



ASSAM ELECTRICITY REGULATORY COMMISSION

FILE NO. AERC. 499/2015

PETITION NO. 10/2016

ORDER SHEET

10.11.2016

Before the Assam Electricity Regulatory Commission

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

Petition No. 10/2016

Relyon Solar Pvt. Ltd

----- Petitioner

Assam Power Distribution Co. Ltd. (APDCL)

----- Respondent

In the matter of

Determination of Tariff for sale of Power from 20 MW Grid Connected Solar PV Power Plant of Relyon Solar Pvt. Ltd to APDCL to be set-up at Borka, Kamrup (R), Assam.

ORDER

1. Background:

The Relyon Solar Pvt. Ltd (hereinafter referred to as the "Petitioner"), filed a Tariff petition on 03.07.2015 before the Commission along with Detailed Project Report (DPR) for determination of Tariff for its proposed 20 MW grid connected Solar PV Power Plant to be set-up at Borka, Kamrup (R), 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 Memorandum of Understanding (MoU) was signed with APDCL on 28.04.2015 for sale of 20 MW power to APDCL.

2. Procedural History:

2.1 The salient points of the Petition (10/2016) are:

- a. The Petitioner has proposed to set up 20 MW Solar PV project at Borka, Kamrup (R), Assam, the salient features of the project are:
 - Capital cost -Rs.10.03 Cr/MW
 - Capacity Utilization Factor (CUF)-16.21%
 - PV module-Multi Crystalline type with module capacity of 300Wp
 - Annual Energy Generation- 30.90 MU
 - Tariff Proposed-Rs 9.75/kWh, however no Tariff computation was submitted.
 - The Power generated will be injected at 33kV level, to be taken to 33/132kV Kamalpur substation, Kamrup.
- b. The Petitioner has mentioned that power generated from the plant will be sold to APDCL. A copy of Memorandum of Understanding

(MoU), signed with APDCL on 28.04.2015 for sale of power was submitted, which was having a validity of 1 year.

- c. The Petitioner stated that 120 Acre of land is available for the project. However, no land related documents were submitted.

2.2 After preliminary scrutiny of the Petition, vide Letter dated 12/08/2015, the following submissions were sought for:

- a. Detailed levelized Tariff Calculation to be submitted
- b. A copy of PPA signed with APDCL
- c. Copy of land documents for purchased/leased in the name of the Petitioner and copy of detail showing land cost.

2.3 Thereafter, vide Letter dated 29/08/2015, the Petitioner submitted replies to Commission's query dated 12/08/2015. The salient points of submission of the Petitioner are:

- a. The Petitioner submitted Bifurcation of capital cost. However, the tariff computation was not submitted.
- b. The Petitioner submitted that PPA is under process with APDCL.
- c. The Petitioner submitted a copy of facilitation agreement between the Petitioner and Raipat Gaon Unnayan Samity, Borka. As per the facilitation agreement, the Petitioner arranged M/S North East Technical Society and Raipat Gaon Unnayan Samity, Borka for providing technical guidance and helping in identifying and obtaining land.

The petitioner also mentioned that the land lease was for a period of 30 years with effect from 28th April, 2015 and the land lease was proposed to be 6% of the net revenue from the solar PV project.

2.4 After preliminary scrutiny of the reply submitted by petitioner the following submissions were sought for vide AERC Letter dated 28/09/2015

- a. Details of proposed location and land lease agreement in the name of the petitioner and the owner of the land.
- b. Land value assessment from the competent district authority of the proposed land.

2.5 Thereafter, vide Letter dated 03/12/2015, the Petitioner submitted replies to Commission's query dated 28/09/2015. The salient points of submission of the Petitioner are

- a. RelyOn solar power ltd has submitted MoU dated 01-12-2015 for land lease / rent agreement Raipat Gaon Unnayan Samity and facilitation agreement dated 01-12-2015 with M/S North East Technical Society (NETES).
- b. After preliminary scrutiny of the MoU with Raipat Gaon Unnayan Samity, it was observed:
 - i. All Government duties i.e. registration fees, stamp duty etc. to be paid by M/S RelyOn Pvt. Ltd.
 - ii. An advance of Rs 8 Lacs towards the scope of work and the payment to the farmers for securing the Land lease/rental.
 - iii. Fixed Land Lease/rental Charge Rs 15000 per Bigha/Year with the escalation of 10% every 5 years upto 25 years.
 - iv. Variable land lease charges 1% of the total Revenue per year from the Solar Park.
 - v. It may be noted that, as per letter dated 29/08/2015 the Land lease was proposed to be 6% of the net revenue from the solar plant. However in the MoU dated 01-12-2015 for land lease / rent agreement Raipat Gaon Unnayan Samity different land lease amount was proposed. Also in the MoU the Patta No and Dag No etc were not mentioned.
 - vi. After preliminary scrutiny of the MoU, vide Letter dated 16/12/2015, the following submissions were sought for:
 - Copy of the land documents specifying Patta No, Dag No. in the name of M/s RelyOn Solar Pvt Ltd.
 - Complete detail of the land cost and its impact on the project cost.

- The Petitioner was asked to submit a detailed revised cost along with the detailed Levellized Tariff Calculations incorporating all the recent developments.
 - A Clarification was asked for on 120 acre of land (as per DPR), whereas as per norms 100 acre (5 acre/Mw) land is required for a 20 MW project.
- vii. Thereafter, vide Letter dated 19/03/2016, the Petitioner submitted replies to Commission's query dated 16/12/2015.
- The Petitioner mentioned that the land is on lease basis for 25 years hence Patta No and Dag No cannot be in the name of the Petitioner.
 - The Petitioner Submitted the concern detail mentioning that the land lease cost will be 6% of net revenue. The break up given below.
 - O &M charges- Rs.8.75 Lacs/Mw/Yr (Average of 25 years)
 - Land Lease Charges- Rs. 6.28 Lacs/Mw/Yr (Average of 25 years)
 - On reply to the query the Petitioner mentioned that to achieve the 20 MW AC we have to set up 17% more panels for 20.4 MW DC that is 117 Acre and also 3 acre is considered for the internal grid sub-station, site office, control rooms etc.
- viii. The Petitioner vide Letter dated 06/04/2016 submitted list of Proposed Land Dag numbers, land map and final Land Lease Agreement. As per the Land Lease Agreement dated 05/04/2016, the terms of Land Lease are as follows:
- Fixed Land Lease/rental Charge Rs 15000 per Bigha/Year with the escalation of 8% every 5 years upto 25 years.
 - Variable land lease charges 1% of the total Revenue per year from the Solar Park will be paid to the Sonapur Jutiya Unnayan Samity.

2.6 Thereafter, several queries were raised and replies received from the Petitioner. Comments from APDCL (respondent) were also asked & replies received on 18/06/2016. The same was forwarded to the Petitioner and counter reply of the Petitioner received on 08/07/2016.

2.7 Vide News Paper Notification dated 24.06.2016, public views & comments were sought and Public Hearing on the Petition was scheduled on 26.07.2016. However, no comments from Public/Public representative were received.

2.8 As scheduled, a Hearing was held on 26.07.2016. During the Hearing, only Petitioner & Respondent (APDCL) was present. No participant from the Public was there. A Hearing order was passed and the Petitioner was directed for submission of oral submission in written form and any additional document, if any. The Order is enclosed as Enclosure-I.

2.9 Some of the clarifications sought during the Hearing dated 26.07.2016, were raised in the form Query dated 28.07.2016 and the Petitioner submitted reply to those queries on 05-08-2016 & 04.08.2016. The Summary of submission of Petitioner:

- a. The Capital cost stands revised to Rs.8.79 Cr/MW and a revised project cost break-up is also submitted
- b. Annual Energy Generation is revised from DPR value of 30.897 MU to 29.496 MU, because earlier certain losses such as External Transformer loss, AC Ohmic Loss etc. Based on the revised Energy injection, the CUF comes out to be 16.84%.
- c. The Petitioner submitted that even though at the time of filing of Tariff Petition, Interest rate of 10% with 10 year loan repayment was proposed, due to change in market scenario loan can be availed at interest rate of 13% with 12 year repayment period.
- d. Tariff Proposed is revised to Rs 9.75/kWh from earlier submission of Rs 11.63/kWh.
- e. The conversion of land from Agricultural to Non Agricultural is in process

2.10 Considering the fact that before the Public Hearing dated 26.07.2016, the abridged form of the Petition was not published, the Petitioner was directed for publishing abridged form of Petition in the newspaper and seeking public comments. Further a Public Hearing was scheduled on 03.11.2016 vide News Paper notification dated 23.10.2016.

2.11 In the meanwhile, vide Letter dated 26.10.2016, the Petitioner submitted a copy of renewed Memorandum of Understanding (MoU) between the Petitioner & APDCL, signed on 18.10.2016, with a validity of 1 year. As per the MoU, a PPA will be entered into by both the parties on mutually agreed terms, subject to requirement of Solar RPO of APDCL. Further, in the MoU, it is mentioned that all Evacuation cost from the generating station will be borne by the Petitioner.

2.12 As scheduled, Public Hearing was held on 03.11.2016. During the Hearing, only the Petitioner and Respondent were present. No representative from Public was present. The Hearing Order is enclosed as Enclosure-II.

3. Legal and Regulatory framework:

3.1 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.

3.2 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.

3.3 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.

3.4 The terms and conditions for determination of Tariff for RE project has been specified in the AERC (Terms and Conditions for Tariff determination from Renewable Energy Sources) Regulations, 2012 (hereinafter referred as AERC RE Tariff Regulations, 2012) notified on 07.11.2012, which was in line with CERC (Terms and Conditions for tariff determination from Renewable Energy Sources) Regulations, 2012.

3.5 Further, in the AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2015, the Technical Parameters and other Technical Considerations such as Evacuation of power, Interface line etc were specified with regard to RE projects.

4. Computation of Provisional Tariff:

4.1 Project Cost:

4.1.6 *Summary of Petitioner's submission:*

4.1.6.1 PV Module Cost: The Petitioner has proposed to install 68000 tier-I multi crystalline solar PV modules having per module output of 300Wp, leading to total output of 20.4MW_{PDC}. The Petitioner has also proposed to install PID free panels. Considering all these, the Petitioner has proposed PV Module cost of Rs 390.01 Lakh/MW.

4.1.6.2 Land Leasing & Land Development: The Petitioner has proposed to take 120 Acre of Land on Lease with the following terms:

- Fixed Land Lease/rental Charge Rs 15000 per Bigha/Year with the escalation of 8% every 5 years upto 25 years.
- Variable land lease charges 1% of the total Revenue per year from the Solar Park payable to the Sonapur Jutiya Unnayan Samity.

The Petitioner has submitted that due to uneven terrain, the Land requires additional Land development cost of 28.57 Lakh/MW. Considering the additional cost towards Land Development cost, the Land cost proposed is Rs 64.07 Lakh/MW.

- 4.1.6.3 Civil & General Works: The Petitioner has submitted that the Civil & General Works includes Typical cost on civil foundation, cable tray supportive structure, Security wall, internal roads etc. The Petitioner has further stated that due to geographical scenario and condition of land, there is requirement for additional expenditure on Foundation. Considering the additional expenditure towards Foundation, the Petitioner has proposed Rs 82 Lakh/MW as cost towards Civil & General works.
- 4.1.6.4 Mounting Structure: The Petitioner has proposed to use 120 micron hot dipped galvanized module mounting structure and cable supportive structure, considering the probable corrosion due high rainfall & humidity. Further to tackle flood & fast vegetation grow, the Petitioner has proposed to have increased height for the Mounitng structure. The Petitioner has also proposed additional cost towards transportation of fabricated Mounting Structure from outside Assam. Considering all these, the Petitioner has proposed cost of Rs75 Lakh/MW towards Mounting Structure.
- 4.1.6.5 Power Conditioning Unit (PCU): The Petitioner has proposed inverter with capacity of 1000kW/inverter and 18nos of central inverters, which will be connected together to make 20 MW. The Petitioner has further stated additional cost is required to be incurred to maintain the optimal environmental condition and 10% extra cost for maintenance of spares. After considering these, the Petitioner has proposed for a cost of Rs 60 Lakh/MW towards PCU.
- 4.1.6.6 Evacuation Cost upto Interconnection Point: The Petitioner has proposed Rs 80 Lakh/MW towards this head, having additional cost towards semi indoor enclosure.
- 4.1.6.7 Preliminary & Pre-operative expenses including IDC & Contingency: The Petitioner proposed a cost of Rs 72 Lakh/MW under this head, which includes cost towards initial study of the project for last one & half year, sourcing of skilled manpower & service from outside Assam, IDC, Contingency etc.
- 4.1.6.8 Evacuation Cost beyond Interconnection Point: The Petitioner has proposed to set up 33 kV double-circuit line with panther conductor of 8km length, with Lattice tower etc.
- 4.1.6.9 Based on the above, the Petitioner has proposed a total project cost of Rs 879.54 Lakh/MW. The break-up of the proposed Project Cost is as follows:

SI No	Particular	Cost (Rs Lakh/MW)
1	PV Module	390.01
2	Land Leasing & Land Development	64.07
3	Civil & General Work	82
4	Mounting Structure	75
5	Power Conditioning Unit (PCU)	60
6	Evacuation Cost Upto Interconnection Point	80

SI No	Particular	Cost (Rs Lakh/MW)
7	Preliminary & Pre-operative expenses including IDC & Contingency	72
	Project Cost	823.08
8	Transmission Line construction and existing Substation augmentation cost	56
	Project Cost including Evacuation Cost beyond Interconnection Point	879.08
	Total Project Cost (Rs Lakh)	17,581.60

4.1.7 Commission's Analysis & Decision:

4.1.7.1 PV Module Cost: The PV Module cost is market dependent and as per the present market scenario, the PV Module cost has gone down substantially. However, considering the further reduction in PV Module cost, the Commission has at present decided to adopt the CERC Benchmark of PV Module Cost applicable for FY 2016-17, as specified in CERC Order dated 23.03.2016, on provisional basis.

4.1.7.2 Land Leasing & Land Development: The Petitioner has proposed to take land on Lease, therefore the Land cost is considered as an Operative Expenditure not part of the Capital Expenditure. However, if the land is transferred to the name of the Petitioner at a later stage, the Petitioner becomes owner of the land, the Petitioner should apply for re-fixation of the Tariff.

The Petitioner has further proposed additional cost towards Land development. However, the Land development cost is part of Civil & General works. Therefore no separate cost is allowed towards Land development cost.

4.1.7.3 Civil & General Works: In reply to query regarding proposal of higher cost towards Civil & General Works, the Petitioner has submitted that the cost is high due to requirement for additional expenditure on Foundation for mitigating geographical & topographical scenario and condition of land.

On study of the CERC Order on Benchmark Capital cost norm, it is observed that Civil cost includes cost pertaining to land development cost, building control room to house inverter and other BoS components, building approach roads, boundary wall, arranging water supply, lighting etc and General works includes security of solar farm, setting up of power back-up generator, yard lighting etc.

However, considering the additional cost towards geographical locality, topographical condition & transportation of material etc from outside Assam, it is deemed fit to allow an additional 15% escalation over the CERC Benchmark cost for FY 2016-17, as specified in CERC Order dated 23.03.2016, for this head of Expenditure.

4.1.7.4 Mounting Structure: In reply to query regarding proposal of higher cost towards Mounting Structure, the Petitioner has submitted that the cost is high due to requirement for additional expenditure for mitigating geographical & topographical scenario by way having higher level of galvanization, higher ground clearance and additional cost for transportation of material etc.

On scrutiny of the submissions and analysis CERC order, it is deemed fit that 15% escalation over the CERC Benchmark cost for FY

2016-17, as specified in CERC Order dated 23.03.2016, will suffice for this head of Expenditure.

- 4.1.7.5 Power Conditioning Unit (PCU): The Petitioner has proposed that the PCU cost is high mainly due to additional cost required to maintain the optimal environmental condition and maintenance of spares.

On scrutiny of the submissions and analysis CERC order, it is deemed fit that 15% escalation over the CERC Benchmark cost for FY 2016-17, as specified in CERC Order dated 23.03.2016, will suffice for this head of Expenditure.

- 4.1.7.6 Evacuation Cost upto Interconnection Point: On scrutiny of the submissions and analysis CERC order, it is deemed fit that 15% escalation over the CERC Benchmark cost for FY 2016-17, as specified in CERC Order dated 23.03.2016, will suffice for this head of Expenditure.

- 4.1.7.7 Preliminary & Pre-operative expenses including IDC & Contingency: As per the CERC Order dated 23.03.2016, this Head of Expenditure is linked to Project Cost and allowed as a percentage of total project cost. The same principle is adopted in this case.

- 4.1.7.8 Evacuation Cost beyond Interconnection Point: Regarding this head of expenditure, an estimate was received from AEGCL. Based on the estimate, it is observed Rs 28 Lakh/MW will be sufficient for construction 33 kV double circuit line of 8 km length, including cost towards Bay, transformer etc.

Further, as per the AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2015, the DISCOM/TRANSCO will construct the interface line (line between the interconnection point and the existing grid or distribution system) if the line is 5 Km or less. The cost of the interface line in excess of 5 km shall be borne by the DISCOM/TRANSCO and the generators on 50:50 basis. As such, the pro-rata cost for 3 km Transmission line is Rs 10.50 Lakh/MW and the 50% of the same is allotted as part of the project cost. Accordingly Rs 5.25 Lakh/MW is allowed. The DISCOM/TRANSCO will bear the rest of the cost as per Regulation.

- 4.1.7.9 Based on the above, the provisionally Rs 541.21 Lakh/MW is approved as project cost for the Project. The break-up of the provisionally approved vis-à-vis Proposed Project Cost is as follows:

SI No	Particular	Cost (Rs Lakh/MW)	
		Proposed	Approved
1	PV Module	390.01	328.39
2	Land Leasing & Land Development	64.07	Allowed as Operative Expense not Capital Expense
3	Civil & General Work	82	40.25
4	Mounting Structure	75	40.25
5	Power Conditioning Unit (PCU)	60	40.25
6	Evacuation Cost Upto Interconnection Point	80	50.60
7	Preliminary & Pre-operative expenses including IDC & Contingency	72	27.47
	Project Cost	823.08	527.21
8	Transmission Line construction and	56	5.25

SI No	Particular	Cost (Rs Lakh/MW)	
		Proposed	Approved
	existing Substation augmentation cost		
	Project Cost including Evacuation Cost beyond Interconnection Point	879.08	532.46
	Total Project Cost (Rs Lakh)	17,581.60	10,649.15

4.2 Technical & Financial Norm:

4.2.6 **Summary of Petitioner's submission:**

The Petitioner has proposed a Levelised Tariff of Rs 9.75/kWh, based on the following parameters:

- 4.2.6.1 Operation and Maintenance Cost (O & M Cost): The Petitioner has proposed O & M Cost for first year 8.75 Lakh/MW with annual escalation of 5.72%.
- 4.2.6.2 Land Lease: The Petitioner has proposed an annual Land Lease of Rs 6.28 Lakh/MW.
- 4.2.6.3 Depreciation: The Petitioner has proposed 5.28% as Depreciation rate upto 12th year and 1.54% 13th year onwards.
- 4.2.6.4 Funding Pattern: The Petitioner has proposed 30% Equity and 70% loan.
- 4.2.6.5 Return on Equity: The Petitioner has proposed 20% Pre Tax (1st 10 years) & 24% Pre-Tax (11th year onwards) as Return on Equity.
- 4.2.6.6 Interest on Loan: The Petitioner has proposed Interest rate of 13%, with a repayment period of 12 years.
- 4.2.6.7 Interest on Working Capital: The Petitioner has not clearly indicated the Interest on Working Capital.
- 4.2.6.8 Auxiliary Power Consumption: The Petitioner has proposed 0% Auxiliary Power Consumption.
- 4.2.6.9 Capacity Utilisation Factor (CUF): As per the final submission of PVSyst report the CUF is 16.84%.
- 4.2.6.10 Energy Generation (MU): The Petitioner has proposed Yearly net Energy Generation of 29.496 MU.
- 4.2.6.11 Module Degradation: The Petitioner has proposed Annual Module Degradation of 0.7%.

4.2.7 **Commission's Analysis & Decision:**

- 4.2.7.1 Operation and Maintenance Cost (O & M Cost): As per the AERC RE Tariff Regulations, 2012, the O & M cost allowable for 1st year of operation is Rs 11 Lakh/MW. At that point of time the norm was in line with the then CERC norm for O & M cost. However, as per the CERC Generic Tariff Order for FY 2016-17, the O & M Cost for first year of operation is Rs 7 Lakh/MW with an annual escalation of 5.72%. This implies that at the national level and in general the O & M cost for Solar PV project has gone down. This is also reflected in the submission of the Petitioner.

Therefore, considering the change in scenario, the Commission deems it fit to reduce the O & M norm by using the provisions under Regulation 85 of the AERC RE Tariff Regulations, 2012. However, considering the additional cost requirement for the state of Assam, the Commission deems it fit to allow additional 15% cost over and above

the CERC Benchmark. Accordingly, Rs 8.05 Lakh/MW is considered to be O & M cost for the 1st year of operation (Rs 7 Lakh/MW + 15% of Rs 7 Lakh/MW)

4.2.7.2 Land Lease: The Commission has allowed the Land Lease cost as per the terms of the submitted Land Lease Agreement by considering:

- Fixed Land Lease/rental Charge Rs 15000 per Bigha/Year with the escalation of 8% every 5 years upto 25 years.
- Variable land lease charges 1% of the total Revenue per year from the Solar Park payable to the Sonapur Jutiya Unnayan Samity.

4.2.7.3 Depreciation: The Depreciation is allowed as per the provisions of the AERC RE Tariff Regulations, 2012. Further, as Evacuation network beyond interconnection point will be maintained by the utility as per AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2015, for computation of Depreciation, Project Cost upto interconnection point is only considered.

4.2.7.4 Funding Pattern: The Petitioner's proposal is in line with the AERC RE Tariff Regulations, 2012 and hence considered the proposed Funding Pattern on the approved Project Cost.

4.2.7.5 Return on Equity: The Petitioner's proposal is in line with the AERC RE Tariff Regulations, 2012 and hence considered the proposed rate of Return on Equity.

4.2.7.6 Interest on Loan: As per AERC RE Tariff Regulations, 2012, the normative interest rate shall be considered as average SBI base rate prevalent during first six months of previous year plus 300 basis point. Accordingly Interest rate of 12.76% is allowed. Further the repayment period of 12 years proposed by the Petitioner is in accordance with the norm and hence allowed the same.

4.2.7.7 Interest on Working Capital: Even though the Petitioner has not clearly indicated the Interest on Working Capital, the Interest on Working Capital being a normative component, the same is allowed as per the AERC RE Tariff Regulations, 2012.

4.2.7.8 Auxiliary Power Consumption: The Petitioner's proposal is per norm and hence Auxiliary Power Consumption of 0% is considered as proposed.

4.2.7.9 Capacity Utilisation Factor (CUF): The Energy Output of a Solar PV System is dependent on various factors such as Solar Irradiation at the project site, PV Module & Panel Efficiency, PCU Efficiency, Transformation Efficiency etc. As such, the net energy output is dependent on the losses at the various stages/parts. In the DPR, the Petitioner has submitted a Simulation report of PVSyst software (a software used for generating Simulation report of energy generation from Solar PV Plant) showing the losses at various stages and finally the Energy Injected into the grid.

Considering the fact that for estimation of power generation from Solar PV power plants, PVSyst, HOMER & RETScreen are the most widely used software, the Commission deems it fit to accept the PVSyst Simulation report submitted by the Petitioner and accordingly considers the Energy Injected into the grid as 29.496 MU. Based on the Energy Injection of 29.496 MU, the CUF of 16.84% is arrived at. Thereby, CUF of 16.84% is approved as proposed by the Petitioner.

4.2.7.10 Energy Generation (MU): The Petitioner has proposed Yearly net Energy Generation of 29.496 MU and the same is reflected in the PVSyst report as well. Therefore, Net Energy Generation per year of 29.496 MU approved.

4.2.7.11 Module Degradation: The Petitioner has proposed Annual Module Degradation of 0.7%. However, in the submitted PVSyst report, the Petitioner has already accounted for Module quality loss thereby the degradation is already factored in. Further, in the CERC Generic Tariff Order for FY 2016-17, the net Energy Generation is kept same for all the 25 years of operation, without considering Degradation factor. Therefore, the Commission deems it fit not to consider separate Module Degradation.

4.2.7.12 Based on the above, the Technical & Financial Norms approved vis-à-vis proposed is shown in the table below:

SL No.	Particulars	UNIT	Proposed	Approved
OPERATIONAL DATA				
1	Installed Capacity	MW	20.00	20.00
2	Annual Gross Generation	MU	29.50	29.50
3	Annual module Degradation	%	0.70%	0.00%
4	Annual Net Generation	MU	29.50	29.50
FINANCIAL DATA				
5	Total Project Cost including IDC	<u>lakh</u>	17581.60	10649.15
6	Project Cost	Lakh/MW	879.08	532.46
7	Debt (70%)	<u>lakh</u>	12307.12	7454.41
8	Equity (30%)	<u>lakh</u>	5274.48	3194.75
	Total (7+8)	-	17581.60	10649.15
9	Discount rate	%	10.70	10.64
<u>NORMS</u>				
Financial Norm				
1	O & M cost	Lakh/MW	8.75	8.05
2	Annual lease rent	Lakh/MW	6.28	Allowed on annual basis
3	Depreciation Rate	upto 12th year	5.83%	5.83%
		13th year onwards	1.54%	The remaining Depreciation is spread over the life
4	ROE	%	20% Pre Tax(1st 10 years) & 24% Pre Tax (from 11th year)	20% Pre Tax(1st 10 years) & 24% Pre Tax (from 11th year)
5	Interest on Term Loan	%	13%	12.76%
6	Interest on working capital	%	13.26%	13.26%
7	O & M annual Escalation Rate	%	5.72%	5.72%
Technical Norm				
8	Auxiliary Power Consumption	%	0.00%	0.00%
9	CUF	%	16.84%	16.84%

4.3 Levelling Tariff:

Based on the above, the Commission has determined and approved a provisional levellised tariff of Rs. 6.67/kWh for a period of 25 years from the date of commercial operation. Details of tariff computation are furnished in Annexure-I enclosed.

5. Other applicable conditions:

5.1 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.

5.2 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.

5.3 Scheduling:

The 20 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.

5.4 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.

5.5 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.

5.6 Determination of final tariff:

The Commission has determined the provisional tariff for the 20 MW Solar PV plant of the Petitioner. The Commission directs the petitioner to file fresh petition for determination of final tariff, immediately after Commercial Operation of the project, 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.

With the above observations and decisions, the Tariff Petition (No. 10/2016) stands disposed of with fixation of the Provisional Levellized Tariff of Rs 6.67 per kWh for a period of 25 years.

Sd/-
(S. C. Das)
Member, AERC

Sd/-
(D. Chakravarty)
Member, AERC

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

ANNEXURE-I

Determination of project specific Tariff for 20 MW Grid connected SOLAR PV POWER PLANT of Relyon Solar Pvt. Ltd

	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	20.00	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20		
2. Gross Generation	MU		29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50		
3. Annual module degradation	MU					-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4. Auxilliary Consumption			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4. Net Generation	MU		29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50	29.50		
Fixed Cost			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	
O & M cost	Rs. Lakh		161	170	180	190	201	213	225	238	251	266	281	297	314	332	351	371	392	414	438	463	490	518	547	579	612	
Land Lease	Rs Lakh		69	68	67	67	66	69	68	68	67	66	71	70	67	67	67	71	76	81	87	93	100	100	100	101	101	
Depreciation	Rs. Lakh		553	553	553	553	553	553	553	553	553	553	553	553	219	219	219	219	219	219	219	219	219	219	219	219	219	
Interest on term loan	Rs. Lakh		912	832	753	674	594	515	436	357	277	198	119	40														
IWC	Rs. Lakh		58	57	55	54	53	52	51	49	48	47	49	48	41	42	43	44	45	47	48	50	51	53	54	56	58	
Return on Equity	Rs. Lakh		639	639	639	639	639	639	639	639	639	639	767	767	767	767	767	767	767	767	767	767	767	767	767	767	767	
Total fixed cost	Rs. Lakh		2,391	2,319	2,248	2,177	2,107	2,041	1,972	1,904	1,836	1,770	1,840	1,775	1,407	1,426	1,447	1,472	1,500	1,529	1,559	1,592	1,626	1,656	1,688	1,721	1,756	
Nominal Fixed cost	Rs. /KWH		8.11	7.86	7.62	7.38	7.14	6.92	6.68	6.45	6.23	6.00	6.24	6.02	4.77	4.84	4.90	4.99	5.08	5.18	5.29	5.40	5.51	5.62	5.72	5.84	5.95	
Discounted Fixed cost	Rs. /KWH		8.11	7.11	6.23	5.45	4.77	4.17	3.64	3.18	2.77	2.41	2.27	1.98	1.42	1.30	1.19	1.10	1.01	0.93	0.86	0.79	0.73	0.67	0.62	0.57	0.53	
Levellized tariff corresponding to useful life																												
O & M expn	Rs. /KWH		0.55	0.58	0.61	0.64	0.68	0.72	0.76	0.81	0.85	0.90	0.95	1.01	1.06	1.12	1.19	1.26	1.33	1.41	1.49	1.57	1.66	1.76	1.86	1.96	2.07	
Land Lease	Rs. /KWH		0.23	0.23	0.23	0.23	0.22	0.23	0.23	0.23	0.23	0.22	0.24	0.24	0.23	0.23	0.23	0.24	0.26	0.28	0.29	0.32	0.34	0.34	0.34	0.34	0.34	
Depreciation	Rs. /KWH		1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	
Interest on term loan	Rs. /KWH		3.09	2.82	2.55	2.28	2.02	1.75	1.48	1.21	0.94	0.67	0.40	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	
IWC	Rs. /KWH		0.20	0.19	0.19	0.18	0.18	0.17	0.17	0.16	0.16	0.16	0.17	0.16	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.20	
ROE	Rs. /KWH		2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	
Total COG	Rs. /KWH		8.11	7.86	7.62	7.38	7.14	6.92	6.68	6.45	6.23	6.00	6.24	6.02	4.77	4.84	4.90	4.99	5.08	5.18	5.29	5.40	5.51	5.62	5.72	5.84	5.95	
Levellized tariff	Rs. /KWH		6.67																									
IWC																												
a) O & M Expenses for 1 month	Rs. Lakh		13	14	15	16	17	18	19	20	21	22	23	25	26	28	29	31	33	35	37	39	41	43	46	48	51	
b) Receivables equivalent to 2 months of Fixed charges	Rs. Lakh		399	387	375	363	351	340	329	317	306	295	307	296	235	238	241	245	250	255	260	265	271	276	281	287	293	
c) Maintenance spares @ 15% of O & M expenses	Rs. Lakh		24	26	27	29	30	32	34	36	38	40	42	45	47	50	53	56	59	62	66	69	73	78	82	87	92	
Working Capital	Rs. Lakh		436	426	417	407	398	390	381	373	365	357	372	365	308	315	323	332	341	351	362	373	385	397	409	422	435	
Interest on Working Capital	Rs. Lakh		58	57	55	54	53	52	51	49	48	47	49	48	41	42	43	44	45	47	48	50	51	53	54	56	58	
Discount Factor (Based on Discount rate @ 10.64%)			1.00	0.90	0.82	0.74	0.67	0.60	0.55	0.49	0.45	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	