



# Verified Carbon Standard

## SOLAR ENERGY PROJECT(S) BY SB ENERGY PRIVATE LIMITED



**INFINITE**  
SOLUTIONS

Document Prepared by (Infinite Solutions)

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# 1 PROJECT DETAILS

## 1.1 Summary Description of the Implementation Status of the Project

The purpose of project activity is to implement renewable grid connected Solar energy projects in the country. The project activity is a voluntary action and SB Energy Private Limited is the Project Proponent for this project activity. There are no mandatory laws or regulations existing in India requiring PP or any other party to develop a programme for renewable generation plants.

The electricity generated by the project renewable energy technology (solar PV) is supplied to the regional grid there by displacing the consumption of electricity from the regional grid electricity distribution system which is part of Indian grid and predominantly by fossil fuel fired thermal power generation-based plants. Thus, serving the nation by contributing in sustainable development and reducing the anthropogenic GHG emissions equivalent to the generation by the project activity.

The monitoring period is from 02/02/2020 to 30/11/2021. The total GHG emission reductions or removals generated in this monitoring period are 3,142,587 tCO<sub>2</sub>e.

The project activity involves the installation of Solar PV Power Projects. The total installed capacity of the project is 2,250 MW; which involves operation of Solar PV projects in multiple states of India. The project is promoted by following project owners which are as follows:

S.No.	Owner of Project/SPV	Project Location	State	Project Capacity (MW)	Commissioning Date	Remark
1	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	27/02/2017	Exists in Verra
				68	22/03/2017	
				100	28/03/2017	
2	SB Energy One Private Limited	Bhadla	Rajasthan	100	21/09/2018	Registered in other GHG standard (Gold Standard)
				100	24/09/2018	
				100	24/09/2018	
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20	04/10/2018	Registered in other GHG standard (Gold Standard)
				20	04/10/2018	
				30	18/09/2018	
				30	18/09/2018	
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	03/05/2019, 09/07/2019	Registered in other GHG

						standard (Gold Standard)
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	20/12/2019, 11/03/2020	Exists in Verra
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Phase 1 (300 MW)– 14/06/2021 Phase 2(300 MW) – yet to be commissioned	Exists in Verra
7	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	17/12/2019	Exists in Verra
8	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned	Yet to be commissioned

**Table 1: List of SPVs**

These are the SPVs of SB Energy Private Limited and the project is promoted by SB Energy Private Limited. As on date, 2000 MW capacity has been commissioned out of the total 2250 MW capacity. Nevertheless, PP has considered the electricity generation from 4 SPVs in this monitoring period.

## 1.2 Sectoral Scope and Project Type

The project activity under consideration is not a grouped project activity.

Sectoral Scope Applicable to project: 01 – Energy Industries (renewable/non-renewable Sources)

Project Type: I – Renewable Energy Projects

Title: ACM0002 Grid-connected electricity generation from renewable sources – Version 19

Reference: ACM0002 Version 19<sup>1</sup>.

## 1.3 Project Proponent

<b>Organization name</b>	SB Energy Private Limited
<b>Contact person</b>	Mr. Alpesh Gedia
<b>Title</b>	Associate Manager - Business Development

<sup>1</sup> <http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

<b>Address</b>	4th Floor - South Wing Adani House, Shantigram, SG Highway, Ahmedabad
<b>Telephone</b>	+91 79-26565555
<b>Email</b>	<a href="mailto:info@adani.com">info@adani.com</a>

#### 1.4 Other Entities Involved in the Project

<b>Organization name</b>	Infinite Solutions
<b>Role in the Project</b>	Project Consultant
<b>Contact person</b>	Mr. Jimmy Sah
<b>Title</b>	Head – Sustainability
<b>Address</b>	Address: 214-215 Milinda Manor, Opp. Next Treasure Island Mall Indore, MP – 452001
<b>Telephone</b>	+91-9644130430
<b>Email</b>	<a href="mailto:jimmy@infisolutions.org">jimmy@infisolutions.org</a>

#### 1.5 Project Start Date

The first project activity under consideration was commissioned and power generation started on 27/02/2017.

Hence the project start date is considered as 27/02/2017.

#### 1.6 Project Crediting Period

Project crediting period for project activity is taken as 10 years renewable twice.

Start date of the first crediting period: 27/02/2017

End date of the first crediting period: 26/02/2027

#### 1.7 Project Location

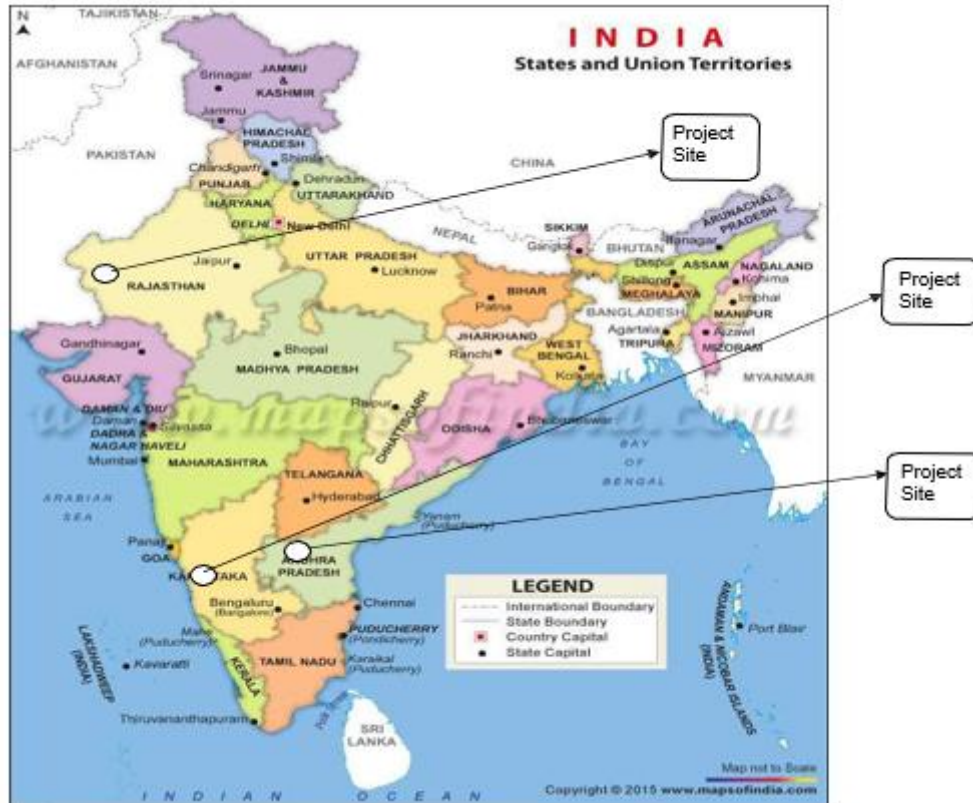
The solar plants are located at various states of India and respective location is given below:

S.No.	Owner of Project/SPV	Project Location	State	Project Capacity (MW)	Geographical Coordinates
1	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	15°41'01.02"N - 78°17'00.44"E
				68	
				100	

2	SB Energy One Private Limited	Bhadla	Rajasthan	100	27°27'54.93"N - 71°59'38.96"E
				100	
				100	
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20	27°31'53.94"N - 71°57'46.99"E
				20	
				30	
				30	
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	27°29'04.1"N - 72°01'25.1"E
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	13°59'32.08"N - 78°25'26.92"E
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	26°57'12.41"N - 72°03'34.99"E
7	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	14°56'58.59"N - 78°13'12.84"E
8	SBG Cleantech Project Co Five Private Limited	Pavagada	Karnataka	200	14°13'26.44"N - 77°25'47.83"E

**Table 2: List of SPVs showing geographical location**

The map of project site is as indicated in the following figure:



**Figure 1: Project location**

## 1.8 Title and Reference of Methodology

**Title** : Grid-connected electricity generation from renewable sources

**Reference** : The project activity meets the eligibility criteria of large-scale project as it is more than 15 MW

**Methodology** : ACM0002: Grid-connected electricity generation from renewable sources - Version 19<sup>2</sup>

**Type I** : Energy industries (renewable / non-renewable sources)

**Category** : Approved Consolidated Methodology (ACM0002)

Tools referred with above methodology and applicable for project activity are:

<sup>2</sup> <http://cdm.unfccc.int/methodologies/DB/VJI9AX539D9MLOPXN2AY9UR1N4IYGD>

Tool to calculate the emission factor for an electricity system<sup>3</sup> - Version 07.0 (EB 100, Annex 04)

Methodological Tool- Tool for the demonstration and assessment of additionality<sup>4</sup> - Version 07.0.0 (EB 70, Annex 08).

## 1.9 Participation under other GHG Programs

Some (3 out of 8 SPVs) of the SPVs of this project activity are registered under other GHG programs.

Below is the list of SPVs under this project activity registered under GS Mechanism:

S. No.	Owner of Project/SPD	Project Location	State	Project Capacity (MW)	Commissioning Date	Status
1	SB Energy One Private Limited	Bhadla	Rajasthan	100	21/09/2018	Registered in Gold Standard GS7071: Registered
				100	24/09/2018	
				100	24/09/2018	
2	SB Energy Three Private Limited	Bhadla	Rajasthan	20	04/10/2018	
				20	04/10/2018	
				30	18/09/2018	
				30	18/09/2018	
3	SB Energy Four Private Limited	Bhadla	Rajasthan	200	03/05/2019, 09/07/2019	Registered in Gold Standard GS7532 - Registered
4	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	27/02/2017	Exists in verra
				68	22/03/2017	
				100	28/03/2017	
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	20/12/2019, 11/03/2020	
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Phase 1 (300 MW)– 14/06/2021 Phase 2(300 MW) – yet to be commissioned	
7	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	17/12/2019	

<sup>3</sup> <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-07-v7.0.pdf>

<sup>4</sup> <http://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

8	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned	Yet to be commissioned
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**Table 3: List of SPVs showing commissioning dates**

### 1.10 Other Forms of Credit

The project activity is not availing any REC benefits and the same can be confirmed from publically available link of REC generators.

Web-link: <https://www.recregistryindia.nic.in/> (RE Generators tab then select accredited)

PP has also submitted undertaking for not availing other forms of environmental credit for the same crediting period under consideration.

As explained above, three of the SPVs of this project activity mention in above section 1.9 are registered under other GHG program (Gold Standard).

Thus, the Project activity has considered four SPVs which is installed capacity of 1100 MW who has no intention and does not perusing registration to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

Therefore, PP has considered generation from four SPVs for the calculation of Emission reduction.

### 1.11 Sustainable Development

The implementation of project activity ensures energy security, diversification of the grid generation mix and sustainable growth of the electricity generation sector in India by means of Solar PV technology.

Nevertheless, Ministry of Environment Forest & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

**Social well-being:** The project would help in generating employment opportunities during the construction and operation phases. The project activity will lead to development in infrastructure in the region like development of roads and also may promote business with improved power generation.

**Economic well-being:** The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.

**Technological well-being:** The successful operation of project activity would lead to promotion of Solar based power generation and would encourage other entrepreneurs to participate in similar projects

**Environmental well-being:** Solar being a renewable source of energy, it reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Due to its zero emission the Project activity also helps in avoiding significant amount of GHG emissions. The project activity will generate power using zero emissions Solar PV based power generation which helps to reduce GHG emissions and specific pollutants like SO<sub>x</sub>, NO<sub>x</sub>, and SPM associated with the conventional thermal power generation facilities.

## 2 SAFEGUARDS

### 2.1 No Net Harm

The project activity does not cause any harm to the local ecology. It primarily requires the installation of the solar PV power project, interfacing the generators with the State Electricity Board by setting up HT transmission lines and installation of other accessories.

Also, as per the Central Pollution Control Board of India notification<sup>5</sup> Solar PV project falls under White Category and are practically non-polluting.

### 2.2 Local Stakeholder Consultation

The Local Stakeholder Meetings were organized for local stakeholder consultation and informed local stakeholder regarding the meeting. The followings are the local stakeholders for the project activity:

- Local community
- Local village administration
- Technology suppliers
- Local vendors

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<sup>5</sup> [http://envfor.nic.in/sites/default/files/Latest\\_118\\_Final\\_Directions.pdf](http://envfor.nic.in/sites/default/files/Latest_118_Final_Directions.pdf)

There were no negative comments received during the meeting and stakeholders appreciated proactive efforts taken by project proponent towards reducing emissions

For ongoing communication, the PP has also placed a grievance register onsite where in the stakeholder can put down his/her complain and the same if found genuine will be addressed immediately.

However, there is no negative feedback has been reported within this monitoring period.

### 2.3 AFOLU-Specific Safeguards

This section is not applicable to the project activity.

## 3 IMPLEMENTATION STATUS

### 3.1 Implementation Status of the Project Activity

The project activity involves the installation of Solar PV project. The total installed capacity of the project is 2,250<sup>6</sup> MW, which involves installation of Solar PV projects of different capacities located in different states of India.

S.No.	Owner of Project/SPV	Project Location	State	Project Capacity (MW)	Commissioning Date	Current Status
1	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	27/02/2017	SPV registered under VCS Project activity. PP has considered electricity generation from this SPV during current verification.
				68	22/03/2017	
				100	28/03/2017	

<sup>6</sup> In this monitoring period four SPVs of 1100 MW capacity has considered the generation for calculating emission reduction under VCS mechanism.

2	SB Energy One Private Limited	Bhadla	Rajasthan	100	21/09/2018	SPVs deregistered from the project activity
				100	24/09/2018	
				100	24/09/2018	
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20	04/10/2018	
				20	04/10/2018	
				30	18/09/2018	
				30	18/09/2018	
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	03/05/2019, 09/07/2019	
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	20/12/2019, 11/03/2020	SPVs registered under VCS Project activity. PP has considered electricity generation from this SPV during current verification.
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Phase 1 (300 MW)– 14/06/2021	
					Phase 2(300 MW)-Yet to be commissioned	
7	SBG Cleantech Project Co Five Private Limited	Pavagada	Karnataka	200	17/12/2019	
8	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned	-

**Table 4: Current Status for the project activity**

The project is promoted by SB Energy Private Limited, who will act as project proponent on behalf of all the individual SPV's.

Solar PV Project Technology Details –

Technical specifications of 350 MW Solar PV Project by SBG Cleantech Project Co. Pvt Ltd are as follows:

Sr No.	Particulars	Details
1	Technology used	Polycrystalline
2	Rating of Solar Modules	310 to 320 Wp, Make- Trina Solar
3	Number of modules of each type	310 Wp- 264,840 315 Wp- 775,280 320 Wp- 402,360

4	Inverter	350 numbers of 1 MW each, make TMEIC
5	Transformer	175 nos.

Technical specifications of 250 MW Solar PV Project by SB Energy Solar Pvt Ltd are as follows:

Solar PV modules:

Module Make	Module Model	Capacity (p)	Number	Total Capacity (MW <sub>p</sub> )
Risen	RSM72-6-330/335P	330	273,273	90.180
Risen		335	179,462	60.120
SunTech	STP330/325-24/Vfw	330	574,835	189.696
SunTech		325	107,816	35.040
		Total	1,135,386	375.036

**Inverters:**

S.No.	Parameter	Details
1.	Make	SUNGROW
2.	Model	SG3125HV-20
3.	Rated Capacity	3125 KW
4.	No. of Inverters	80

Technical specifications of 200 MW Solar PV Project by SBG Cleantech Project Co Five Private Limited are as follows:

Solar PV modules:

Blockwise Location:	Risen 330 Wp	Risen 335 Wp	jienergy 330 Wp	jienergy 335 Wp	Znshine 330 Wp	Capacity MWp (DC)	Capacity MW (AC)
B-23	227292					75.01	50
B-24		223944				75.02	50
B-25			181846	44764		75.01	50
B-26					227292	75.01	50

<b>Sub Total</b>	227292	223944	181846	44764	227292	300.04	200
<b>Total number of PV Modules</b>					905138		

**Inverters:**

S.No.	Parameter	Details
1.	Make	Kehua
2.	Model	SPI3125K-B-H
3.	Rated Capacity	3125 KW
4.	No. of Inverters	64

**Technical specifications of 600 MW Solar PV Project by SB Energy Six Private Limited are as follows:**

**Phase I – 300 MW Technical Specifications**

	Details
Technology used	Poly-Crystalline
	Mono-Crystalline
Rating of each module(Wp)	330Wp , 335 Wp , 340 Wp , 345 Wp , 350 Wp, 380 Wp, 385 Wp
Number of modules installed	2357428 Nos
Source of modules installed of each type	1.Suntech
	2.Jinergy
	3.Trina
	4.Risen

The project activity has been in operation continuously since its commissioning. There have been no emergencies happened to the monitoring system. There are no events or situation that occurred during the monitoring period which may impact the applicability of the methodology.

There is no major shutdown observed during the current monitoring period in the project activity & supporting documents for the same has been provided to the Auditor.

Lifetime of the project activity: -

The estimated lifetime of the project activity is considered as 25 years for solar technology.

## 3.2 Deviations

### 2.3.1 Methodology Deviations

There are no methodological deviations applied during this monitoring period.

### 2.3.2 Project Description Deviations

**Project description deviation is applied during current monitoring period of the project activity: -**

During the current monitoring period, PP has updated in the MR that out of 8 SPVs, 3 SPVs are registered under GS mechanism & deregistered from the VCS project activity and details of the same has been provided under below table:-

S.No.	Owner of Project/SPD	Project Location	State	Project Capacity (MW)	Geographical Coordinates	GS ID/current project status
1	SB Energy One Private Limited	Bhadla	Rajasthan	100	27° 29' 04.49" N 71° 58' 54.09" E	GS 7071/ Deregistered from the VCS Project activity
				100	27° 29' 29.04" N 71° 59' 15.89" E	
				100	27° 28' 10.08" N 72° 00' 02.97" E	
2	SB Energy Three Private Limited	Bhadla	Rajasthan	20	27° 32' 08.45" N 71° 57' 19.10" E	
				20	27° 32' 25.47" N 71° 57' 24.23" E	
				30	27° 31' 55.48" N 71° 57' 58.23" E	
				30	27° 32' 21.8" N 71° 57' 47.54" E	
3	SB Energy Four Private Limited	Bhadla	Rajasthan	200	27° 29' 04.1" N 72° 01' 25.1" E	GS 7532/ Deregistered from the VCS Project activity
					27° 29' 04.1" N 72° 01' 25.1" E	

**Table 5: SPVs seeking registration in other voluntary mechanisms**

Remaining 5 SPVs under project activity are not seeking registered under GS Mechanism & out of 5 SPVs, 4 SPVs are claiming carbon credits under VCS Mechanism during current monitoring period & 1 SPV yet to be commissioned but not seeking registration under GS Mechanism. Please refer below :-

S.No.	Owner of Project/SPV	Project Location	State	Project Capacity (MW)	Commissioning Date
1	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	27/02/2017
				68	22/03/2017
				100	28/03/2017
2	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	20/12/2019, 11/03/2020
3	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Phase 1 – 300 MW-14/06/2021 Phase 2 – Yet to be commissioned
4	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	17/12/2019
5	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned

**Table 6: SPVs seeking registration in Verra**

**Deviation during previous monitoring period:**

During the previous monitoring period, PP has updated in the MR that out of 8 SPD, 7 SPDs are seeking registration under GS mechanism and details of the same has been provided under section 1.9 of the previous MR. **Remaining one SPD (SBG Cleantech Project Co. Pvt Ltd – Kurnool – 350 MW Capacity)**, which is not pursuing registration under any other GHG program and continuing under VCS mechanism.

However, the deviation does not impact the applicability of the methodology, additionality, or the appropriateness of the baseline scenario.

### 3.3 Grouped Projects

This section is not applicable to the project activity.

## 4 DATA AND PARAMETERS

### 4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid,OM,y}$
Data unit	tCO <sub>2</sub> /MWh
Description	Operating Margin CO <sub>2</sub> emission factor in year y

<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018
<b>Value applied</b>	0.9726
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07.0.0” as 3-year generation weighted average using data for the years 2014-2015, 2015-2016 & 2016 - 2017. The data are obtained from “CO <sub>2</sub> Baseline Database for Indian Power Sector” version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India
<b>Purpose of Data</b>	For the calculation of the Baseline Emission
<b>Comments</b>	This parameter is fixed ex-ante for the entire first crediting period.

<b>Data / Parameter</b>	EF <sub>grid,BM,y</sub>
<b>Data unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	Build Margin CO <sub>2</sub> emission factor in year y
<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018
<b>Value applied</b>	0.8723
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07” as per the latest data available for the most recent year 2016-17. The data is obtained from “CO <sub>2</sub> Baseline Database for Indian Power Sector” version 13, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of Data</b>	For the calculation of the Baseline Emission
<b>Comments</b>	This parameter is fixed ex-ante for the entire first crediting period.

<b>Data / Parameter</b>	EF <sub>grid,CM,y</sub>
<b>Data unit</b>	tCO <sub>2</sub> /MWh
<b>Description</b>	Combined Margin CO <sub>2</sub> emission factor in year y
<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018
<b>Value applied</b>	0.9475
<b>Justification of choice of data or description of measurement methods and procedures applied</b>	Calculated as per “Tool to calculate the emission factor for an electricity system, version 07.0.0”. The data is obtained from “CO <sub>2</sub> Baseline Database for Indian Power Sector” Version 13, June 2018, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of Data</b>	For the calculation of the Baseline Emission
<b>Comments</b>	This parameter is fixed ex-ante for the entire first crediting period.

## 4.2 Data and Parameters Monitored

Data / Parameter	$EG_{\text{facility},y}$
Data unit	MWh
Description	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity in year y
Source of data	Credit Report /JMR as per Monthly Generation Report
Description of measurement methods and procedures to be applied	<p>Data Type: Measured                      Monitoring equipment: Energy Meters are used for monitoring                      Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually                      Archiving Policy: Paper &amp; Electronic                      Calibration frequency: One in five years</p> <p>Electricity exported/imported to the grid is in kWh. However, for the calculation purpose electricity exported is converted in MWh.</p> <p><b>1. For 350 MW Capacity – Kurnool – Andhra Pradesh</b></p> <p>The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid obtained from joint meter reading certificates/credit notes issued by state electricity board as per below equation:</p> $EG_{\text{facility},y} = EG_{\text{Export}} - EG_{\text{Import}}$ <p>The joint reading at metering point is carried out once in a month in presence of O&amp;M officials and state electricity board personnel. The calculations/measurement of net electricity supplied to grid is under purview of state electricity board and the PP/Project activity owner has no role on it. PP/Project activity owner will get value of net electricity supplied to grid and hence this parameter is mentioned as a part of monitoring plan.</p> <p>Cross Checking:                      Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the PP to the State Electricity Board or invoices with third party.</p> <p><b>2. For 250 MW – Andhra Pradesh &amp; 200 MW – Pavagadaa(Karnataka)</b></p> <p>The REA statement issued by SRPC(Southern Regional Power Committee) contains the information of the Scheduled Power, Actual Power, and the Deviation between actual &amp; scheduled power. The scheduled power being feed into the grid can be cross-checked from the monthly Invoices raised by the PP. For ER calculations, the values of Actual power have been considered.</p> <p><b>3. For 600 MW Capacity (Phase 1 -300 MW -Commissioned)- Phalodi – Rajasthan</b></p>

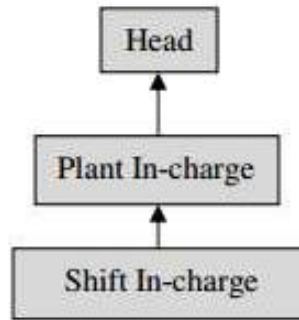
	The REA statement issued by NRPC(Northern Regional Power Committee) contains the information of Details of Inter-Regional Bilateral Exchanges (LUs) in which actual generation value can be cross-checked from the monthly Invoices raised by the PP.
Frequency of monitoring/recording	Continuous monitoring and monthly recording
Value monitored	3,316,715 MWh
Monitoring equipment	Monitoring equipment will be energy meter installed at the project activity site. Readings will be cross checked with back up meter. The accuracy class of meters, calibration frequency of meters is totally under purview of state electricity board and PP does not have any control on it. For detailed schedule of calibration of energy meters used in the project activity please refer Appendix- 1.
QA/QC procedures to be applied	The calibration of all the meters will be undertaken once in five years <sup>7</sup> and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.5s or higher. The meter accuracy class and calibration interval are under purview of state electricity board and PP/Project Activity owner do not have any control on it. It is also noted that apportioning procedure (if applicable for project activity) is under control of state electricity board and PP do not have any control on it. The available parameter to PP/project activity owner is the net electricity supplied to grid and same parameter is mentioned as monitoring parameter.
Purpose of the data	Calculation of baseline emissions
Calculation method	The parameter is measured and if any calculation is required, the calculation is based on measured parameters
Comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period

### 4.3 Monitoring Plan

The monitoring plan, which is implemented by the PP describes about the monitoring organisation, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data results with the PP. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:

<sup>7</sup> [http://www.aegcl.co.in/Metering\\_Regulations\\_Of\\_CEA\\_17\\_03\\_2006.pdf](http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf)



**Figure 2: Organisational structure for monitoring**

PP has assigned the responsibility of operation and maintenance of project activity with relevant and authorised O&M contractors. The Plant In-charge and Shift In-Charge would be deployed by O&M contractors.

**Responsibilities of Head:** Overall functioning and maintenance of the data.

**Responsibilities of Plant In-charge:** Responsibility for Maintains the data records, ensures completeness of data, and reliability of data (calibration of equipment's).

**Responsibilities of Shift In-charge:** Responsibility for day to day data collection and maintains day to day log book for monitored data.

In the event when the individual verification period dates and billing cycle dates of the project activity do not coincide, then the electricity export will be apportioned based on number of days. The ratio of number of days under monitoring period and total number of days under billing cycle will multiplied to total electricity export to billing cycle.

For project activity which involves solar projects with common metering, apportioning will be followed to determine net electricity export to grid. The apportioning procedure is not under control of PP, thus value of net electricity supplied to grid is available to PP and same is mentioned as monitoring parameter. The value of net electricity supplied to grid is used for ER calculations.

It is to be noted that the metering arrangement, accuracy class of meters, feeder arrangements, calibration frequency of meters are under control of state electricity board and PP does not have any control on it. Thus, any deviation at actual site or during verification is accepted.

**Data Measurement:** Projects activity comprises of installation Energy meters at a GSS Substation prior to the Delivery point.

### **1. 350 MW Kurnool – Andhra Pradesh**

The electricity exported & imported are measured by Energy meter installed at substation. The electricity is fed in the Integrated Indian grid. Monitoring consists of metering the net electricity supplied to the grid ( $EG_{\text{facility},y}$ ). This parameter is based on the monthly JMRs undertaken by AP TRANSCO and PP which is continuously through energy meters. The PP will then raise monthly electricity sales invoices based on the JMR reading.

### **2. 250 MW – Anantapur (Andhra Pradesh) & 200 MW – Pavagadaa (Karnataka)**

The parameter  $EG_{P,J,y}$  is calculated using the difference of export and import value measured from the electricity meter. Thus, value of net electricity supplied is directly sources from the REA statement.

The REA statement issued by SRPC which provide the values of Scheduled Power, Actual Power, and the Deviation between actual & scheduled power for the month.

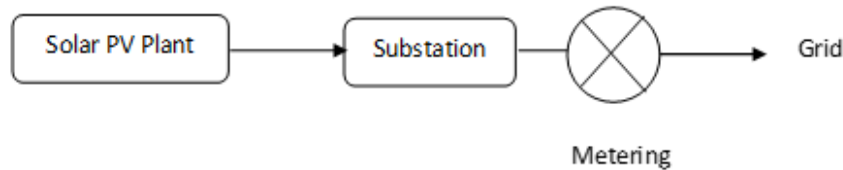
The actual power is used for emission reduction calculation. For billing purpose, the meter readings shall be measured on monthly basis and the PP has no control over the process. Based on the statement the Invoice is raised by PP on the scheduled energy and thus crosschecking of actual energy supplied to grid from invoices is not possible. The scheduled power being feed into the grid can be cross-checked from the monthly Invoices raised by the PP. For ER calculations, the values of Actual power have been considered.

The SRPC is a credible government body, and the REA statement is publicly available at the website of SRPC, which can be referred from [https://www.srpc.kar.nic.in/html/all\\_uploads.html#gsc.tab=0](https://www.srpc.kar.nic.in/html/all_uploads.html#gsc.tab=0)

### **3. For 600 MW Capacity – Phalodi – Rajasthan**

The REA statement issued by NRPC(Northern Regional Power Committee) contains the information of Details of Inter-Regional Bilateral Exchanges (LUs) in which actual generation value can be cross-checked from the monthly Invoices raised by the PP.

The NRPC is a credible government body, and the REA statement is publicly available at the website of NRPC, which can be referred from <http://nrpc.gov.in/>.



**Figure 3: Sample Line diagram of Solar PV project being followed at site**

#### **QA & QC Procedures to be followed**

Necessary check meters as required would be installed, to operate in standby mode or when the main meters are not working. All meters will be calibrated at least once in five year as per CEA notification. Records of calibration certificates will be maintained for verification. Hence, high quality is ensured with the above parameters. The calibration of meters is under purview of state electricity board and CME/ project activity owner do not have any control on it.

#### **Data Recording and Storage**

For measuring the net energy supplied to grid by the project activity at the interconnection point, one set of Main meter and Check Meter shall be provided. Representatives of both project activity Owner and State Utility will be present to record the monthly meter readings. The state utility will prepare the credit report for the net energy supplied to the grid and same will be used as a basic document for monitoring and verification of the net energy supplied to the grid. Based on the monthly credit report, the project activity Owner shall raise an invoice to the utility. Utility will pay to the project activity Owner based on this document.

The above document will be kept at safe storage for verification of emission reductions generated from the project activity. The period of data storage will be 2 years beyond crediting period.

#### **Emergency preparedness**

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. However, in case monitoring equipment get failed or found faulty, they shall be replaced with calibrated meters as quickly as possible. In case main meter get failed or found faulty, the reading of check meter will be considered.

### Personnel training

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff will be trained. The Shift In-charge and Plant In-charge will be trained in equipment operation, data recording, operation and maintenance and emergency procedures in compliance with the monitoring plant.

## 5 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

### 5.1 Baseline Emissions

The baseline emission calculation for the project activity is attributable to the CO<sub>2</sub> Emission that could have been produced by the fossil fuel-based power plants in absence of the proposed project activity. Therefore, the amount electricity supplied to the Indian grid will be multiplied by the grid emission factor of Indian grid to calculate the baseline emissions reduced by the proposed project

$$BE_y = EG_{Pj,y} \times EF_{grid,CM,y}$$

Project Site	Capacity	Generation(MWh)	Emission Reduction(tCO <sub>2</sub> e)
Kurnool	350	1,234,777	1,169,951
Ananthpur	200	980,935	929,436
Pavagadaa	250	780,996	739,993
Phalodi	300	320,007	303,207
<b>Total</b>		<b>3,316,715</b>	<b>3,142,587</b>

$$= 3,316,715 \times 0.9475 = 3,142,587 \text{ tCO}_2\text{e}$$

Where,

<b>BE<sub>y</sub></b>	=	Baseline Emissions in year y; tCO <sub>2</sub>
<b>EG<sub>Pj,y</sub></b>	=	Quantity of net electricity supplied to the grid as a result of the implementation of the CDM project activity in year y (MWh)
<b>EF<sub>grid,CM,y</sub></b>	=	CO <sub>2</sub> emission factor of the grid in year y; tCO <sub>2</sub> /MWh

## 5.2 Project Emissions

As per methodology, for renewable energy projects, there is no any project emissions occurred.

Hence, PE<sub>y</sub> = 0.

## 5.3 Leakage

As per methodology, for renewable energy projects, there is no any leakage emissions occurred.

Hence, LE<sub>y</sub> = 0

## 5.4 Net GHG Emission Reductions and Removals

Year	Baseline emissions or removals (tCO <sub>2</sub> e)	Project emissions or removals (tCO <sub>2</sub> e)	Leakage emissions (tCO <sub>2</sub> e)	Net GHG emission reductions or removals (tCO <sub>2</sub> e)
2020(02/02/2020 to 31/12/2020)	1,471,722	0	0	1,471,722
2021(01/01/2021 to 30/11/2021)	1,670,865	0	0	1,670,865
<b>Total</b>	<b>3,142,587</b>	<b>0</b>	<b>0</b>	<b>3,142,587</b>

Parameters	Emission Reduction(tCO <sub>2</sub> e)
Annual Estimated emission Reduction As per PDD (2250 MW)	<b>43,546,464</b>
Annual Estimated emission Reduction As per PDD (1100 MW)	<b>2,051,702</b>

Estimated emission reduction for this monitoring period (2250 MW) - 668 Days	<b>79,695,994</b>
Estimated emission reduction for this monitoring period (1100 MW) - 668 Days	<b>3,754,895</b>
Total Emission Reduction for this monitoring period	<b>3,142,587</b>
Difference in Emission reduction	<b>-16%(Lower)</b>

The achieved GHG emission is 16% lower as compared to the estimated values in the registered VCS PD & MR. This is due to the lower number of sunshine hours during the monitoring period. The generation of electricity depends upon many other climatic conditions, and the availability of sunlight is not within the control of the project participant.

# APPENDIX 1: < METER CALIBRATION DETAILS >

## 350 MW – Kurnool – Andhra Pradesh

Particular	Meter Serial No.	Accuracy Class	Calibration Date	Validity	Recent Calibration Date	Validity
SBG Cleantech Project Co Pvt Ltd (350 MW)						
<b>Pooling Station 203</b>						
Main Meter	16196315	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024
Check Meter	16196317	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024
<b>Pooling Station 204</b>						
Main Meter	16196320	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024
Check Meter	16196328	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024
<b>Pooling Station 206</b>						
Main Meter	16196408	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024
Check Meter	16196417	0.2 s	20/02/2017	19/02/2022	17/10/2019	16/10/2024

## 250 MW – Anantapur – Andhra Pradesh

EHT/DISCOM Grid Connected substation Details: 220/400 KV PGCIL S.S., N.P. Kunta.

Feeder details	Meter	Make	Accuracy Class	Serial No	Calibration date	Calibration due date
GSS (Feeder-I)	Main Meter	L&T	0.2 s	NP-9769-A	20/12/2019	19/12/2024
GSS (Feeder-I)	Check Meter	L&T	0.2 s	NP-9768-A	20/12/2019	19/12/2024
GSS (Feeder-II)	Main Meter	L&T	0.2 s	NP-9726-A	20/12/2019	19/12/2024
GSS (Feeder-II)	Check Meter	L&T	0.2 s	NP-9725-A	20/12/2019	19/12/2024

## 200 MW – Pavgada – Karnataka

EHT/DISCOM Grid Connected substation Details: KSPDCL Substation 5 - 66/220 KV which is further connected to PGCIL GSS.

ABT meters	Capacity	Plant End	Meter Make/Class	Meter Serial No	Calibration Date	Calibration Date Due Date
1) Block 23	25 MW	Main Meter	L&T & 0.2 s	LT-0769-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0764-A	20/11/2019	19/11/2024
	25 MW	Main Meter	L&T & 0.2 s	LT-0866-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0863-A	20/11/2019	19/11/2024
2) Block 24	25 MW	Main Meter	L&T & 0.2 s	LT -0874-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0871-A	20/11/2019	19/11/2024
	25 MW	Main Meter	L&T & 0.2 s	LT-0881-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0878-A	20/11/2019	19/11/2024
3) Block 25	25 MW	Main Meter	L&T & 0.2 s	LT-0870-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0880-A	20/11/2019	19/11/2024
	25 MW	Main Meter	L&T & 0.2 s	LT-0876-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0877-A	20/11/2019	19/11/2024
4) Block 26	25 MW	Main Meter	L&T & 0.2 s	LT-0872-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0778-A	20/11/2019	19/11/2024
	25 MW	Main Meter	L&T & 0.2 s	LT-0882-A	20/11/2019	19/11/2024
		Check Meter	L&T & 0.2 s	LT-0888-A	20/11/2019	19/11/2024

**600 MW – Phalodi - Rajasthan**
**220/400/765 KV BHADLA SUBSTATION**

Description	Main Meter- GSS	Check Meter - GSS
Meter Sr No	NS1125A	1127-A
Meter Make	Secure	secure
Accuracy	0.2 s	0.2 s
Calibration date	07/06/2021	07/06/2021
Calibration due date	06/06/2026	06/06/2026

## < COMMISSIONING DATES >

S.No.	Owner of Project /SPV	Project Location	State	Project Capacity (MW)	Commissioning Date	Co-ordinates
1	SBG Cleantech Project Co. Pvt Ltd	Kurnool	Andhra Pradesh	182	27/02/2017	15°41'01.02"N - 78°17'00.44"E
				68	22/03/2017	
				100	28/03/2017	
2	SB Energy One Private Limited	Bhadla	Rajasthan	100	21/09/2018	27°27'54.93"N - 71°59'38.96"E
				100	24/09/2018	
				100	24/09/2018	
3	SB Energy Three Private Limited	Bhadla	Rajasthan	20	04/10/2018	27°31'53.94"N - 71°57'46.99"E
				20	04/10/2018	
				30	18/09/2018	
				30	18/09/2018	
4	SB Energy Four Private Limited	Bhadla	Rajasthan	200	03/05/2019, 09/07/2019	27°29'04.1"N - 72°01'25.1"E
5	SB Energy Solar Private Limited	Ananthapur	Andhra Pradesh	250	20/12/2019, 11/03/2020	13°59'32.08"N - 78°25'26.92"E
6	SB Energy Six Private Limited	Phalodi, Jaisalmer	Rajasthan	600	Phase 1 (300 MW)– 14/06/2021 Phase 2(300 MW) – yet to be commissioned	26°57'12.41"N - 72°03'34.99"E
7	SBG Cleantech Project Co Five Private Limited	Pavagadaa	Karnataka	200	17/12/2019	14°13'26.44"N - 77°25'47.83"E
8	SB Energy Seven Private Limited	Kadappa	Andhra Pradesh	250	Yet to be commissioned	14°56'58.59"N - 78°13'12.84"E