



**Project design document form  
(Version 11.0)**

*Complete this form in accordance with the instructions attached at the end of this form.*

**BASIC INFORMATION**

<b>Title of the project activity</b>	Bundled Solar Power Project by Emami Power Limited
<b>Scale of the project activity</b>	<input type="checkbox"/> Large-scale <input checked="" type="checkbox"/> Small-scale
<b>Version number of the PDD</b>	10
<b>Completion date of the PDD</b>	26/03/2020
<b>Project participants</b>	Emami Power Limited
<b>Host Party</b>	India
<b>Applied methodologies and standardized baselines</b>	Methodology: AMS-I.D: Grid connected renewable electricity generation (Version 18, EB 18)
<b>Sectoral scopes</b>	Sectoral scope: 01, Energy industries (renewable/non-renewable)
<b>Estimated amount of annual average GHG emission reductions</b>	21,633 tCO <sub>2</sub> e

## SECTION A. Description of project activity

### A.1. Purpose and general description of project activity

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The commissioned project activity is an initiative by the Emami group to export renewable electricity produced by Solar PV Power Project to the power deficit grid in order to decrease power shortage and reduce greenhouse gas emissions.

Emami Group is a well-diversified professionally managed group of companies in Eastern India having interest in FMCG, newsprint, writing instrument, healthcare and hospital, retail pharmacies, departmental stores, Bio-diesel, edible oil, cement real estate and construction.

Emami has developed 13.00 MW grid connected solar PV power project in Karnataka & Tamil Nadu states in India.

This implemented solar power project is based on Poly Crystalline Silicon Photo Voltaic technology. Sun light with the help of PV modules will be converted into D.C. power which will then be combined to get the desired level of current and voltage. Now this D.C. output will be converted with the help of Inverters into the A.C. power of certain voltage and current level. At this stage current and voltage level can be stepped up with the help of transformers which then will be injected into the grid through distribution licensee substation.

The solar energy generated by the project will replace the fraction of thermal power supplied by the integrated Indian Grid to the states. In the absence of the project activity equivalent amount of power generation would have taken place in the integrated Indian grid connected power stations which is dominated by fossil fuel power generating stations. Thus the generation from project activity will result in reduction of the greenhouse gas emissions and will help in achieving a low carbon development path for the state and the nation.

Emami Cement Limited<sup>1</sup> has commissioned 3.00 MW solar power project at Tamilnadu on March 18, 2016. And Emami Power Limited 10.00 MW solar power project at Karnataka has commissioned on March 17, 2016.

The project activity involves installation of 3.00 MW project at village Perunali, District – Ramanathapuram in Tamil Nadu & 10.00 MW project at village Neralekunte, District – Tumkur in Karnataka. Project activity is expected to supply 22,967 MWh of net electricity annually for the renewable crediting period of 7 years, renewable twice.

The electricity generated from the project activity is sold to integrated Indian grid through Power Purchase Agreement (PPA) with DISCOM. Power purchase agreement signed between Emami Power Ltd. and Chamundeshwari Electricity Supply Corporation Ltd. on Sept. 25, 2014 for 10.00 MW solar power project in Karnataka & between Emami Cement Ltd.<sup>2</sup> and Tamilnadu Generation and distribution Corporation Ltd. (TANGEDCO) on Oct. 06, 2015 for 3.00 MW solar power project in Tamilnadu.

The commissioned project activity is not a component project activity (CPA) that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

### Purpose of the project activity

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<sup>1</sup> Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law tribunal (NCLT) vide its order dated 17<sup>th</sup> December 2018

<sup>2</sup> Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law tribunal (NCLT) vide its order dated 17<sup>th</sup> December 2018

The main purpose of the project activity is to generate electrical energy in sustainable means using solar PV modules and to contribute to climate change mitigation efforts.

Apart from generation of renewable electricity, the project has also been conceived for the following:

To enhance the propagation of commercialisation of clean solar energy in the region.

To contribute to the sustainable development of the region, socially, environmentally & economically.

To reduce the prevalent regulatory risks for this project through revenues from the CDM.

### **Contribution of project activity to sustainable development**

Government of India has stipulated following indicators for sustainable development in the interim approval guidelines for CDM projects.

1. Social well-being
2. Economic well-being
3. Environmental well-being
4. Technological well-being

#### **1. Social well being:**

- The project activity on its small way will help to development of plant site which is an isolated rural area.
- The project contributes for social well-being on its small way by generating few job opportunities during the initial stage of project development, (e.g. civil works, construction activity,) and during the operation of the project activity. (e.g. Security, O & M personnel)
- The project contributes on its small way along with other project activities like development of road network will help to access/strengthen the basic amenities to people leading to improvement in quality of life of people in the area and improved communication facilities in remote area.

#### **2. Economic well-being:**

- The project brings additional investment in the area to contribute in meeting increasing power demand of the people.
- Use of solar energy for electricity generation instead continuing the conventional practice reduces stress on the economy of the country.
- The project contributes to diversification of the national energy supply, which is dominated by conventional fuel based generating units.

#### **3. Environmental well-being:**

- The project utilizes solar energy for generating electricity which otherwise would have been generated through the operation of power plants in the Southern grid of India, contributing to reduction in specific emissions (tons of emissions /MWh of energy generated) including GHG emissions

- As Solar power project produce no end products in the form of waste (e.g. Particulate Matter, Fly ash, Water effluent etc.). This will help in reduction of overall pollution from power generation.
- Being a renewable resource, using solar energy to generate electricity contributes to conventional (e.g. fossil fuel) resource conservation and prevents subsequent degradation of other resources.
- Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

#### 4. Technological well-being:

The project activity will be making of use of the reliable and proven technology available locally to ensure that an environmentally safe technology is only being implemented in the project activity. Setting up of this project will also increase the private sector participation in this project category thereby contributing to more green power to the grid system.

#### A.2. Location of project activity

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Host Party: India

State: Karnataka & Tamil Nadu

Village: Neralekunte & Dommathamari

Taluka: Pavagada

District: Tumkur

State: Karnataka

Village: Perunali

Taluka: Kamuthi

District: Ramanathpuram

State: Tamil Nadu

Physical / Geographical location:

Project Promoter	Project State	Latitude	Longitude
Emami Cement Ltd. <sup>3</sup>	Tamil Nadu	09° 13'37.2" N (9.227 N)	78°19'27.6" E (78.32433 E)
Emami Power Ltd.	Karnataka	13° 59' 33.04" N (13.992511 N)	77°21'56.79" E (77.365775 E)

The project activity is located in Karnataka & Tamil Nadu states in India. Project site in Karnataka state is located in village Neralekunte & Dommathamari of Pavagada Taluk in Tumkur District. Pavagada is located at 99 km from Tumkur. Penukonda is nearest railways station located at 35 km from Pavagada.

Project site in Tamil Nadu state is located in village Perunali of Kamuthi Taluk in Ramanathpuram District. Kamuthi is located at 70 km from Ramanathpuram District. Site is approximately 25 km from Perunali. Sattur is the nearest railway station located at 47 km from Perunali.

Location Map:

<sup>3</sup> Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law tribunal (NCLT) vide its order dated 17<sup>th</sup> December 2018



Project Site



Project site

### A.3. Technologies/measures

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This category comprises renewable energy generation units, such as photovoltaics that supply generated electricity to integrated Indian grid.

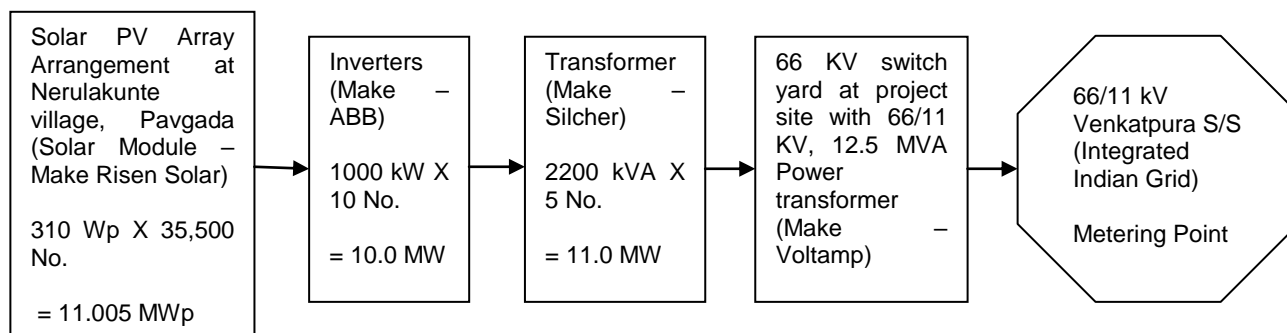
The solar energy generated by the project will replace the fraction of thermal power supplied by the integrated Indian grid. In the absence of the project activity equivalent amount of power generation would have taken place in the integrated Indian grid connected power stations which is dominated by fossil fuel power generating stations. Thus the generation from project activity will result in reduction of the greenhouse gas emissions.

The project category comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to a national or a regional grid. As the project activity is the implementation of a solar photovoltaic project that supplies electricity to grid, hence it falls under this category.

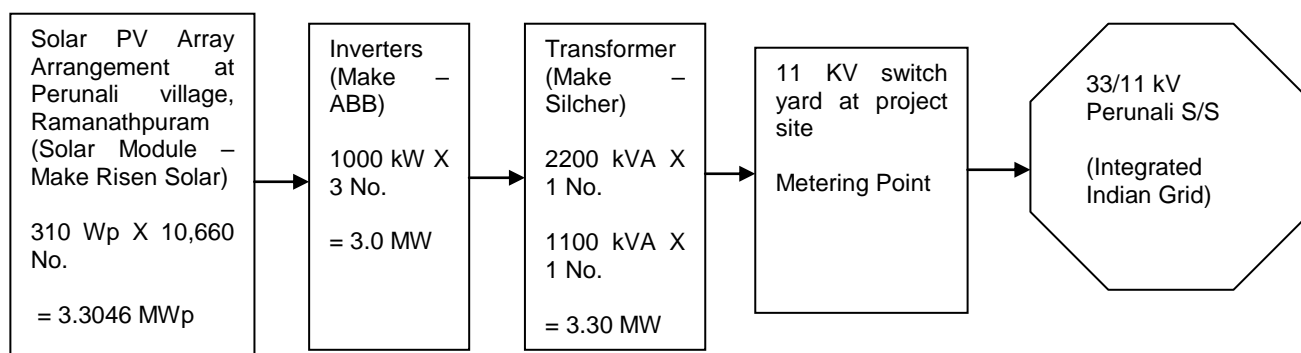
The project activity is solar photovoltaic based power generation project. The total installed capacity of the solar PV power project is 13.00 MW. Inverters are installed at the plant site to convert the DC (Direct Current) power to AC (Alternate Current) Power.

Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in and environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame and grouped are termed as PV Array.

Technical specification for 10 MW Solar Potovoltaic power plant at Pavagada, Karanataka.



Technical specification for 3 MW Solar Potovoltaic power plant at Perunali, Tamilnadu.



Technical data of the solar cell modules:

Parameter	Unit	Description
Type	-	Polycrystalline
Number of PV Modules	-	35,500 (310 Wp) for Karnataka 10,660 (310 Wp) for Tamilnadu
Model	-	RSM-72-6-310P
Nominal Power per PV Module	Wp	310
Total Installed Capacity	MW	11.005
Rated voltage (Vmp) STC	V	36.40
Rated current (Imp) STC	A	8.52
Cell Dimensions	mm	1956 x 992 x 40 mm.
Efficiency	%	15.98
Average Lifetime	Years	25
Manufacturer	-	Risen Energy Co. Ltd.

Technical data of the inverter:

Parameter	Unit	Description
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Model		PVS 800-57-1000KW-C
Quantity	No.	10
Input data (DC) – Max. DC power	kWp	1100
Voltage range	V	600-850
Maximum DC voltage	V	1100
Max. DC current	A	1710
No. of protected DC inputs		8 to 20 (+/-)
Output data (AC) – nominal power	kW	1000
Max. output power	kW	1200
Nominal current	A	1445
Nominal output voltage	V	400
Max. efficiency	%	98.9
External auxiliary voltage		230 V, 50 Hz
Manufacturer		ABB

The solar array produces DC current that passes through inverter, which converts it in to AC current and voltage. Power is sent to the utility meter and is sent out to the general utility grid network. The ABT meters are capable of measuring the electricity parameters on a real time basis.

At night, loads operate from utility power since the solar power system does not produce power. The inverter shuts down automatically in case of utility power failure for safety, and reconnects automatically when utility power resumes.

The project is a renewable energy project which displaces the electricity from the grid that is dominated by carbon intensive fossil fuel. The electricity generation from the project activity is an environmentally safe and sound power generation technology.

The project activity used the reliable and proven technology available locally to ensure that an environmentally safe technology is only being implemented in the project activity.

The other equipments installed in the project activity like Inverters, Junction Box & Transformers are also well proven and safe.

#### A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
India (Host)	Emami Power Limited	No

#### A.5. Public funding of project activity

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The project has not received any public funding from Annex I countries and Official Development Assistance (ODA). The project is unilateral project.

#### A.6. History of project activity

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It is confirmed that:

The commissioned CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA);

The commissioned CDM project activity is not a project activity that has been deregistered.

It is also declared that:

The commissioned CDM project activity was not a CPA that has been excluded from a registered CDM PoA;

Not a registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the commissioned CDM project activity.

#### **A.7. Debundling**

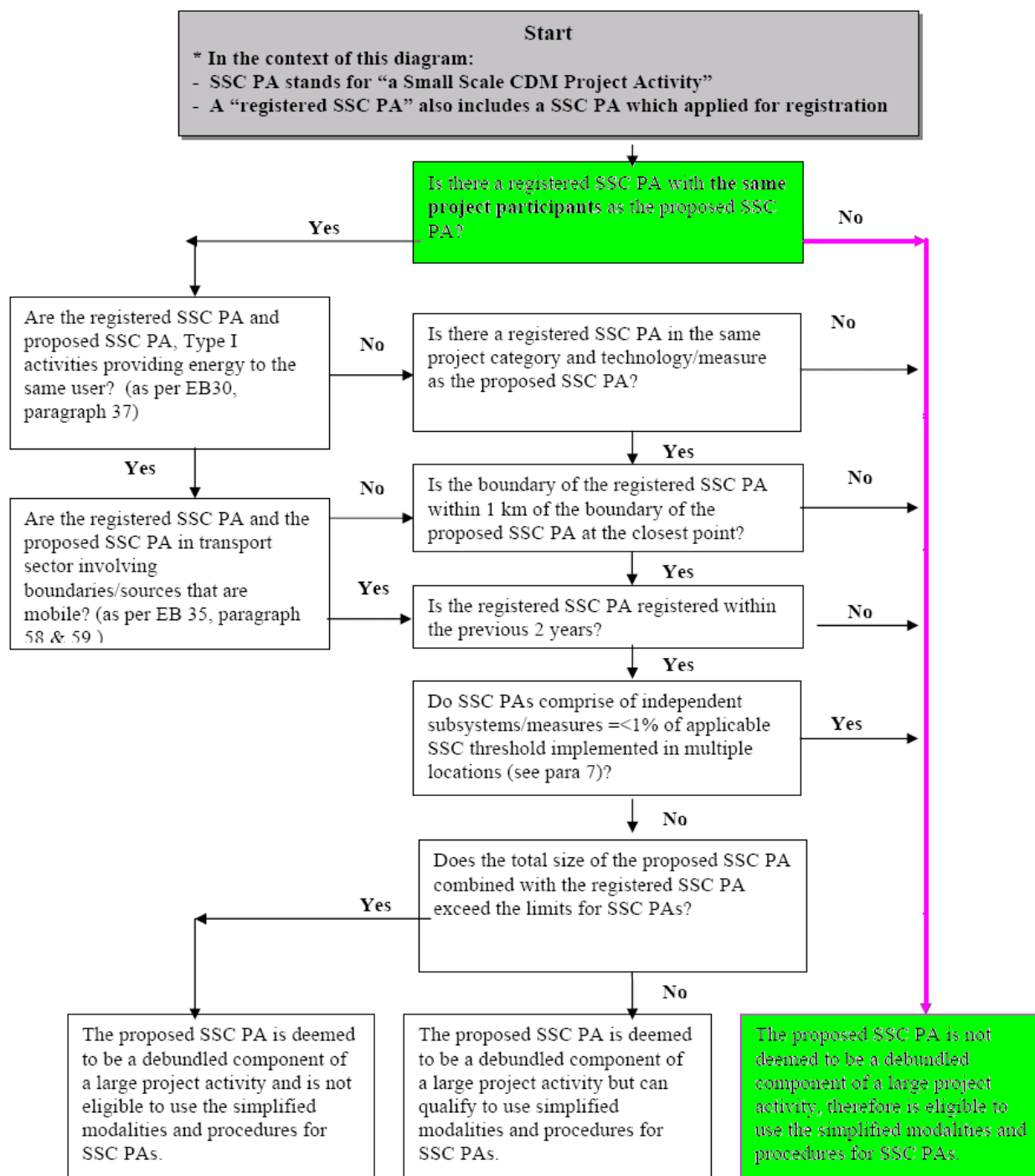
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As per para 5.1 of methodological tool ,“Assessment of debundling for small scale project activities”, (EB 83, Annex 13, Version 04.0 ) – A proposed small scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale project activity or an application to register another small-scale CDM project activity:

- With the same project participants
- In the same project category and technology
- Registered within the previous two years; and
- Whose project boundary is within 1 km of the project boundary of the proposed small scale activity under the CDM at the closest point



## I. DETERMINING THE OCCURRENCE OF DEBUNDLING



Submitting herewith complete list of CDM projects developed by Emami group.

1. Project title – “10 MWp Grid Interactive Solar Power Project in Gujarat Solar Park, India”.

Location – Latitude: 23°54'09.67" N, Longitude: 71°11'51.75"E

Village – Charanka

Taluka – Santalpur

District – Patan

State – Gujarat

Status – Registered on 19/10/2012 (Project ID 7791)

2. Project title - “Renewable Power Project by Emami Power Ltd.”

Location - Latitude:29°45'11.18" N , Longitude: 77°49'18.76"E

Village – Udelhedi, Naharpur, Mannakhedi, Kumrada  
 Tehsil – Roorkee  
 District – Haridwar  
 State – Uttarakhand

Status – The project<sup>4</sup> is registered on 21 Aug 2017 with reference no. 10393.

Emami confirms that it does not have any registered or applied to register for any similar project with similar technology/measure within the previous 2 years whose project boundary is within 1 km of the project boundary of this project activity. Thus it is confirmed that the small scale project activity is not a debundled component of a larger project activity.

## **SECTION B. Application of methodologies and standardized baselines**

### **B.1. References to methodologies and standardized baselines**

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AMS-I.D.<sup>5</sup> “Grid connected renewable electricity generation” – Version 18.0

Tools referred in this methodology:

Tool to calculate the emission factor for an electricity system – version 07.0, EB 100, Annex 4

### **B.2. Applicability of methodologies and standardized baselines**

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Requirements with respect to technology/measure under AMS I. D. – Grid connected renewable electricity generation (Version 18.0)

<b>Technology/measure</b>	<b>Justification</b>
This methodology comprises renewable energy generation units, such as photovoltaics, hydro, tidal/wave, wind, geothermal and renewable biomass, (a) supplying electricity to a national or a regional grid. Or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is a 13 MW solar PV project, generate electricity by using renewable source of energy i.e Solar and supply to electricity distribution system (regional grid). As the project activity is supplying electricity from a renewable source to the regional grid i.e integrated grid of India, Hence the project activity satisfies this applicability criterion.
1 This methodology is applicable to project activities that (a) install a Greenfield plant; (b) involve a capacity addition in (an) existing plant(s); (c) involve a retrofit of (an) existing plant(s); (d) involve a rehabilitation of (an) existing plant(s)/ unit(s) ; or (e) involve a replacement of (an) existing plant(s).	The PP has installed new Solar PV based power generation project at site where there was no renewable energy power plant operating prior to the implementation of the project activity (Greenfield plant), hence the application of type & category I. D is applicable.
2 Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this	The present CDM project activity is not a hydro project, the project activity is Solar PV based power generation project,

<sup>4</sup> <https://cdm.unfccc.int/Projects/DB/Applus1501710196.92/view>

<sup>5</sup> <https://cdm.unfccc.int/methodologies/DB/W3TINZ7KKWCK7L8WTFQOQFQQH4SBK>

<p>methodology:</p> <ul style="list-style-type: none"> <li>• The project activity is implemented in an existing reservoir with no change in the volume of reservoir;</li> <li>• The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, as per definitions given in the Project Emissions section, is greater than 4 W/m<sup>2</sup>;</li> <li>• The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the Project Emissions section, is greater than 4 W/m<sup>2</sup>.</li> </ul>	<p>hence this criteria is not applicable.</p>
<p>3. If the new unit has both renewable and non-renewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.</p>	<p>The project activity is installation of new Solar PV based power generation project (i.e. only renewable component) and not the any addition to existing non-renewable component. Further the project total capacity is 13.00 MW which is within the eligibility limit for small scale CDM project activity. Hence this criterion is not applicable.</p>
<p>4. Combined heat and power (co-generation) systems are not eligible under this category.</p>	<p>This is not a combined heat and power (co-generation) system. Hence this criterion is not applicable for the project activity.</p>
<p>5. In the case of project activities that involve the addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.</p>	<p>The project activity is Greenfield project and not involves any addition to the existing renewable power generation facility. Hence, this criteria is not applicable for the project activity.</p>
<p>6. In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.</p>	<p>The project activity is Greenfield project and not seek/involves any retrofit or modification of an existing facility for renewable energy generation. Hence this criteria is not applicable for the project activity.</p>
<p>7. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as "AMS-I.C.: Thermal energy production with or</p>	<p>The present CDM project activity is Solar PV based power generation project, hence this criteria is not applicable.</p>

without electricity” shall be explored.	
8. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.	The present CDM project activity is Solar PV based power generation project, hence this criteria is not applicable.

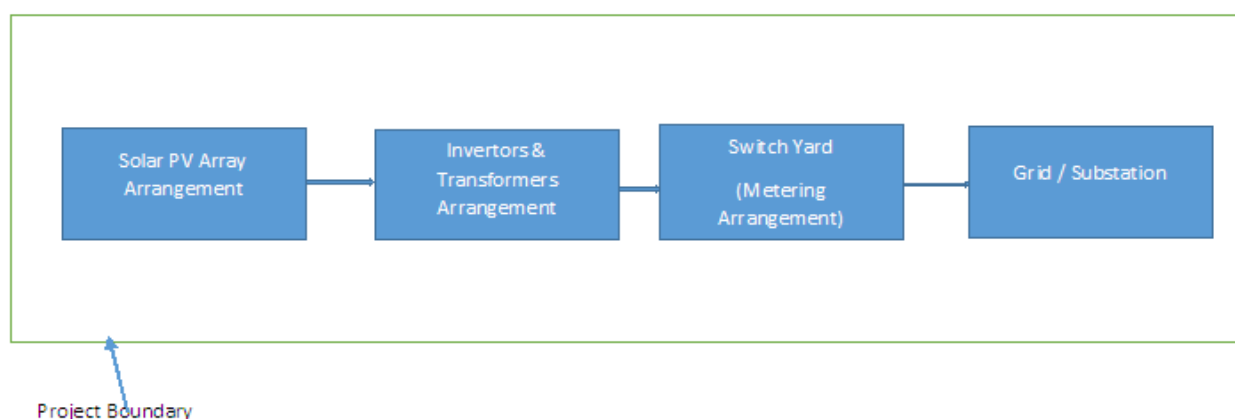
The project activity is installation of 13.00 MW of solar PV modules and there would not be any change in the capacity of the project during its crediting period. Since the project generates and exports renewable electricity to the grid system and the capacity of the project activity is well below the qualifying limit of 15 MW. Hence the choice of project Type and category I.D (Version 18, EB 81, Annex 24) is justified.

### B.3. Project boundary, sources and greenhouse gases (GHGs)

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As per the para 18 of applied methodology (Version 18, EB 81) of AMS I. D. “The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to”.

Actual Arrangement of Emami’s Solar Power Project of 13.00 MW, situated at Karnataka & Tamil Nadu is as below.



The project boundary includes PV arrays, invertors, transformers and metering system along with pooling substation and connected to grid i.e. integrated Indian grid.

Source		GHG	Included?	Justification/Explanation
Baseline	CO <sub>2</sub> emissions from electricity generation in fossil fuel fired power plants that are displaced due to the project activity	CO <sub>2</sub>	Yes	Main emission source
		CH <sub>4</sub>	No	Minor emission source
		N <sub>2</sub> O	No	Minor emission source
Project activity	Green Field Project involving implementation of new solar power project: Electricity generation from the project activity	CO <sub>2</sub>	No	Electricity generation from solar power does not have any emission sources.
		CH <sub>4</sub>	No	
		N <sub>2</sub> O	No	

### B.4. Establishment and description of baseline scenario

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As per para 19 of the methodology AMS I.D. (Version 18, EB 81, Annex 24) “The baseline scenario is that electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into grid.”

As the project activity displaced electricity from Integrated Indian grid, hence Integrated Indian grid connected power plants are considered for the project baseline.

As per para 22 of the methodology AMS I.D. (Version 18, EB 81, Annex 24), “Baseline emissions include only CO<sub>2</sub> emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.”

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

Where:

$BE_y$  = Baseline emissions in year  $y$  (t CO<sub>2</sub>)

$EG_{PJ,y}$  = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year  $y$  (MWh)

$EF_{grid,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year  $y$  calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO<sub>2</sub>/MWh)

### B.5. Demonstration of additionality

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The table below is only applicable if the proposed project activity is a type of project activity which is deemed automatically additional, as defined by the applied approved methodology, tool, standardized baseline or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by a DNA and approved by the Board.

Specify the methodology, tool, standardized baseline or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by DNAs and approved by the Board, that establish automatic additionality for the proposed project activity (including the version number and the specific paragraph, if applicable).	As per methodological tool: Demonstration of additionality of small scale project activities (version 13.0, EB 99, Annex 3) documentation of barriers is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small scale CDM thresholds (e.g. installed capacity up to 15 MW), the positive list comprises of the following grid connected and off grid renewable electricity generation technologies (i) Solar technologies (photovoltaic and solar thermal electricity generation (ii) Off-shore wind technologies (iii) Marine technologies (wave/tidal) (iv) building integrated wind turbines or household rooftop wind turbines of a size up to 100 kW.
Describe how the proposed project activity meets the criteria for automatic additionality in the relevant methodology, tool, standardized baselines or specific renewable technologies/measures conferring automatic additional microscale CDM project activities proposed by a DNA and approved by the Board.	As the project is a grid connected photovoltaic project with 13.00 MW capacity, there is no requirement to demonstrate the additionality of the project.

### Prior consideration of CDM:

In line with para 40 of CDM validation and verification standard (version 02.0), the proposed CDM project activity is with a start date after 02/08/2008, accordingly, the project participant has informed the Host Party DNA and the UNFCCC secretariat in writing of the commencement of the

project activity and of their intention to seek CDM status on 25/01/2016, which is within six months of the project activity start date.

Board meeting of Emami Cement Ltd.<sup>6</sup> was held on 24/03/2014 and resolution has been passed to set up a Solar (PV) Power Plant of 10.00 MW capacity in the State of Karnataka and to execute power purchase agreement in respect of solar power project.

Board meeting of Emami Power Ltd. was held on 21/12/2012 and resolution has been passed to set up a Solar (PV) Power Plant of 3.00 MW capacity in the State of Tamil Nadu.

Further, allotment of project has been done by KREDL through letter dated 24/07/2014 to Emami Power Limited for development and setting up of 10.00 MW Solar power project in the state of Karnataka & 3.00 MW project has been awarded by TANGEDCO through letter dated 05/10/2015 to Emami Cement Limited<sup>7</sup> for development and setting up of 3 MW Solar power project in the state of Tamil Nadu.

From the above it can be concluded that CDM was seriously considered in the decision to implement the project activity.

**Chronology of events in reference to the Solar PV based power generation project implementation along with CDM is mentioned below:**

Sr. No.	Date	Events
<b>For Karnataka Site</b>		
1	24/03/2014	Board Note
2	24/07/2014	LOA by KREDL
3	01/12/2014	Request for proposal
4	12/08/2015	LOA issued to Sterling & Wilson
5	26/08/2015	Amended LOA issued to Sterling & Wilson
6	25/09/2014	Power Purchase Agreement
7	19/12/2015	Agreement signed between EPL & SWPL
8	17/03/2016	Commissioning of project activity
<b>For Tamil Nadu Site</b>		
1	21/12/2012	Board Note
2	05/10/2015	LOA by TANGEDCO
3	27/03/2015	Request for proposal
4	30/09/2015	LOA issued to Sterling & Wilson
5	06/10/2015	Power Purchase Agreement
6	26/11/2015	Agreement signed between EPL & SWPL
7	25/01/2016	Prior CDM consideration for bundled project activity to UNFCCC & NCDMA
8	18/03/2016	Commissioning of project activity
9	17/12/2018	Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law Tribunal (NCLT)
10	06/08/2019	Application submitted to Ministry of Environment and Forest Climate Change for name change of project proponent.
11	21/10/2019	Letter received from Ministry of Environment, Forest and Climate Change approving name change of project proponent.

<sup>6</sup> Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law tribunal (NCLT) vide its order dated 17<sup>th</sup> December 2018

<sup>7</sup> Emami Cement Ltd. got demerged in Emami Power Ltd. under the order of National Company Law tribunal (NCLT) vide its order dated 17<sup>th</sup> December 2018

## B.6. Estimation of emission reductions

### B.6.1. Explanation of methodological choices

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As per the latest guidelines of the methodology AMS I.D. (Version 18, EB 81, Annex 24) to estimate the baseline emissions, the CO<sub>2</sub> emission factor is calculated as per the procedures laid in paragraph 12 (a), *A combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the 'Tool to calculate the Emission Factor for an electricity system'*. (Version 07.0, EB 100, Annex 4)

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

As per para 23 of the methodology AMS I.D. Version 18, the emission factor can be calculated in a transparent and conservative manner as follows:

- a) A combined margin (CM) consisting of the combination of operating margin (OM) and Build margin (BM) according to the procedures prescribed in the *"Tool to calculate the Emission Factor for an electricity system"* (Version 07.0, EB 100, Annex 4)
- OR
- b) The weighted average emissions (in t CO<sub>2</sub> / MWh) of the current generation mix. The data of the year in which project generation occurs must be used.

Calculation shall be based on data from an official source (where available) and made publically available.

From the above two options PP has chosen option (a) for calculation of grid emission factor.

The ex-ante CO<sub>2</sub> emission factor i.e. combined margin emission factor is calculated as per the *"Tool to calculate the Emission Factor for an electricity system"* (Version 07.0, EB 100, Annex 4) as follows:

#### **Step 1: Identify the relevant electricity systems**

The project activity is located in the Karnataka (10.00 MW) and Tamilnadu (3.00 MW) state of India. Hence the project electricity system not located partially or totally in Annex-I countries.

The relevant electricity system for the project activity is identified as follows:

The electricity of the project is physically connected through transmission & distribution lines of the Karnataka and Tamilnadu state utility grid which comes under geographic scope of Integrated Indian grid of Indian power sector.

The Build margin emission factor is determining by considering the project electricity system (i.e. Integrated Indian grid).

The Operating Margin emission factor (Simple OM) is calculated as the generation weighted average of CO<sub>2</sub> emissions per unit net electricity generation (t CO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low – cost/ must run power plant/units. (Please refer below step 3 for detail calculation).

#### **Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)**

Project participants may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation.

PP has chosen the option I to calculate the operating margin and build margin emission factor.

### **Step 3: Select a method to determine operating margin (OM)**

The calculation of the operating margin emission factor ( $EF_{\text{grid, OM, y}}$ ) is based on one of the following methods: which are described under step 4 (Refer “*Tool to calculate the emission factor for an electricity system*”, (Version 07.0, EB 100, Annex 4)

- (a) Simple operating margin;
- (b) Simple adjusted operating margin;
- (c) Dispatch data analysis operating margin;
- (d) Average operating margin.

The simple OM method (option a) can only be used if low- cost/must-run resources constitute less than 50% of total grid generation in: 1) average of the five most recent years, or 2) based on long-term averages for hydroelectricity production.

The low cost/ must run resources constitute less than 50% of the total grid generation in the average of the five most recent years. (Refer table below)

Sector-wise installed capacity (MW) as on 31.03.2019<sup>8</sup>

Sector	Hydro	Thermal	Nuclear	Renewable	Total
State	29878.80	72849.14	0.00	2347.93	105075.86
<b>Central</b>	12126.42	66057.91	6780.00	1632.30	<b>86596.63</b>
<b>Private</b>	3394.00	87372.30	0.00	73661.40	<b>164427.70</b>
All India	45399.22	226279.34	6780.00	77641.63	356100.19

\*As per the CEA'S latest baseline CO<sub>2</sub> baseline database Version 15 (published on December 2019)

The simple operating margin is the weighted average emissions rate of all generation sources except so called low cost or must run sources. In India, hydro and nuclear stations, qualify as low cost/must –run sources and excluded. The operating margin, therefore, can be calculated by dividing the grids total CO<sub>2</sub> emissions by the net generation of all thermal stations.

The above table clearly shows that the percentage of total grid generation by low-cost/must-run plants for the Integrated Indian grid is only **14.65%** which is much lesser than 50% of the total generation. Thus, Simple OM method can be used for calculating the emission factor.

CEA has considered the CDM registered power plants in the calculation of Operating margin.

### **Step 4: Calculate the operating margin emission factor according to the selected method**

The simple OM emission factor is calculated as the generation-weighted average CO<sub>2</sub> emissions per unit net electricity generation (tCO<sub>2</sub>/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

The simple OM may be calculated by one of the following two points:

Option A: Based on the net electricity generation and a CO<sub>2</sub> emission factor, of each power unit or  
 Option B: Based on the total net electricity generation of all power plants serving the system and the fuel types and total fuel consumption of the project electricity system.

<sup>8</sup> [http://cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver15.pdf](http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf)



Option B can only be used if:

- (a) The necessary data for Option A is not available; and
- (b) Only nuclear and renewable power generation are considered as low-cost/must-run power sources and the quantity of electricity supplied to the grid by these sources is known; and
- (c) Off-grid power plants are not included in the calculation (i.e., if Option I has been chosen in Step 2).

As the all three conditions for using above option B are applicable for the project, PP has chosen the option B for calculating the simple OM. The Central Electricity Authority (CEA) has calculated and published the simple operating margin emission factor; latest version is used for the simple operating margin emission factor.

- Ex ante option: A 3-year generation-weighted average, based on the most recent data available at the time of submission of the PDD to the DOE for validation, without requirement to monitor and recalculate the emissions factor during the crediting period, or
- Ex post option: The year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring. If the data required to calculate the emission factor for year y is usually only available later than six months after the end of year y,

Out of the above two options, the Ex-ante vintage is opted and the Simple OM selected will remain same throughout the entire crediting period of the project activity.

Under this option, the simple OM emission factor is calculated based on the net electricity generation of each power unit and an emission factor for each power unit, as follows:

$$EF_{grid,OMsimple,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where:  $EF_{grid,OMsimple,y}$  = Simple operating margin CO<sub>2</sub> emission factor in year y (t CO<sub>2</sub>/MWh)

$EG_{m,y}$  = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$  = CO<sub>2</sub> emission factor of power unit m in year y (t CO<sub>2</sub>/MWh)

m = All power units serving the grid in year y except low-cost/must-run power units

y = The relevant year as per the data vintage chosen

Hence, the published simple operating margin value for the full generation-weighted average for the most recent 3 years i.e. 2016-17, 2017-18, 2018-19 for which data are available at the time of PDD submission is considered for calculating the Ex-ante simple operation margin emission factor.

#### EF<sub>grid, OM, y</sub> Calculation approach

The EF <sub>grid, OM, y</sub> for Integrated Indian grid region	Net Generation in Operating Margin (GWh)	Emission factor (t CO <sub>2</sub> /MWh)
For the year 2016-2017	916,278	0.96
For the year 2017-2018	960,693	0.95
For the year 2018-2019	995,957	0.97
<b>Weighted Average EF<sub>grid, OM, y</sub></b>	<b>0.962</b>	

#### **Step 5: Calculate the build margin (BM) emission factor**

Vintage of data is based on option 1 of step 5. (Refer “Tool to calculate the emission factor for an electricity system”, Version 07.0, EB 100, Annex 4), Option 1 “for the first crediting period calculate

the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM – PDD submission to the DoE for validation. This option does not require monitoring the emission factor during the crediting period. BM calculation has been done *ex-ante* and hence BM value will remain fixed and need not be monitored during the crediting period.

The value of the data has been taken from the data published by CEA as referred in earlier step. The CEA CO<sub>2</sub> emission database is based on Tool approved and published by CDM Executive Board “Tool to calculate the emission factor for an electricity system” version (Version 07.0, EB 100, Annex 4). The details of the key assumptions considered to calculate the figure can be found in the CEA Baseline Database<sup>9</sup>. CEA has not considered the capacity additions from retrofit power plants in the calculation of build margin.

The build margin emission factor of all the power units in the respective regional grid during the most recent year for which power generation data is available was calculated in line with the requirement under “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) & by published by the CEA CO<sub>2</sub> Baseline Database, the BM value for the year 2018-19 was considered for calculating the emission factor for an electricity system:

The Build Margin emission factor is the generation weighted average emission factor (tCO<sub>2</sub>/MWh) of all power units m during the most recent year y for which electricity generation data is available, calculated as follows as mentioned in equation no. 15 of “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4):

$$EF_{grid,BM,y} = \frac{\sum_m EG_{m,y} \times EF_{EL,m,y}}{\sum_m EG_{m,y}}$$

Where-

$EF_{grid,BM,y}$  = Build margin CO<sub>2</sub> emission factor in year y (t CO<sub>2</sub>/MWh)

$EG_{m,y}$  = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)

$EF_{EL,m,y}$  = CO<sub>2</sub> emission factor of power unit m in year y (t CO<sub>2</sub>/MWh)

$m$  = Power units included in the build margin

$y$  = Most recent historical year for which electricity generation data is available

The BM value for the year 2018-19 is as follows-

**$EF_{grid,BM,y} = 0.88 \text{ tCO}_2\text{e/MWh}$**

#### **Step 6: Calculate the combined margin emissions factor**

(a) The calculation of the combined margin (CM) emission factor ( $EF_{grid,CM,y}$ ) is based on one of the following methods: Weighted average CM or

(b) Simplified CM

PP has chosen weighted average CM method (option a) to calculate  $EF_{grid,CM,y}$

The combined margin emissions factor is calculated as follows:

$$EF_{grid,CM,y} = EF_{grid,OM,y} * W_{OM} + EF_{grid,BM,y} * W_{BM}$$

Where:

<sup>9</sup> [http://cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver15.pdf](http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf)

$EF_{grid,BM,y}$  = Build margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)  
 $EF_{grid,OM,y}$  = Operating margin CO<sub>2</sub> emission factor in year y (tCO<sub>2</sub>/MWh)  
 $W_{OM}$  = Weighting of operating margin emissions factor (%)  
 $W_{BM}$  = Weighting of build margin emissions factor (%)

For wind and solar projects, the default weights are as follows:  $w_{OM} = 0.75$  and  $w_{BM} = 0.25$  (owing to their intermittent and non-dispatch able nature).

$$\begin{aligned}
 EF_{grid,CM,y} &= EF_{grid,OM,y} \times 0.75 + EF_{grid,BM,y} \times 0.25 \\
 &= 0.962 \times 0.75 + 0.88 \times 0.25 \\
 EF_{grid,CM,y} &= 0.942 \text{ t CO}_2/\text{MWh}
 \end{aligned}$$

Thus, the CM emissions factor ( $EF_{grid,CM,y}$ ) for the project has been calculated to be:

$$EF_{grid,CM,y} = 0.942 \text{ t CO}_2/\text{MWh}$$

**Baseline Emission Factor: 0.942 t CO<sub>2</sub>/MWh**

### **Project Emissions (PE<sub>y</sub>):**

As per paragraph 39 of approved methodology AMS- I. D., (Version 18, EB 81, Annex 24), *for most renewable energy project activities,  $PE_y = 0$ . However, for the following categories of project activities, project emissions have to be considered following the procedure described in the most recent version of ACM0002.*

- *Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, Electricity/fossil fuel consumption)*
- *Emissions from water reservoirs of hydro power plants*
- *As it is a renewable energy project, i.e. solar power plant, hence it does not involve any fossil fuel consumption for its power generation*

As this project activity is Solar PV based power generation project and not geothermal or hydro power plant hence project emissions are zero.

### **Leakage Emissions (LE<sub>y</sub>):**

As per paragraph 42 of the approved methodology AMS- I. D. (Version 18, EB 81, Annex 24), *General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues.* As this project activity is Solar PV based power generation project and not a biomass project hence leakage emissions considered are zero.

### **Emission Reductions (ER<sub>y</sub>):**

The emission reductions ( $ER_y$ ) are calculated as per equation 9 under para 43 of AMS-I.D. (Version 18, EB 81, Annex 24).

$$ER_y = BE_y - PE_y - LE_y$$

Where:

- $ER_y$  = Emission reductions in year y (t CO<sub>2</sub>e/y)  
 $BE_y$  = Baseline Emissions in year y (t CO<sub>2</sub>/y)  
 $PE_y$  = Project emissions in year y (t CO<sub>2</sub>/y)  
 $LE_y$  = Leakage emissions in year y (t CO<sub>2</sub>/y)

**B.6.2. Data and parameters fixed ex ante**

(Copy this table for each piece of data or parameter.)

Data/Parameter	EF <sub>grid,CM,y</sub>
Data unit	t CO <sub>2</sub> e/ MWh
Description	Ex-ante Combined margin CO <sub>2</sub> emission factor for the Integrated Indian grid
Source of data	Baseline CO <sub>2</sub> Emission Database, Version 15 (published on December 2019)
Value(s) applied	0.942
Choice of data or measurement methods and procedures	<p>The inputs values of OM and BM have been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable.</p> <p><a href="http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf">http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf</a></p> <p>The EF<sub>grid, CM, y</sub> calculation is based on the guidelines in “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4)</p>
Purpose of data	The Combined Margin Emission Factor has been calculated as a weighted sum of Operating Margin emission factor and Build Margin emission factor taking the weight age value as 0.75 and 0.25 respectively.
Additional comment	The PP has opted for ex-ante approach for the determination of combined margin emission factor where emission factor is fixed for the entire crediting period so the value need not to be monitored.

Data/Parameter	EF <sub>OM,y</sub>
Data unit	tCO <sub>2</sub> e / MWh
Description	Ex-ante operating margin CO <sub>2</sub> emission factor for the Integrated Indian grid
Source of data	Baseline CO <sub>2</sub> Emission Database, Version 15 (published on December 2019)
Value(s) applied	0.962
Choice of data or measurement methods and procedures	<p>The values for OM has been calculated based on latest last three years (2016-17, 2017-18 &amp; 2018-19) average by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable.</p> <p><a href="http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf">http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf</a></p> <p>The EF<sub>grid OM, y</sub> calculation is based on the guidelines in “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4)</p>
Purpose of data	Calculation of Ex-ante Combined margin CO <sub>2</sub> emission factor for the Integrated Indian grid
Additional comment	The values are based on latest last three years average. The PP has opted for ex-ante approach for the determination of combined margin emission factor where emission factor is fixed for the entire crediting period so the value need not to be monitored.

Data/Parameter	EF <sub>grid,BM,y</sub>
Data unit	tCO <sub>2</sub> e / MWh
Description	Build margin CO <sub>2</sub> emission factor for the Integrated Indian grid
Source of data	Baseline CO <sub>2</sub> Emission Database, Version 15 (published on December 2019)
Value(s) applied	0.88
Choice of data or measurement methods and procedures	The values for BM for the year 2018-19 has been calculated by Ministry of Power, Central Electricity Authority Govt. of India, hence are authentic and reliable. <a href="http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf">http://cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver15.pdf</a> The EF <sub>grid BM, y</sub> calculation is based on the guidelines in “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4)
Purpose of data	Calculation of Ex-ante Combined margin CO <sub>2</sub> emission factor for the Integrated Indian grid
Additional comment	The values are for the year 2018 -19

### B.6.3. Ex ante calculation of emission reductions

>>

As per above section B.6.1 above, the emission reductions (ER<sub>y</sub>) are calculated as per equation 9 under paragraph 43 of AMS-I. D (Version 18, EB 81, Annex 24).

$$ER_y = BE_y - PE_y - LE_y$$

As, both PE<sub>y</sub> and LE<sub>y</sub> have been considered as zero for the project activity. Thus ER<sub>y</sub> = BE<sub>y</sub>

The basic assumption for calculating baseline emissions (BE<sub>y</sub>) of the project activity is due to the displacement of grid electricity. Hence, for the baseline estimation energy baseline value is considered from the expected generation by the project activity.

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

Expected generation by the project activity for 10.00 MW project at Karnataka (17,827 MWh) is considered on the basis of PLF 20.35% and for 3.00 MW project at Tamilnadu (5,140 MWh) is considered on the basis of PLF 19.56%, as per section 3(a) mentioned in the document EB48 Annex 11 “Guidelines for the reporting and validation of Plant Load Factors.” For calculation of emission reduction, yearly generation considered (25 years)) which is inclusive of annual degradation.

$$BE_y = 22,967 \text{ MWh} (17,827 + 5140) \times 0.942 \text{ t CO}_2 \text{ e/MWh}$$

$$BE_y = 21,633 \text{ t CO}_2 / \text{yr}$$

Thus the annual ex-ante estimated emission reductions are **21, 633 t CO<sub>2</sub> e**.

### B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO <sub>2</sub> e)	Project emissions (t CO <sub>2</sub> e)	Leakage (t CO <sub>2</sub> e)	Emission reductions (t CO <sub>2</sub> e)
Year 1	21,633	0	0	21,633
Year 2	21,633	0	0	21,633

Year 3	21,633	0	0	21,633
Year 4	21,633	0	0	21,633
Year 5	21,633	0	0	21,633
Year 6	21,633	0	0	21,633
Year 7	21,633	0	0	21,633
<b>Total</b>	151,431	0	0	151,431
<b>Total number of crediting years</b>	07			
<b>Annual average over the crediting period</b>	21,633	0	0	21,633

## B.7. Monitoring plan

### B.7.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter.)

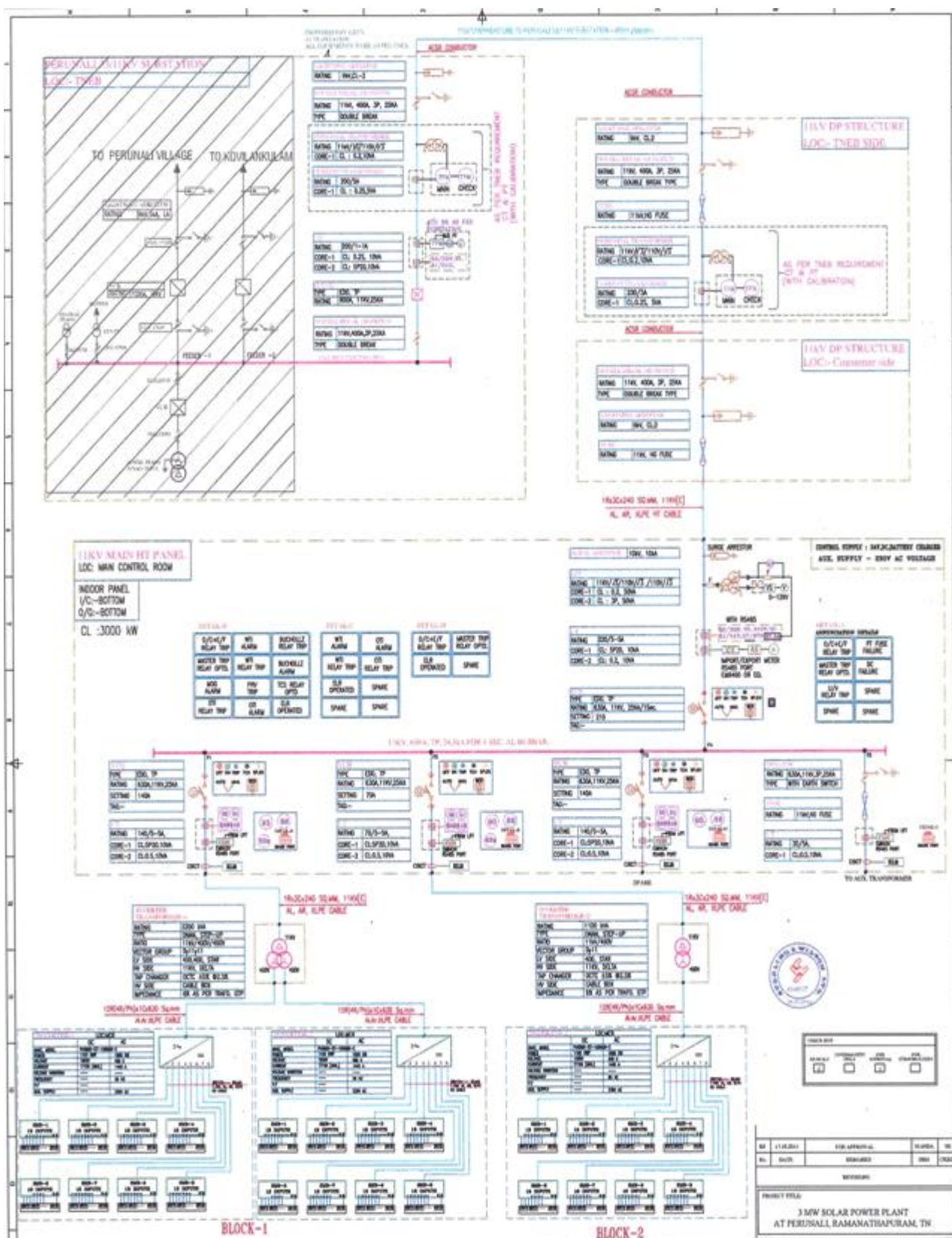
<b>Data/Parameter</b>	EG <sub>PJ, facility, y</sub> (Karnataka)
<b>Data unit</b>	MWh
<b>Description</b>	Quantity of net electricity supplied by project activity to grid in year y (i.e. Integrated Indian grid power distribution company for the state of Karnataka)
<b>Source of data</b>	Monthly electricity generation report ( Form B) by state electricity utility
<b>Value(s) applied</b>	17,827
<b>Measurement methods and procedures</b>	<p>Measurement methods and procedures will be as per the procedure mentioned in the power purchase agreement.</p> <p>Recording procedure:</p> <p>The export and import energy will be measured continuously using Main &amp; Check meters. Export &amp; Import readings of Main &amp; Check meters (with accuracy class 0.2S) shall be taken in presence of officials of distribution licensee and PP's representative. Check meter reading will be considered when Main meter is found to be defective or stopped.</p> <p>The metering point of Emami Power Ltd. is connected to the Venkatapura substation (66/11 kV).</p> <p><math>EG_{PJ,y} = EG(\text{Export})_y - EG(\text{Import})_y</math></p>
<b>Monitoring frequency</b>	Continuous monitoring, hourly measurement and monthly recording
<b>QA/QC procedures</b>	<p>The net electricity supplied to the grid can be cross checked with the invoice for sold electricity. Invoices are prepared as per clause no. 13.3 of the Power Purchase Agreement, "115% of energy provided by DISCOM for start-up power shall be deducted from the energy pumped into the grid by the developer for determine the amount payable by DISCOM".</p> <p>The energy meters will be tested / calibrated once in a year. The meters will be tested / calibrated using accredited mobile laboratory or at any accredited laboratory in the presence of state utility personnel &amp; representative of PP.</p>
<b>Purpose of data</b>	Calculation of baseline emission

Additional comment	Data will be archived in electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.
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Data/Parameter	EG <sub>PJ, facility, y</sub> (Tamilnadu)
Data unit	MWh
Description	Quantity of net electricity supplied by project activity to grid in year y (i.e. Integrated Indian grid power distribution company for the state of Tamilnadu)
Source of data	Monthly electricity generation report (Statement of solar power Generation) by state electricity utility (TANGEDCO)
Value(s) applied	5,140
Measurement methods and procedures	<p>Measurement methods and procedures will be as per the procedure mentioned in the power purchase agreement. The export and import energy will be measured continuously using Main &amp; Check meters (with accuracy class 0.2S). Export &amp; Import readings of Main &amp; Check meters shall be taken as per the procedures devised by the distribution licensee / STU. The Reading of main &amp; check meter (both Export &amp; Import readings) would be recorded in log book on monthly basis. Check meter reading will be considered when Main meter is found to be defective or stopped.</p> <p>The metering point of Emami Cement Ltd. is at project site. Solar Power plant is connected to the Perunali substation (33/11 kV)</p> <p><math>EG_{PJ,y} = EG_{\text{export}} - EG_{\text{import}}</math></p>
Monitoring frequency	Continuous monitoring, hourly measurement and monthly
QA/QC procedures	<p>The net electricity supplied to the grid can be cross checked with the invoice for sold electricity.</p> <p>The energy meters will be tested / calibrated once in a year. The meters will be tested / calibrated using accredited mobile laboratory or at any accredited laboratory in the presence of state utility personnel &amp; representative of PP.</p>
Purpose of data	Calculation of baseline emission
Additional comment	Data will be archived in electronic form for two years after the end of crediting period or of the last issuance of CERs for this project activity, whichever occurs later.

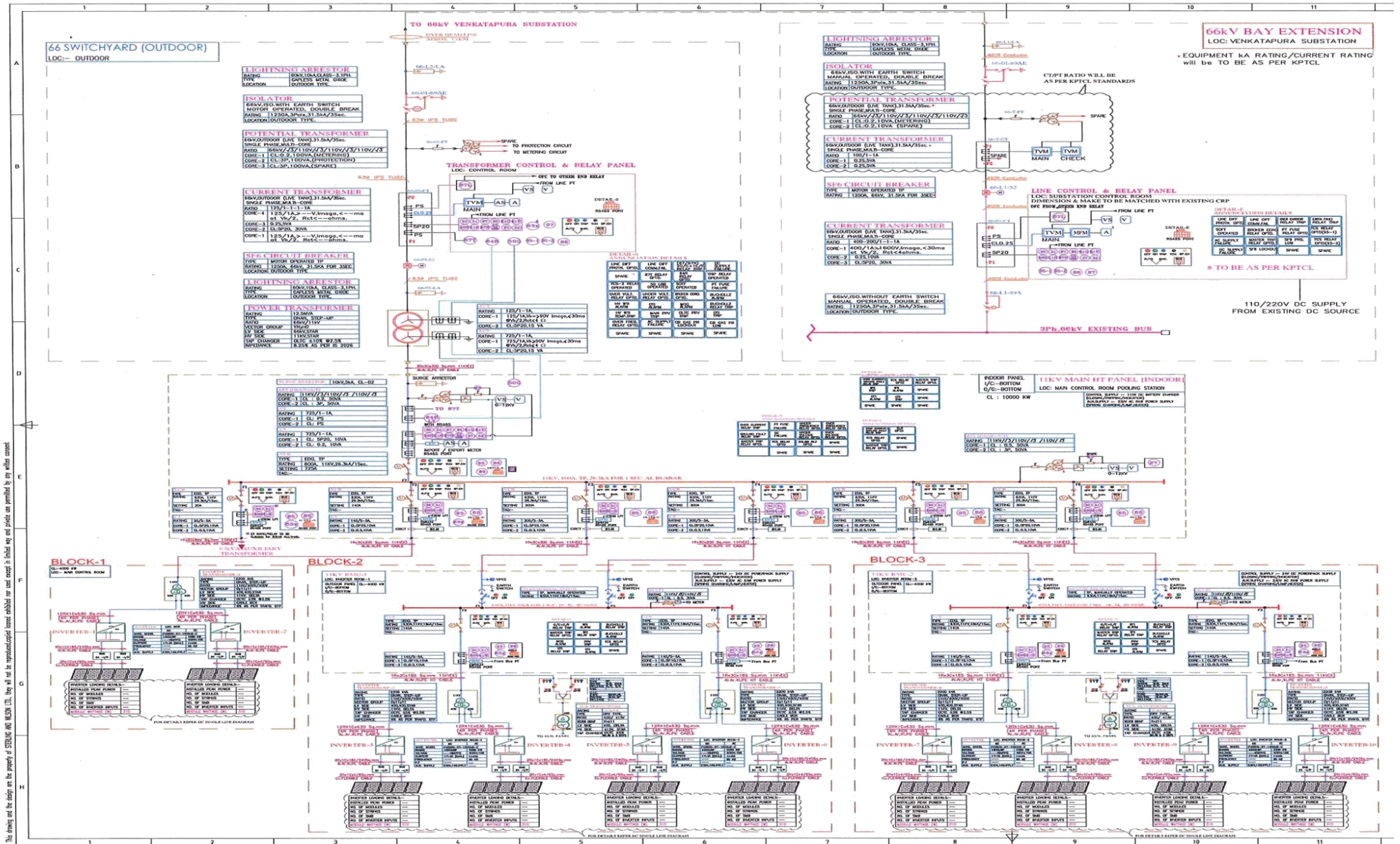


The single line diagram of solar plant connected to Pernauli substation is below:



The Single line diagram of Karnataka 10 MW Solar power project is below:..





**B.7.2. Sampling plan**

&gt;&gt;

Data and Parameters mentioned in the above section B.7.1 is not determined by any sampling approach. The electricity generation is monitored continuously and monthly recorded by the distribution licensee in presence of PP. Hence no sampling plans applicable for the project activity.

**B.7.3. Other elements of monitoring plan**

&gt;&gt;

The main meter and check meter is installed at the switch yard. The reading is noted down in the presence of distribution licensee representative and the representative of Emami. Accordingly, the generation monthly generation report is prepared by state utility.

The monthly generation report mentions the electricity exported to the grid inter connection point

- Main meter installed at the switch yard is responsible for accounting the net electricity exported to the grid. The reading is recorded by this meter by state electricity utility representative in the presence of the representative of Emami.
- The State Utility and the Power Producer shall jointly read the metering system every month at the delivery point.
- In the event that the Main Metering System is not in service as a result of maintenance, repairs or testing, then the Backup Metering System (i.e. Check Meter) shall be used during the period, the Main Metering System is not in service and the provisions above shall apply to the reading of the Backup Metering System.
- The Main Metering System and the Backup Metering System shall be sealed in the presence of representative of Power Producers and state utility.
- When the main metering system and/or Backup Metering System and/or any component thereof is found to be outside the acceptable limits of accuracy or otherwise not functioning properly, it shall be repaired, re-calibrated or replaced by the Power Producer and/or state utility at Power Producer's cost, as soon as possible.
- All the main and check meters shall be calibrated once in year.
- In case, both the main meters and check meter are found to be beyond permissible limit of error, both the meters shall be calibrated immediately and the correction applicable to main meters shall be applied to the energy registered by the main meter at the correct energy for the purpose of energy accounting / billing for the actual period during which inaccurate measurements were made, if such period can be determined or, if not determinable, shall be shorter of:
  - (a.) The period since the immediately preceding test of the relevant Main meter, or
  - (b.) One hundred and eighty days immediately preceding the test at which the relevant Main meter was determined to be defective or inaccurate.

**Procedure for possible monitoring data adjustment where dates of monitoring period are not matching with billing cycle dates:**

There are instances when the claim of emission reduction will be in middle of any month and adjustment will have to be done to arrive at electricity exported reading for that certain period. The following generation data adjustment procedure will be followed, if the crediting period date of the project activity falls in – between the billing cycles of JMR.

The calculation will be done based on the ratio of generation at Main Meter of Project Activity. (The monthly meter readings (at main meter))

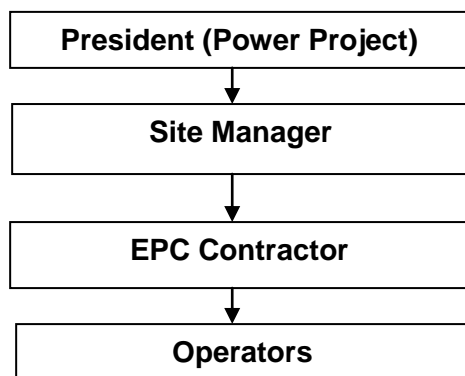
Example for apportioning for the Project Activity:

Partial day's generation of the Month at main meter for the project activity	:	X
Total generation at the project activity for (kWh) for the corresponding month.	:	Y
Ratio for the Partial days	:	$Z = (X/Y)$ Project activity) for the corresponding month (kWh).
Generation as per JMR	:	G
Generation for calculating emission reduction for partial days	:	$G*Z$

The project proponent has proposed the following operational & management structure in order to monitor the emission reduction. The organization structure for the solar power plant envisages a Site manager as the in-charge for the entire power plant operations. He will be positioned at site and will directly report to the President (Power Project). He will be assisted by EPC contractor and operators.

The entire operation & Maintenance including deployment of operator and other staff is with M/s. Sterling & Wilson Pvt. Ltd. The O&M contract period is 10 years. The day-to-day operation like planning the routine maintenance, safety and environmental control will be placed under the care of the Site manager.

The organizational structure and responsibilities on project operation, monitoring, data recording and ER calculation has been mentioned below:



Organizational Structure (CDM team)

Designation	Responsibility
President (Power Project)	<ul style="list-style-type: none"> <li>Overall performance monitoring</li> <li>Project Execution</li> </ul>

Site Manager	<ul style="list-style-type: none"> <li>▪ Operation</li> <li>▪ Verification of Data</li> <li>▪ Site visit to check authenticity of data and take corrective action, whenever necessary</li> <li>▪ Storage of data</li> <li>▪ Operation, monitoring and verification of Data</li> <li>▪ Data recording</li> <li>▪ Storage of data</li> <li>▪ Archive data</li> </ul>
EPC Contractor & Operators	<ul style="list-style-type: none"> <li>▪ Operation and maintenance</li> <li>▪ Data recording</li> <li>▪ Storage of Data</li> </ul>

## SECTION C. Start date, crediting period type and duration

### C.1. Start date of project activity

>>

12/08/2015 (LOA issued to Sterling & Wilson Pvt Ltd. for the 10.00 MW project in Karnataka)

### C.2. Expected operational lifetime of project activity

>>

25 years

### C.3. Crediting period of project activity

#### C.3.1. Type of crediting period

>>

Renewable (2 times renewable for 7 years each)

#### C.3.2. Start date of crediting period

>>

01/04/2020

#### C.3.3. Duration of crediting period

>>

07 years

## SECTION D. Environmental impacts

### D.1. Analysis of environmental impacts

>>

As per the notification from MoEF dated September 14, 2006<sup>10</sup> and its amendment notification S.O.-3067(E) dated 1/12/2009<sup>11</sup>, the list of project activities which require prior environmental clearance is stipulated. This does not include the proposed small scale project activity type as it involves solar power generation. Hence the project activity does not require any Environmental impact analysis.

<sup>10</sup> <http://moef.gov.in/wp-content/uploads/2017/08/so1533.pdf>

<sup>11</sup> <http://moef.gov.in/wp-content/uploads/2017/08/3067.pdf>

**D.2. Environmental impact assessment**

&gt;&gt;

Not Applicable

**SECTION E. Local stakeholder consultation****E.1. Modalities for local stakeholder consultation**

&gt;&gt;

**Karnataka :**

PP identified local communities, farmers, teachers, panchayat members and villagers, as the stakeholders with an interest in the CDM activities. The stakeholder consultation meeting held at solar power project site, Survey no. 55 Neralekunte village, Pavagada taluka, Tumkur district of Karnataka on 22/12/2016 at 11.30 am to 2.00 pm.

The PP intimated stakeholders in advance, requesting to attend meeting or depute their representatives at venue by public notice displayed at primary school building, newspaper advertisement in local newspaper "Deccan Herald" dated 08/12/2016 in English, in local newspaper "Prajha Vani" dated 08/12/2016 in Kannada and through personal invitation letters on 08/12/2016.

The stakeholder meeting was conducted in local language (Kannada) & in English. The representative of Emami briefed stakeholders about the project activity.

**Tamilnadu :**

PP identified local communities, farmers and villagers, as the stakeholders with an interest in the CDM activities. The stakeholder consultation meeting held at solar power project site at Perunali village, Kamuthi taluka, Ramnathpuram district of Tamilnadu on 05/01/2017 at 11.30 am to 2.00 pm.

The PP intimated stakeholders in advance, requesting to attend meeting or depute their representatives at venue by public notice displayed at panchayat office, newspaper advertisement in local newspaper "Dinamani" dated 15/12/2016 in Tamil, in "Indian Express" dated 15/12/2016 in English and through personal invitation letters.

The stakeholder meeting was conducted in local language (Tamil) & in English. The representative of Emami briefed stakeholders about the project activity.

The fixed agenda of the meeting & points discussed was as follows:

- Welcome to all stakeholders
- Purpose of the meeting
- An overview of global warming & the CDM project activity.
- CDM Funds related to project activity.
- Project promoters, process & responsibility
- Benefits on solar power project (Economical, social & Environmental) with example
- Queries and responses from the proponent and the stakeholders
- Vote of thanks

Meeting Details:

Date of Meeting	Venue	Time	Language for mode of communication
22/12/2016	Solar power project site, Survey no. 55 Neralekunte village	11.30 am to 02.00 pm.	Local language (Kannada) & in English

05/01/2017	Solar power project site, Perunali village	11.30 am to 02.00 pm.	Local language (Tamil) & in English
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PP's representative answered the questions of stakeholders

## E.2. Summary of comments received

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No negative comments have been received in context of the project. Stakeholders were supportive for the implementation of the project as a CDM project, and they believe that solar power project is environmentally safe and may help them.

Other issues discussed during the meeting are as follows-

- Job opportunities during day - to - day maintenance and security of project site.
- Preference for local people for job opportunity
- Other work pertaining to these projects will help the local villagers also such as hiring of transport services, civil contracts, etc

## E.3. Consideration of comments received

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Karnataka :

The local residents – Mr. A. Krishnappa raised his concern about free electricity.

Mr. Shankar Nath (Emami) clarified that installed solar power plant is grid connected project activity, and project activity will help power deficit Karnataka state grid in order to decrease power shortage.

Mr. V.N. Reddy, a freedom fighter raised his concern about preference for local people in employment at project site.

Mr. Shankar Nath (Emami) Clarified that project contributed for social well-being on its small way by generating few job opportunities during the initial stage of project development (e.g. civil works, construction activity) and during the operation of the project activity local people will be given preference for job opportunities like Security, O & M work etc.

Mr. Ramkrishna Reddy & Mr. P.V. Horun raised concern about the effect on human health due to radiation and increased temperature due to implemented solar power project activity.

Mr. Rahul Kulkarni (MITCON) clarified that there is no radiation and temperature increase which will affect the surrounding environment and human health due to implementation of the project activity. And also being small scale project activity the project activity does not require any Environmental impact analysis as per notification by MoEF, Govt. Of India

The Panchayat members and other stakeholders accepted the assurance given by the project proponent.

Tamilnadu:

Prof. Dr. S. Kamaraj raised concern about the training of operators for O & M activities and involvement of local personnel for the same.

Mr. Shankar Nath (Emami) Clarified that Sterling & Wilson Pvt. Ltd. has appointed as O & M contractor for 10 years and as and when required during the operation of the project activity local people will be given preference for job opportunities like Security, O & M work etc.

Mr. S. Madhavan has suggested that the unutilised project land can be utilised to develop nursery, Emami representative welcomed this suggestion.

**SECTION F. Approval and authorization**

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PP has received Host Country Approval from NCDMA i.e. Ministry of Environment and Forests and Climate Change (MoEF), India on April 15, 2019 (Certificate No.13008/81/2017-CC)

PP has submitted request letter to Ministry of Environment and Forests and Climate Change on August 06, 2019 for change in the name of project proponent.

PP has received letter from Ministry of Environment, Forests and Climate Change dated October 21, 2019 approving name change of project proponent.

## Appendix 1. Contact information of project participants

<b>Organization name</b>	Emami Power Limited
<b>Country</b>	India
<b>Address</b>	E. M. Bypass, Emami Tower, 687, Anandpur, Kolkata – 700107, West Bengal
<b>Telephone</b>	91 - 33 - 66136218
<b>Fax</b>	91 - 33 - 66136243
<b>E-mail</b>	<a href="mailto:mrghosh@emamigroup.com">mrghosh@emamigroup.com</a>
<b>Website</b>	<a href="http://www.emamilttd.in">http://www.emamilttd.in</a>
<b>Contact person</b>	Mr. M.R. Ghosh

## Appendix 2. Affirmation regarding public funding

- √ The project has not received any public finding and Official Development Assistance (ODA).
- √ The project is unilateral project.

## Appendix 3. Applicability of methodologies and standardized baselines

Please refer above section B.2 for applicability of selected methodology

## Appendix 4. Further background information on ex ante calculation of emission reductions

Please refer above section B.6.3 for ex- ante calculation of emission reductions.

## Appendix 5. Further background information on monitoring plan

Please refer above section B.7 for detail monitoring information.

## Appendix 6. Summary report of comments received from local stakeholders

Please refer above section E.2 of the PDD.

## Appendix 7. Summary of post-registration changes

Not applicable.

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## Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
11.0	31 May 2019	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with version 02.0 of the “CDM project standard for project activities” (CDM-EB93-A04-STAN);</li> <li>• Make editorial improvements.</li> </ul>
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: <ul style="list-style-type: none"> <li>• Improve consistency with the “CDM project standard for project activities” and with the PoA-DD and CPA-DD forms;</li> <li>• Make editorial improvement.</li> </ul>
09.0	24 May 2017	Revision to: <ul style="list-style-type: none"> <li>• Ensure consistency with the “CDM project standard for project activities” (CDM-EB93-A04-STAN) (version 01.0);</li> <li>• Incorporate the “Project design document form for small-scale CDM project activities” (CDM-SSC-PDD-FORM);</li> <li>• Make editorial improvement.</li> </ul>
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: <ul style="list-style-type: none"> <li>• Include provisions related to statement on erroneous inclusion of a CPA;</li> <li>• Include provisions related to delayed submission of a monitoring plan;</li> <li>• Provisions related to local stakeholder consultation;</li> <li>• Provisions related to the Host Party;</li> <li>• Make editorial improvement.</li> </ul>
05.0	25 June 2014	Revision to: <ul style="list-style-type: none"> <li>• Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0));</li> <li>• Include provisions related to standardized baselines;</li> <li>• Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1;</li> <li>• Change the reference number from F-CDM-PDD to CDM-PDD-FORM;</li> <li>• Make editorial improvement.</li> </ul>
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the “Guidelines for completing the project design document form for CDM project activities” (EB 66, Annex 8).

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: project activities, project design document		