitted that as per the terms of the PPA dated 10.11.2014, the delivery point is the 33 KV Bus-Bar of Discom's/ STU's sub-station which is one Km. (approx.) away from the Generator's sub-station.

However, they submitted that the Commission vide AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 has defined the "Interconnection Point" for solar PV as the line isolator on outgoing feeder on HV side of the Pooling Sub-station i.e. generator sub-station in line with the CERC. It is therefore the responsibility of the respondent to provide evacuation facility at Generator's Sub-station. But the respondent is insisting that the Regulation envisages deliver/interconnection point to be at APDCL/STU substation and accordingly the relevant clause is included in the PPA, they submitted.

Under the circumstance as mentioned above, the petitioner pleaded to the Commission to consider and include additional cost of Rs. 14 lakh/MW in the capital cost towards laying transmission line upto APDCL sub-station from the generator's sub-station and Bays, if so decides by the Commission.

b) Submission of the respondent:

The respondent submitted that on the basis of relevant regulations of CERC/CEA/AERC, it is the responsibility of the petitioner upto the delivery point as defined in the PPA dated 10.11.2014.

c) Commission's decision:

The Commission observed that the capital cost of a solar PV project interalia includes evacuation cost upto the interface point i.e. Generator's sub-station. Considering the submission of both the petitioner and the respondent carefully and since, both petitioner and respondent mutually agreed to supply power at the delivery point i.e. APDCL's 33 KV sub-station as per the provisions of the PPA, the Commission deems it appropriate to allow Rs. 14 lakh/MW as a part of the total project cost as the evacuation cost beyond the I/C point to be borne by the petitioner.

While approving the transmission cost including Bays beyond I/C point, the Commission has referred to the current cost of 33 KV transmission line and Bays as submitted by the petitioner on 10.02.2015.

5 Total project cost:

a) Submission of the petitioner:

The petitioner prayed that the Commission may kindly allow the capital cost of Rs. 4740 lakh @ Rs. 948 lakh/MW on the basis of justification given in the relevant paras above even though the estimated project cost is higher than what was considered by CERC for FY 2013-14 and FY 2014-15.

b) Submission of the respondent:

Since the cost of RE power is decreasing at a faster rate, the Commission is prayed to maintain the limit of CERC norms in the interest of ultimate consumer.

c) Commission's decision:

The Commission noted that the capital cost is the most critical element in tariff determination. This comprises of cost of land, plant and machinery, civil works, erection, commissioning, cost associated with power evacuation and other related charges.

Based on the careful analysis of the submissions of both the petitioner and the respondent and decisions on relevant paras above, the Commission has approved the total project cost for determination of tariff as under:

Cost Items	Proposed (Lakh/MW)	Approved (Lakh/MW)
1. PV modules	391	362.58
2. Land cost	72	53.35
3. Civil & General works	95	69.00
4. Mounting structure	108	57.50
5. Power conditioning unit	65	57.50
6. Evacuation cost upto Inter Connection (I/C) point (Cables and Transformer)	108	69.00
7. Preliminary, pre-operation expense including IDC and contingency (10% of the project)	95	74.33
8. Total project cost upto I/C point	934	743.26
9. Evacuation cost beyond I/C point	14	14.00
10. Total project cost (Rs. Lakh/MW)	948	757.26
11. Total project cost (Rs. Lakh)	4740	3786.32

6 Treatment of subsidy and incentive:

a) Submission of the petitioner:

The petitioner submitted that as of now, it has not availed any subsidy or incentive of any type from any state/Central government/body for its proposed project. Accordingly, the petitioner is seeking tariff determination without considering any subsidy. However, if the petitioner is able to get 30% capital subsidy subsequently upon applying for it, the tariff would obviously be lower. Keeping in this view, they have also proposed a tariff with subsidy. The tariff with subsidy is proposed to replace the tariff without subsidy w.e.f. CoD only after the petitioner actually receives capital subsidy from the Government.

They further submitted that they don't intend to avail the accelerated depreciation under the Income Tax Act, 1961 as it will be operating as a Special Purpose Vehicle with its own balance sheet. Hence, it would not be able to generate sufficient profits to absorb the accelerated

depreciation. The petitioner is, therefore, seeking tariff without any adjustment for accelerated depreciation benefit.

b) Submission of the respondent:

The respondent submitted that as per CERC RE Regulations, 2012 not only capital subsidy/ Incentive but also CDM benefit, if availed by the petitioner from any third source the same are to be shared by the petitioner with the ultimate consumers in the form of tariff.

c) Commission's decision:

Regulation 23 of the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012 specifies that the Commission shall take into consideration any incentive or subsidy offered by the central or State Government, including accelerated depreciation benefit if availed by the generating company, for the renewable energy power plants while determining the tariff.

Considering that the petitioner is not availing any subsidy at present as per their submission, the Commission decided to calculate the tariff without considering any subsidy. However, the Commission shall review the tariff considering the subsidy benefit, if availed by the project developer in future.

7 Other Financial norms:

The Commission after due consideration adopted norms for other financial parameters such O&M, interest on term loan, depreciation, interest on working capital, R.O.E. etc., as per the CERC generic tariff order dated 15.05.2014 in the petition no.: SM/354/2013 (Suo-Motu).

In view of fore-going decisions, the various parameters considered by the Commission for determination of the project Specific Tariff for the 5 MW grid connected solar PV project of the petitioner are given in the table below:

Parameters	Unit	Proposed	Approved
A. Project cost:			
Capital cost including IDC and evacuation cost beyond I/C point.	Rs. Lakh/MW	948	757.26
Less subsidy at present	-do-	NIL	NIL
Total capital cost	-do-	948	757.26
B. Operational and Financial norms:			
CUF	%	14.95	16.21
Aux. energy consumption	%	0.25	0.25
Annual module degradation after 4 th yr	%	0.5	0.5
Debt : Equity ratio	%	70:30	70:30
Interest on loan (tenure of 12 years)	%	12.7	12.7
Normative O&M Expenditure	Rs. Lakh/ MW	12.30	12.30
Annual escalation on normative O&M expenditure	%	5.72	5.72
Annual average escalation on Annual Rent/Recurring Cost	%	33.10	NIL
Depreciation	%	5.83% upto 12 th yr. 1.54% from	5.83% upto 12 th yr. 1.54% from

Parameters	Unit	Proposed 13 th yr.	Approved 13 th yr.
Interest on Working capital	%	13.20	13.20
ROE (Pre-tax)	%	20% 1 st 10 yrs. 24% from 11 th yr.	20% 1 st 10yrs. 24% from 11 th yr.
Discount rate		10.67	10.67
Project useful life	years	25	25

Considering the above approved parameters, **the Commission has determined and approved a provisional levelized discounted tariff of Rs. 9.72/kWh for a period of 25 years from the date of commercial operation.** Details of tariff computation are furnished in Annexure-I enclosed.

8 **Other applicable conditions:**

8.1 **Statutory and other clearances:**

All statutory clearances and necessary approvals shall be obtained by the developer for setting up of the project. The developer is also responsible for their compliance and their renewals as may be required from time to time.

8.2 **Sharing of CDM benefit:**

The sharing of Clean Development Mechanism (CDM) benefits shall be as per the provision of AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 (Regulation 22) which is as under:

The proceeds of carbon credit from approved CDM project shall be shared between generating company and concerned beneficiaries in the following manner, namely

a) 100% of the gross proceeds on account of CDM benefit to be retained by the project developer in the first year after the date of commercial operation of the generating station ;

b) In the second year, the share of the beneficiaries shall be 10% which shall be progressively increased by 10% every year till it reaches 50%, where after the proceeds shall be shared in equal proportion, by the generating company and the beneficiaries.

8.3 **Scheduling:**

The 5 MW solar PV plant of the petitioner shall be subjected to the scheduling and dispatched code specified under AERC Grid Code, as amended from time to time under Regulation 12.3 of the

AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012.

8.4 Taxes and duties:

The tariff determined under this order shall be exclusive of taxes and duties as may be levied by the state/central Govt. and the same shall be passed through on actual incurred basis as specified under Regulation 24 of the AERC (Terms and Conditions for Tariff Determination from Renewable Energy Sources), 2012.

8.5 Evacuation of power:

Interconnection facilities and communication links are to be installed and maintained by the licensee at the interconnection points to enable evacuation of power from the project at the cost of the petitioner.

8.6 Determination of final tariff:

The Commission has determined the provisional tariff for the 5 MW solar PV plant of the Petitioner as specified under 37.2 of the AERC (Tariff) Regulations, 2006. The Commission directs the petitioner to file fresh petition for determination of final tariff based on actual capital expenditure of the project incurred upto the date of commercial operation duly certified by the statutory auditors based on annual audited accounts as specified under Regulation 37.3 of the said Regulations.

With the above observations and decisions, the tariff petitions (No. 10/2013 & No. 22/2014) stands disposed of.

Sd/-
(D. Chakravarty)
Member, AERC

Sd/-
(Dr. R. K. Gogoi)
Member, AERC

Sd/-
(N.K. Das)
Chairperson, AERC

ANNEXURE-1

Determination of project specific Tariff for 5 MW Grid connected SOLAR PV POWER PLANT of SEIPL

Technical Parameters	Year	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
1. Installed Capacity	MW	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
2. Gross Generation @ 16.21% CUF after module degradation	MU	7.10	7.10	7.10	7.10	7.07	7.03	7.00	6.96	6.93	6.89	6.86	6.82	6.79	6.75	6.72	6.69	6.65	6.62	6.59	6.55	6.52	6.49	6.46	6.42	6.39
3. Annual module degradation after 4th year @ 0.5%	MU	-	-	-	-	0.04	0.04	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
4. Auxiliary Consumption @ 0.25%	MU	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
4. Net Generation	MU	7.08	7.08	7.08	7.08	7.01	6.98	6.94	6.91	6.87	6.84	6.80	6.77	6.74	6.70	6.67	6.64	6.60	6.57	6.54	6.50	6.47	6.44	6.41	6.38	6.34
Fixed Cost																										
O&M i) Normative O & M cost (Rs 12.3 lakh/MW with 5.72% yearly escalation)	Rs. Lakh	62	65	69	73	77	81	86	91	96	101	107	113	120	127	134	142	150	158	167	177	187	198	209	221	234
ii) Annual rent	Rs. Lakh	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71	8.71
Depreciation (5.83% for 12 years and 1.54% from 13th years)	Rs. Lakh	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199	199
Interest on term loan (12.70%)	Rs. Lakh	323	295	266	238	210	182	154	126	98	70	42	14	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Working Capital (13.2%)	Rs. Lakh	20	20	19	19	19	18	18	17	17	17	17	16	13	13	14	14	15	15	16	16	17	17	18	19	19
Return on Equity (20% Pre Tax for first 10 years & 24% Pre Tax from 11th year)	Rs. Lakh	227	227	227	227	227	227	227	227	227	227	239	239	239	239	239	239	239	239	239	239	239	239	239	239	239
Total fixed cost	Rs. Lakh	839	814	789	765	740	716	692	669	646	623	612	590	433	440	448	456	464	473	483	493	504	515	527	539	553
Nominal Fixed cost	Rs./KWH	12	11	11	11	11	10	10	10	9	9	9	9	6	7	7	7	7	7	7	8	8	8	8	8	9
Discounted Fixed cost	Rs./KWH	12	10	9	8	7	6	5	5	4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1
Levelized tariff corresponding to useful life																										
O & M expn	Rs./KWH	0.99	1.04	1.09	1.15	1.22	1.29	1.36	1.44	1.52	1.61	1.70	1.80	1.91	2.02	2.14	2.27	2.40	2.54	2.69	2.85	3.03	3.21	3.40	3.60	3.82
Depreciation	Rs./KWH	2.80	2.80	2.80	2.80	2.83	2.85	2.86	2.88	2.89	2.90	2.92	2.93	0.78	0.78	0.79	0.79	0.79	0.80	0.80	0.81	0.81	0.81	0.82	0.82	0.83
Interest on term loan	Rs./KWH	4.55	4.16	3.76	3.37	3.00	2.61	2.22	1.83	1.43	1.03	0.62	0.21	-	-	-	-	-	-	-	-	-	-	-	-	-
Interest on Working Capital	Rs./KWH	0.29	0.28	0.27	0.27	0.26	0.26	0.26	0.25	0.25	0.24	0.24	0.24	0.19	0.20	0.21	0.22	0.22	0.23	0.24	0.25	0.26	0.27	0.28	0.29	0.30
Return on Equity	Rs./KWH	3.21	3.21	3.21	3.21	3.24	3.26	3.27	3.29	3.31	3.32	3.51	3.52	3.54	3.56	3.58	3.59	3.61	3.63	3.65	3.67	3.69	3.70	3.72	3.74	3.76
Total Cost of Generation	Rs./KWH	11.84	11.49	11.14	10.79	10.56	10.27	9.97	9.68	9.40	9.11	8.99	8.71	6.42	6.56	6.71	6.87	7.03	7.20	7.39	7.58	7.78	7.99	8.22	8.46	8.71
Discounted Levelized tariff	Rs./KWH																									
Interest on Working Capital																										
a.) O & M Expenses for one month	Rs. Lakh	5.85	6.14	6.45	6.78	7.13	7.49	7.88	8.29	8.72	9.18	9.66	10.18	10.72	11.29	11.89	12.53	13.21	13.92	14.67	15.47	16.32	17.21	18.15	19.15	20.20
b.) Receivables equivalent to 2 months of Fixed charges	Rs. Lakh	138.36	134.20	130.07	125.98	121.93	117.93	113.96	110.04	106.18	102.36	100.53	96.83	70.67	71.87	73.15	74.49	75.92	77.42	79.01	80.69	82.47	84.35	86.34	88.44	90.66
c.) Maintenance spares @ 15% of O & M expenses	Rs. Lakh	9.23	9.75	10.31	10.90	11.52	12.18	12.88	13.62	14.40	15.22	16.09	17.01	17.98	19.01	20.10	21.25	22.46	23.75	25.11	26.54	28.06	29.67	31.36	33.16	35.05
Working Capital	Rs. Lakh	153.44	150.10	146.84	143.66	140.58	137.60	134.72	131.95	129.29	126.76	126.29	124.02	99.37	102.17	105.14	108.27	111.59	115.09	118.79	122.71	126.85	131.23	135.85	140.74	145.92
Interest on Working Capital (13.20%)	Rs. Lakh	20.25	19.81	19.38	18.96	18.56	18.16	17.78	17.42	17.07	16.73	16.67	16.37	13.12	13.49	13.88	14.29	14.73	15.19	15.68	16.20	16.74	17.32	17.93	18.58	19.26
Discount Factor (Based on Discount rate @ 10.67%)		1.00	0.90	0.82	0.74	0.67	0.60	0.54	0.49	0.44	0.40	0.36	0.33	0.30	0.27	0.24	0.22	0.20	0.18	0.16	0.15	0.13	0.12	0.11	0.10	0.09