



# ASSAM ELECTRICITY REGULATORY COMMISSION

FILE NO. AERC. 558/2016

PETITION NO. 18/2016

## ORDER SHEET

16.11.2016

Before the Assam Electricity Regulatory Commission

ASEB Campus, Dwarandhar,  
G. S. Road, Sixth Mile, Guwahati – 781 022  
South West Energy Pvt. Ltd

----- 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 South West Energy Pvt. Ltd to APDCL to be set-up at Dakhin Mandakata Mouza Barbhangsor, Kamrup (R), Assam.

## ORDER

### 1. Background:

The South West Energy Pvt. Ltd (hereinafter referred to as the "Petitioner"), filed a Tariff petition on 18.04.2016 before the Commission along with Detailed Project Report (DPR) for determination of Tariff for its proposed 5 MW grid connected Solar PV Power Plant to be set-up at Dakhin Mandakata Mouza Barbhangsor, 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 29.01.2016 for sale of 5 MW power to APDCL.

### 2. Procedural History:

2.1 The salient points of the Petition (18/2016) are:

a. The Petitioner has proposed to set up 5 MW Solar PV project at Dakhin Mandakata Mouza Barbhangsor, Kamrup (R), Assam, the salient features of the project are:

- Capital cost -Rs.9.83 Cr/MW
- Capacity Utilization Factor (CUF)-17.4%
- PV module-Multi Crystalline type with module capacity of 315Wp
- Annual Energy Generation (injection to the grid)  
-As per Levelised Tariff calculation sheet: 7.6 MU  
-As per PVSyst Simulation report: 7.942 MU
- Tariff Proposed-Rs 12.04/kWh.
- The Power generated will be injected at 33kV level & will be fed to the 33kV Bezera sub-station, 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 29.01.2016 for sale of power was submitted, which was having a validity of 1 year.
- c. The Petitioner stated that 34.14 Acre of land is available for the project. However, no proper land related documents were submitted.

**2.2** After preliminary scrutiny of the Petition, vide Letter dated 02/05/2016, the following submissions were sought for:

- a. Land Lease deed/Sale deed in the name of the developer showing land cost.
- b. A detail copy of land schedule.
- c. Land value assessment from competent Government authority.
- d. A detail planning on power evacuation including getting right of way.

**2.3** Thereafter, vide notice dated 17/08/2016 a preliminary Hearing was scheduled on 30/08/2016 and vide letter dated 17/08/2016, Respondent-1 (APDCL) was directed to seek their views & comments on the petition filed by the Petitioner.

**2.4** The Respondent-1 submitted their views and comments on 30/08/ 2016 on the petition filed by South West Energy Pvt. Ltd.

**2.5** As scheduled, preliminary Hearing was conducted on 30/08/2016 and the key directives issued are stated below:

- a. The Commission directed the Petitioner and the Respondents (APDCL and AEGCL) to have a joint meeting and to arrive at a mutually acceptable decision on the power evacuation plan. The Commission also asked both the parties to sort out all other technical matters.
- b. Commission directed the Petitioner to submit the detail cost breakup with proper justification indicating deviation from CERC norms if any with justification, Power evacuation plan and a report on status of the Land on or before 10/09/2016.
- c. The next date of Hearing was scheduled on 15/09/2016.

The Hearing Order is enclosed as Enclosure-I.

**2.6** After the preliminary Hearing the Petitioner submitted the following details vide letter dated 09/09/2016.

- a. Lease deed of land with supporting documents. As per the Land document:
  - 86 Bigha 3 Kotha Land will be taken on Lease for 27 years
  - Lease rent is Rs 17,000/- per Bigha per year without any escalation
- b. Break up of total project cost with proper justification. As per the revised document:
  - The total project cost is revised to Rs 796.69 Lakh/MW
  - Levellised Tariff is revised to Rs 9.72/kWh

**2.7** Further, as scheduled, next Hearing was held on 15/09/2016 and the Commission directed the petitioner to publish the abridged form of the petition in six local daily newspapers within next seven days from the date of this notification as per the format approved by the Commission.

The Hearing Order is enclosed as Enclosure-II.

**2.8** As per the direction in the preliminary Hearing dated 15/09/2016 the Petitioner published the approved abridged notice form of the Petition in six local daily news papers on 27/09/2016 and 28/09/2016, seeking comments and objections from stakeholders within 21days time.

**2.9** Thereafter, vide News Paper Notification dated 23/10/2016, Public Hearing on the Petition was scheduled on 03/11/2016. However, no comments from Public/Public representative were received.

**2.10** As scheduled, a Public Hearing was held on 03/11/2016. During the Hearing, only Petitioner, Respondent1 (APDCL) & Respondent 2 (AEGCL) was present. No participant from the Public was there.

During the Hearing, the petitioner submitted that while preparing the PVSyst Simulation report, 100% Grid availability was considered and accordingly a Capacity Utilization Factor (CUF) of 18.12% was arrived. However, considering that the Grid availability generally varies from 85% to 100%, the Grid availability of 96% was considered while computing the CUF of proposed 17.40% in the Petition. The petitioner also reiterates that the various calculations related to computation levelized Tariff computation was based on CUF of 17.40%. The Petitioner prayed to the Commission to consider a CUF of 17.4%, considering 96% of Grid availability.

The Commission directed the Petitioner to submit the updated PVSyst Simulation report within two days.

The Hearing Order is enclosed as Enclosure-III.

**2.11** Thereafter, on 05/11/2016, as per direction of the Commission, the Petitioner submitted revised PVSyst Simulation report. As per the revised report, the Energy Injection to the grid stands revised to 7.622 MU from the earlier value of 7.942 MU.

### **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:**

##### **4.1.1 *Summary of Petitioner's submission:***

4.1.1.1 PV Module Cost: The Petitioner has proposed to install 15880 tier-I multi crystalline solar PV modules having per module output of 315Wp, leading to total output of 5MW. Considering all these, the Petitioner has proposed PV Module cost of Rs 312.8 Lakh/MW.

4.1.1.2 Land Leasing & Land Development: The Petitioner has proposed to take 86 Bighas and 3 Katha of Land on Lease with the following terms:

- Fixed Land Lease/rental Charge Rs 17000 per Bigha/Year upto 27 years without any escalation.

The Petitioner has submitted that due to uneven terrain, the Land requires additional Land development cost of 30.00 Lakh/MW. Considering the additional cost towards Land Development cost, the Land cost proposed is Rs 145.64 Lakh/MW.

- 4.1.1.3 Civil & General Works: The Petitioner has submitted that the Civil & General Works includes typical cost on leveling and grading, pitching and filling etc. The Petitioner has further stated that additional expenditure of Rs. 3.5 Lakh/MW towards WBM roads and Rs 20 Lakh/MW towards fencing is also considered. Accordingly, the Petitioner has proposed Rs 72.50 Lakh/MW as cost towards Civil & General works.
- 4.1.1.4 Mounting Structure: The Petitioner has proposed to use 70 Tons of cold rolled steel per MW with 100 micron galvanized module mounting structure with cost/tonne of Rs 73,500. Considering all these, the Petitioner has proposed cost of Rs51.45 Lakh/MW towards module Mounting Structure.
- 4.1.1.5 Power Conditioning Unit (PCU): The Petitioner has proposed Conext Core XC-630 inverter with capacity of 630 kW. After considering these, the Petitioner has proposed for a cost of Rs 40.05 Lakh/MW towards PCU.
- 4.1.1.6 Evacuation Cost upto Interconnection Point: The Petitioner has proposed Rs 87 Lakh/MW towards this head.
- 4.1.1.7 Preliminary & Pre-operative expenses including IDC & Contingency: The Petitioner proposed a cost of Rs 47.94 Lakh/MW under this head, which includes IDC, specific Contingencies etc.
- 4.1.1.8 Evacuation Cost beyond Interconnection Point: The Petitioner has proposed Rs 39 Lakh/MW towards this head for a transmission line of 5 km.
- 4.1.1.9 Based on the above, the Petitioner has proposed a total project cost of Rs 796.69 Lakh/MW. The break-up of the proposed Project Cost is as follows:

SI No	Particular	Cost (Rs Lakh/MW)
1	PV Module	312.80
2	Land Leasing & Land Development	145.64
3	Civil & General Work (fencing, WBM Roads, Land filling)	72.50
4	Mounting Structure	51.45
5	Power Conditioning Unit (PCU)	40.35
6	Evacuation Cost Upto Interconnection Point	87.00
7	Preliminary & Pre-operative expenses including IDC & Contingency	47.94
	<b>Project Cost Upto Interconnection Point</b>	<b>757.68</b>
8	Evacuation Cost beyond Interconnection Point	39.00
	<b>Project Cost</b>	<b>796.68</b>
	<b>Total Project Cost (Rs Lakh)</b>	<b>3983.40</b>

#### **4.1.2 Commission's Analysis & Decision:**

4.1.2.1 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. Further as per the CERC Order dated 23.03.2016, the CERC Benchmark PV Module Cost applicable for FY 2016-17 is Rs 328.39 Lakh/MW.

As the PV Module Cost proposed by the Petitioner is within the norm, the proposed PV Module Cost of Rs 312.80 Lakh/MW is approved.

4.1.2.2 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.

4.1.2.3 Civil & General Works: 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.

4.1.2.4 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 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.

4.1.2.5 Power Conditioning Unit (PCU): The Petitioner has proposed that the PCU cost is high mainly due to additional warranty cost required beyond 5 years which is ignored by CERC. The prevailing charges for extra warranty, including the services cost at remote locations gives an additional cost of Rs 5.05 Lakh/MW.

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.

4.1.2.6 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.

4.1.2.7 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.

4.1.2.8 Evacuation Cost beyond Interconnection Point: As per the AERC (Co-generation and Generation of Electricity from Renewable Sources of Energy) Regulations, 2015, the DISCOM/TRANSCO is required to construct the interface line (line between the interconnection point and the existing grid or distribution system) if the line is 5 Km or less. In this case, as per submission of the Petitioner, the line between the interconnection point and the existing grid or distribution system is of 5 km distance, hence, no cost is allowed under this head of expenditure. The DISCOM/TRANSCO will bear the Evacuation cost beyond Interconnection Point as per Regulation.

4.1.2.9 Based on the above, provisionally Rs 510.76 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:

	Item	Cost (Rs Lakh/MW)	
		Proposed	Approved
1	PV module	312.80	312.80
2	Land	145.64	Allowed as Operative Expense not Capital Expense
3	Civil & General works	72.50	40.25
4	Mounting structure	51.45	40.25
5	Power Conditioning Unit	40.35	40.25
6	Evacuation cost upto Inter-Connection Point	87.00	50.60
7	Preliminary & Pre-operative expense including IDC & contingency	47.94	26.61
	<b>Total Project Cost upto inter-connection point (Rs Lakh/MW)</b>	<b>757.68</b>	<b>510.76</b>
	<i>Evacuation cost beyond Inter-Connection Point</i>	<i>39.00</i>	<i>00.00</i>
	<b>Total Project Cost (Rs Lakh/MW)</b>	<b>796.68</b>	<b>510.76</b>
	<b>Total Project Cost for 5MW (Rs Lakh)</b>	<b>3,983.40</b>	<b>2,553.80</b>

## 4.2 Technical & Financial Norm:

### 4.2.1 Summary of Petitioner's submission:

The Petitioner has proposed a Levellized Tariff of Rs 9.72/kWh, based on the following parameters:

4.2.1.1 Operation and Maintenance Cost (O & M Cost): The Petitioner has proposed O & M Cost for first year Rs 13.00 Lakh/MW with annual escalation of 5.72%.

4.2.1.2 Depreciation: The Petitioner has proposed 5.28% as Depreciation rate upto 12<sup>th</sup> year and 1.54% 13<sup>th</sup> year onwards.

- 4.2.1.3 Funding Pattern: The Petitioner has proposed 30% Equity and 70% loan.
- 4.2.1.4 Return on Equity: The Petitioner has proposed 20% Pre Tax (1<sup>st</sup> 10 years) & 24% Pre-Tax (11<sup>th</sup> year onwards) as Return on Equity.
- 4.2.1.5 Interest on Loan: The Petitioner has proposed Interest rate of 12%, with a repayment period of 15 years.
- 4.2.1.6 Interest on Working Capital: The Petitioner has proposed 13.5% Interest on Working Capital.
- 4.2.1.7 Auxiliary Power Consumption: The Petitioner has proposed 0% Auxiliary Power Consumption.
- 4.2.1.8 Capacity Utilization Factor (CUF): The Petitioner has proposed CUF of 17.40%.
- 4.2.1.9 Energy Generation (MU): The Petitioner has proposed Yearly net Energy Generation of 7.62 MU.

#### **4.2.2 Commission's Analysis & Decision:**

- 4.2.2.1 Operation and Maintenance Cost (O & M Cost): As per the AERC RE Tariff Regulations, 2012, the O & M cost allowable for 1<sup>st</sup> 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.

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 1<sup>st</sup> year of operation (Rs 7 Lakh/MW + 15% of Rs 7 Lakh/MW)

- 4.2.2.2 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 17000 per Bigha/Year upto 25 years.
- 4.2.2.3 Depreciation: The Depreciation is allowed as per the provisions of the AERC RE Tariff Regulations, 2012.
- 4.2.2.4 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.
- 4.2.2.5 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.
- 4.2.2.6 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. The proposed interest rate is in line with the AERC Regulations and hence considered interest rate of 12% is considered. Further, even though the petitioner has proposed repayment period of 15 years, however, as per Regulations repayment period of 12 years is approved.

- 4.2.2.7 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.
- 4.2.2.8 Auxiliary Power Consumption: The Petitioner's proposal is per norm and hence Auxiliary Power Consumption of 0% is considered as proposed.
- 4.2.2.9 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 7.622 MU. Based on the Energy Injection of 7.622 MU, the CUF of 17.40% is arrived at. Thereby, CUF of 17.40% is approved as proposed by the Petitioner.
- 4.2.2.10 Energy Generation (MU): The Petitioner has proposed Yearly net Energy Generation of 7.622 MU and the same is reflected in the PVSyst report as well. Therefore, Net Energy Generation per year of 7.622 MU approved.
- 4.2.2.11 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
<b>OPERATIONAL DATA</b>				
1	Installed Capacity	MW	5.00	5.00
2	Annual Gross Generation	MU	7.62	7.62
3	Annual Net Generation	MU	7.62	7.62
<b>FINANCIAL DATA</b>				
4	Total Project Cost including IDC	<u>lakh</u>	<b>7966.80</b>	<b>2553.80</b>
5	Project Cost	Lakh/MW	796.68	510.76
6	Debt (70%)	<u>lakh</u>	5576.76	1787.66
7	Equity (30%)	<u>lakh</u>	2390.04	766.14
	<b>Total (7+8)</b>		<b>7966.80</b>	<b>2553.80</b>
8	Discount rate	%	10.81	10.64
<b><u>NORMS</u></b>				
<b>Financial Norm</b>				
1	O & M cost	Lakh/MW	13.00	8.05
2	Annual lease rent	Lakh/MW	Proposed as part of Project Cost	Allowed on Annual Basis
3	Depreciation Rate	upto 12th year	5.83%	5.83%
		13th year onwards	1.54%-13 yr onwards	The remaining Depreciation



SL No.	Particulars	UNIT	Proposed	Approved
				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	%	12.00%	12.00%
6	Interest on working capital	%	13.50%	13.26%
7	O & M annual Escalation Rate	%	5.42%	5.42%
<b>Technical Norm</b>				
8	Auxiliary Power Consumption	%	0.00%	0.00%
9	CUF	%	17.40%	17.40%

#### 4.3 **Levelling Tariff:**

Based on the above, the Commission has determined and approved a provisional levelling tariff of Rs. 6.07/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 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.

##### 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 5 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. 18/2016) stands disposed of with fixation of the Provisional Levellised Tariff of Rs 6.07 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 5 MW Grid connected SOLAR PV POWER PLANT of South West Energy 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	
<b>1. Installed Capacity</b>	MW	5.00	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
<b>2. Gross Generation</b>	MU		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
<b>3. Annual module degradation</b>	MU																										
<b>4. Auxillary Consumption @ 0%</b>			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<b>4. Net Generation</b>	MU		7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	7.62	
<b>Fixed Cost</b>			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		40	42	45	47	50	52	55	58	61	65	68	72	76	80	84	89	94	99	104	110	116	122	129	136	143
Land Lease	Rs Lakh		13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
Depreciation	Rs. Lakh		134	134	134	134	134	134	134	134	134	134	134	134	53	53	53	53	53	53	53	53	53	53	53	53	53
Interest on term loan	Rs. Lakh		206	188	170	152	134	116	98	80	63	45	27	9													
IWC	Rs. Lakh		14	13	13	13	13	12	12	12	12	11	12	12	10	10	10	10	11	11	11	12	12	12	13	13	13
Return on Equity	Rs. Lakh		153	153	153	153	153	153	153	153	153	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184	184
<b>Total fixed cost</b>	Rs. Lakh		559	543	528	512	496	481	466	450	435	421	437	423	335	340	344	349	354	359	365	371	377	384	391	398	406
Nominal Fixed cost	Rs. /KWH		7.34	7.13	6.92	6.72	6.51	6.31	6.11	5.91	5.71	5.52	5.74	5.55	4.40	4.46	4.52	4.58	4.65	4.72	4.79	4.87	4.95	5.04	5.13	5.22	5.33
<b>Discounted Fixed cost</b>	Rs. /KWH		7.34	6.44	5.65	4.96	4.35	3.80	3.33	2.91	2.54	2.22	2.09	1.83	1.31	1.20	1.10	1.00	0.92	0.85	0.78	0.71	0.66	0.60	0.55	0.51	0.47
<b>Levillised tariff corresponding to useful life</b>																											
O & M expn	Rs. /KWH		0.53	0.56	0.59	0.62	0.65	0.69	0.72	0.76	0.81	0.85	0.90	0.94	0.99	1.05	1.11	1.17	1.23	1.30	1.37	1.44	1.52	1.60	1.69	1.78	1.87
Land Lease	Rs. /KWH		0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Depreciation	Rs. /KWH		1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Interest on term loan	Rs. /KWH		2.70	2.46	2.23	1.99	1.76	1.52	1.29	1.06	0.82	0.59	0.35	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-
IWC	Rs. /KWH		0.18	0.17	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.15	0.15	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18
ROE	Rs. /KWH		2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.01	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41	2.41
<b>Total COG</b>	Rs. /KWH		7.34	7.13	6.92	6.72	6.51	6.31	6.11	5.91	5.71	5.52	5.74	5.55	4.40	4.46	4.52	4.58	4.65	4.72	4.79	4.87	4.95	5.04	5.13	5.22	5.33
<b>Levillized tariff</b>	Rs. /KWH		6.07																								
<b>IWC</b>																											
a) O & M Expenses for 1 month	Rs. Lakh		3	4	4	4	4	4	5	5	5	5	6	6	6	7	7	7	8	8	9	9	10	10	11	11	12
b) Receivables equivalent to 2 months of Fixed charges	Rs. Lakh		93	91	88	85	83	80	78	75	73	70	73	71	56	57	57	58	59	60	61	62	63	64	65	66	68
c) Maintenance spares @ 15% of O & M expenses	Rs. Lakh		6	6	7	7	7	8	8	9	9	10	10	11	11	12	13	13	14	15	16	16	17	18	19	20	21
<b>Working Capital</b>	Rs. Lakh		103	100	98	96	94	92	90	89	87	85	89	87	74	75	77	79	81	83	85	87	90	92	95	98	101
Interest on Working Capital	Rs. Lakh		14	13	13	13	13	12	12	12	12	11	12	12	10	10	10	10	11	11	11	12	12	12	13	13	13
<b>Discount Factor (Based on Discount rate @ 10.64%)</b>			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