

100 MW SOLAR PROJECT IN BHADLA IN RAJASTHAN.

Document Prepared by WeAct Pty Ltd.

Project Title	100 MW Solar project in Bhadla in Rajasthan.
Version	01 (first version for initial listing at VCS registry)
Date of Issue	13-Dec-2018
Monitoring Period	01-Sep-2018 to 31-Oct-2018 (inclusive both the dates)
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1. PROJECT DETAILS

1.1 Summary Description of the Project and its Implementation Status

The main purpose of this project activity is to generate clean electricity through renewable source of solar energy and to supply electricity to the Rajasthan state electricity grid (Discom).

The project activity involves installation of 100 MW_{ac} solar power project in Bhadla in the state of Rajasthan, India. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 146,086 tCO₂e per year (proposed avg. value), thereby displacing 154,179 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/fossil fuel based power plants. Total estimated GHG emission reductions for a period of 10 years of crediting period (renewal) is 14,60,862 tonnes of CO₂e.

The project activity has been commissioned on 01th Sep 2018, therefore the current monitoring period is considered from 01-Sep-2018 to 31-Oct-2018. The total GHG emission reductions or removals generated in this monitoring period are 43,020 tCO₂e (projected).

The solar power does not involve any fossil fuel consumption and hence the project does not lead to any greenhouse gas emissions. Thus, electricity would be generated through sustainable means without causing any negative impact on the environment.

The details of the project are mentioned in the table:

Project Investor' Name*	Commissioning Date	Capacity in MW _{AC}	Location (Village/State)
Clean Sustainable Energy Pvt. Ltd.	01-Sep-2018	100	Village: Bhadla, District: Jodhpur

*WeAct Pty Ltd will be acting as the authorized representative and the focal point for all the VCS actions.

Scenario existing prior to the implementation of project activity:

The project is a green-field activity, therefore in absence of the project activity the 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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Baseline Scenario:

As per the applicable methodology, a Greenfield power plant is defined as "a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity".

As the project activity falls under the definition of a Greenfield power plant, the baseline scenario as per paragraph 22 of Section 5.2.1 of applied methodology is the following:

If the project activity is the installation of a Greenfield power plant, the baseline scenario is 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, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

Hence, pre-project scenario and baseline scenario are the same.

1.2 Sectoral Scope and Project Type

The project activity falls under the following Sectoral scope and Project Type:

Sectoral Scope : 01 - Energy industries (renewable / non-renewable sources)
 Project Type : I - Renewable Energy Projects
 Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 19¹

The project is not a grouped project activity.

1.3 Project Proponent

Organization name	Clean Sustainable Energy Pvt. Ltd.
Contact person	Prashant Choubey
Title	Senior Vice President
Address	3rd floor, PTI building, 4 Parliamnet Street, Delhi – 110001. India.
Telephone	+91-97113 02259
Email	prashant.choubey@avaada.com

Clean Sustainable Energy Pvt. Ltd. is acting as the Project Proponent (PP) having overall operational control and ownership of the Project activity.

1.4 Other Entities Involved in the Project

Organization name	WeAct Pty Ltd
Role in the project	Authorized Representative
Contact person	Satish Duvvuru
Title	Director
Address	1/115 Chapal Street, Widnsor, Victoria-3181, Australia.
Telephone	Ph: +61-409 135 580
Email	satish@weact.com.au

WeAct Pty Ltd. is the “Authorized Representative”² of PP and the “Sole Focal Point” for all the communications with the DOE, VCS Board and Registry; and to take all the necessary actions for the project under VCS mechanism as and when required

1.5 Project Start Date

Project Start Date: 01-Sep-2018.

As per VCS guidelines, the project start date is the date on which the project has been commissioned. The project activity was commissioned as on 01th Sep 2018.

¹ <https://cdm.unfccc.int/methodologies/DB/VJ19AX539D9MLOPXN2AY9UR1N4IYGD>

² Communication Agreement has been executed in between PP and Authorized Representative.

1.6 Project Crediting Period

Crediting Period Start date : 01-September-2018
 Crediting Period End date : 31-August-2028

Thus, a total crediting period of “10 years” has been proposed.

Also, the project activity adopts renewable crediting period of 10 years period which can be renewed for 2 times.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Project Scale	
Project	√
Large project	

Year	Estimated GHG emission reductions or removals (tCO ₂ e)
Year 1	1,49,403
Year 2	1,48,656
Year 3	1,47,913
Year 4	1,47,174
Year 5	1,46,438
Year 6	1,45,705
Year 7	1,44,977
Year 8	1,44,252
Year 9	1,43,531
Year 10	1,42,813
Total estimated ERs	14,60,862
Total number of crediting years (Current Crediting Period)	10
Average annual ERs	1,46,086

1.8 Description of the Project Activity

The project activity involves the installation of Solar PV plant. The total installed capacity of the project is 100 MW_{ac}. The project is developed by Clean Sustainable Energy Pvt. Ltd.

The project activity aims to harness solar energy through installation of PV. The solar PV power plant will have solar PV modules, inverters, transformers and other protection system and supporting components. Details of which would be provided during the validation.

The Project activity is a new facility (Greenfield) and the electricity generated by the Project will be exported to the Indian Grid. The Project will therefore displace an equivalent amount of electricity which would have otherwise been generated by fossil fuel dominant electricity grid.

In the Pre- project scenario the equivalent amount of electricity, either fetched (under captive cases) or delivered to the grid by the project activity, would have otherwise been generated by the operation of grid-connected fossil fuel based power plants and by the addition of new generation sources.

The project shall result in replacing anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 1,46,086 tCO₂e per year (an avg. estimated value), thereby displacing an annual average of 1,54,179 MWh³ of electricity from the grid (projected).

Solar Power Project Technology Details⁴:

The technology employed, converts solar energy to electrical energy. In solar power generation, energy of solar is converted into mechanical energy and subsequently into electrical energy. The technology is an environment friendly technology since there are no GHG emissions associated with the electricity generation. There is no transfer of technology involved in the project activity.

Emission Reductions from anthropogenic sources:

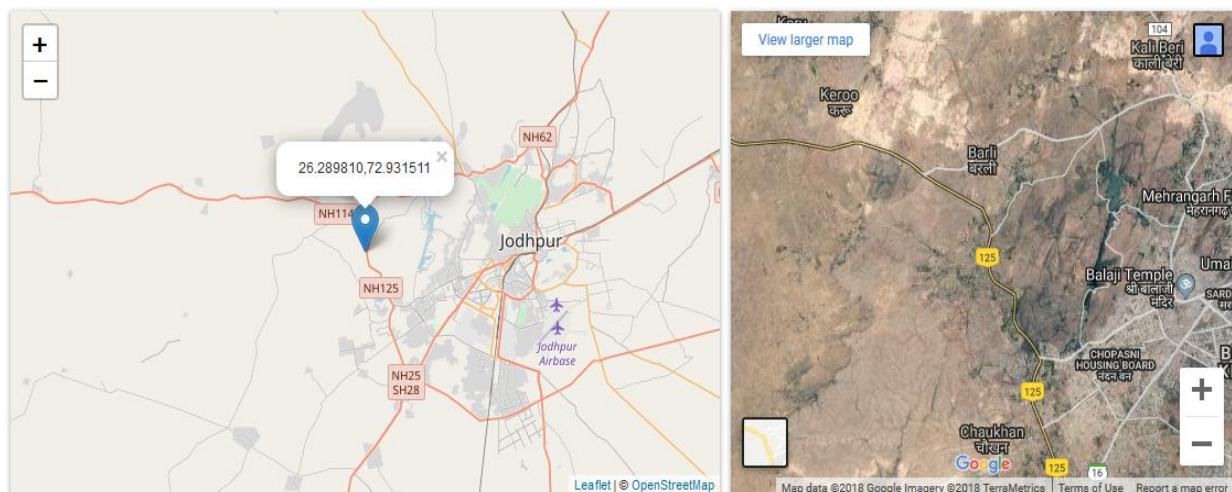
The solar power generated from the project will be displacing the electricity generated from thermal power stations feeding into Indian grid and will be replacing the usage of diesel generators for meeting the power demand during shortage periods. Since, the solar power plant harvests energy from sustainable source of "solar energy" and also it does not use any fossil fuel for its operation the power generated from the project will certainly prevent the anthropogenic GHG emissions which is generally produced by the fossil fuel based thermal power stations comprising coal, diesel, furnace oil and gas etc. which contributes to the project's baseline, i.e. Grid. (Emission reduction calculation sheet be submitted to DOE as a separate document).

1.9 Project Location

The proposed 100MW_{AC} solar PV Plant site is located in Bhadla village, Jodhpur district, in the Indian state of Rajasthan. The site is well connected by state highway state highway (SH) NH-15.

The geo-coordinates of the location are as follows:

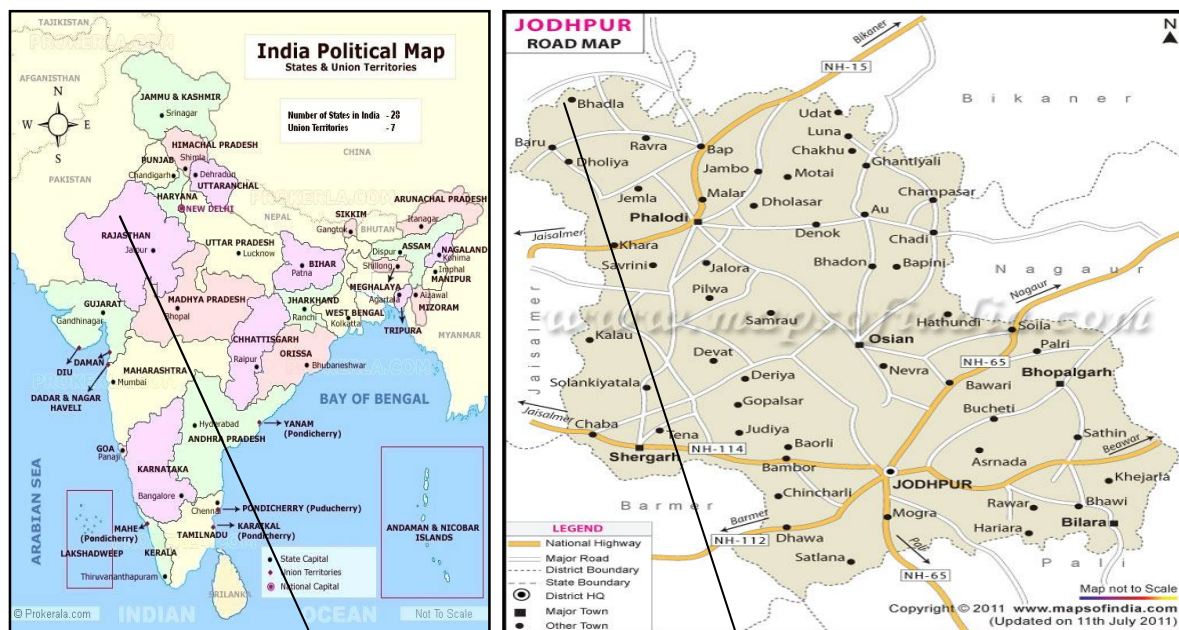
Latitude : 26° 17' 23.316" N (or 26.289810)
Longitude : 72° 55' 53.436" E (or 72.931510)



Bhadla is about 200 km north of Jodhpur and about 320 km west of Jaipur. The nearest village is Bap, which is approximately in the 50km radius from the Project site location. Location details of the project are given below in the figure:

³ A detailed calculation sheet will be submitted to DOE during the validation process.

⁴ The technical specification of the project will be provided to DOE for validation and shall be included in the next version of the VCS PD.



Showing State of Rajasthan

Bhadla village, Jodhpur district

1.10 Conditions Prior to Project Initiation

The project is a Greenfield solar power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal or destruction. Prior to the initiation of the project activity, the equivalent amount of electricity would have been drawn from grid connected or new power plants, in Indian Grid. The grid is predominantly coal based and therefore is a major source of carbon di-oxide emissions in India. The main emission in the pre project scenario is the fossil fuel based power plants connected to the Indian Grid, and main GHG involved is CO₂. The baseline identified in section 2.4 is same as the pre-project scenario.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project has received necessary approvals for development and commissioning for solar project from the state Nodal agencies and is in compliance to the local laws and regulations.

The relevant national laws and regulations pertaining to generation of energy in India are:

- Electricity Act 2003
- National Electricity Policy 2005
- Tariff Policy 2006

The Project activity conforms to all the applicable laws and regulations in India:

- Power generation using solar energy is not a legal requirement or a mandatory option.
- There are state and sectoral policies, framed primarily to encourage solar power projects. These policies have also been drafted realizing the extent of risks involved in the projects and to attract private investments.
- The Indian Electricity Act, 2003 (May 2007 Amendment) does not influence the choice of fuel used for power generation.
- There is no legal requirement on the choice of a particular technology for power generation.

1.12 Ownership and Other Programs

1.12.1 Project Ownership

The Project is developed and owned by Clean Sustainable Energy Pvt. Ltd., who authorizes WeAct Pty Ltd. as the authorized representative of project proponent for the VCS project, and to receive VCUs and remain focal point of communication at the registry.

The ownership of the project shall be demonstrated through the following documents:

- 1) Commissioning certificates for 100 MW Solar PV in the name of Clean Sustainable Energy Pvt. Ltd. issued by respective state nodal agencies /authorities of the state Rajasthan of India.
- 2) Power Purchase Agreement with Rajasthan Electricity Board for sale of electricity by the Clean Sustainable Energy Pvt. Ltd
- 3). The authorization letter and communication agreement which confirms the nomination and authorization of WeAct as Authorized Representative of Project Proponent for the VCS project.

1.12.2 Emissions Trading Programs and Other Binding Limits

Net GHG emission reductions or removals generated by the Project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions in any Emission Trading program or other binding limits.

1.12.3 Other Forms of Environmental Credit

The Project has no intend to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program.

1.12.4 Participation under Other GHG Programs

The project has not been developed under any other GHG mechanism or Programs.

1.12.5 Projects Rejected by Other GHG Programs

The Project is not rejected by other GHG programs.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

This is not a grouped project activity. Thus, this section is not applicable for this project.

Leakage Management

Not applicable to the project activity

Commercially Sensitive Information

No commercially sensitive information has been excluded from the public version of the project description.

Sustainable Development

Contribution to sustainable development:

Ministry of Environment and Forests, 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 leads 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 is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits the project activity will also help to reduce the demand supply gap in the state. The project activity will generate power using zero emissions solar based power generation which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities.
- **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

Further Information

Not Applicable

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Title of Methodology : ACM0002: Grid-connected electricity generation from renewable sources - Version 19⁵

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

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

Category : Approved Consolidated Methodology (ACM0002)

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

- Tool to calculate the emission factor for an electricity system - Version 06.0 (EB 97, Annex 07)⁶
- Methodological Tool- Tool for the demonstration and assessment of additionality - Version 07.0.0 (EB 70, Annex 08)⁷.

⁵ <https://cdm.unfccc.int/methodologies/DB/VJ19AX539D9MLOPXN2AY9UR1N4IYGD>

⁶ https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v1.1.pdf/history_view

⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

2.2 Applicability of Methodology

The project activity involves generation of grid connected electricity from renewable solar energy. The project activity has a proposed capacity of 100 MW which will qualify for a large scale CDM project activity under Type-I of the large scale methodologies. The project status is corresponding to the methodology ACM0002 version 19 and applicability of methodology is discussed below.

Applicability Criterion	Project Case
<p>1. This methodology is applicable to grid- connected renewable energy power generation project activities that:</p> <ul style="list-style-type: none"> (a) Install a Greenfield power plant; (b) Involve a capacity addition to (an) existing plant(s); (c) Involve a retrofit of (an) existing operating plants/units; (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s)/unit(s) 	<p>The project activity is a Renewable Energy Project i.e. Solar Power Project which falls under applicability criteria option 1 (a) i.e., “Install a Greenfield power plant”. Hence the project activity meets the given applicability criterion.</p>
<p>2. The methodology is applicable under the following conditions:</p> <ul style="list-style-type: none"> (a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, solar power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit; (b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for solar, solar, wave or tidal power capacity addition projects the existing plant/unit started commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity. 	<p>The option (a) of applicability criteria 2 is applicable as project is renewable energy solar power plant/unit. Hence the project activity meets the given applicability criterion.</p>
<p>3. In case of hydro power plants, one of the following conditions shall apply:</p> <ul style="list-style-type: none"> (a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or (b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m²; or (c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than 4 W/m²; or (d) The project activity is an integrated hydro power project involving multiple reservoirs, where the 	<p>The project is installation of new solar based electricity generation plants (not a hydro power plant). Hence this criterion is not applicable.</p>

<p>power density for any of the reservoirs, calculated using equation (3), is lower than or equal to 4 W/m², all of the following conditions shall apply:</p> <ul style="list-style-type: none"> (i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than 4 W/m²; (ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity; (iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m² shall be: <ul style="list-style-type: none"> a. Lower than or equal to 15 MW; and b. Less than 10 per cent of the total installed capacity of integrated hydro power project 	
<p>4. In the case of integrated hydro power projects, project proponent shall:</p>	<p>The project is solar power project and thus the criterion is not applicable to this project activity.</p>
<p>5. Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or</p>	<p>The project is solar power project and thus the criterion is not applicable to this project activity.</p>
<p>6. Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity.</p>	<p>The project is solar power project and thus the criterion is not applicable to this project activity.</p>
<p>7. The methodology is not applicable to:</p> <ul style="list-style-type: none"> (a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site; (b) Biomass fired power plants/units 	<ul style="list-style-type: none"> (a) The project activity is Greenfield and there is no switching of fossil fuel to renewable energy. Hence the criteria is not applicable to the project activity (b) The project is not a biomass fired power plant. Hence the criteria is not applicable to the project activity
<p>8. In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance.</p>	<p>Not applicable, the solar project is a Green field project activity and this project is not the enhancement or up gradation project.</p>
<p>9. In addition, the applicability conditions included in the tools referred to below apply.</p>	<p>Please refer tables below.</p>

Tool to calculate the emission factor for an electricity system9 - Version 06.0 (EB 97, Annex 07)

Applicability Criterion	Project Case
This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is a grid connected Greenfield solar power project and thus the tool is applicable.
Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option II.a and option II.b. If option II.a is chosen, the conditions specified in “Appendix 2: Procedures related to off-grid power generation” should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	Steps involved in calculation of Emission Factor are included in section B.6.3 of the PD as per the requirement of the tool.
In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.	Project is located in non-Annex I country and hence the tool is applicable.
Under this tool, the value applied to the CO ₂ emission factor of bio fuels is zero.	The project is a solar project and there is no involvement of bio fuels.

Methodological Tool- Tool for the demonstration and assessment of additionality- Version 07.0.0 (EB 70, Annex 08)

Applicability Criteria has been demonstrated in section on additionality below.

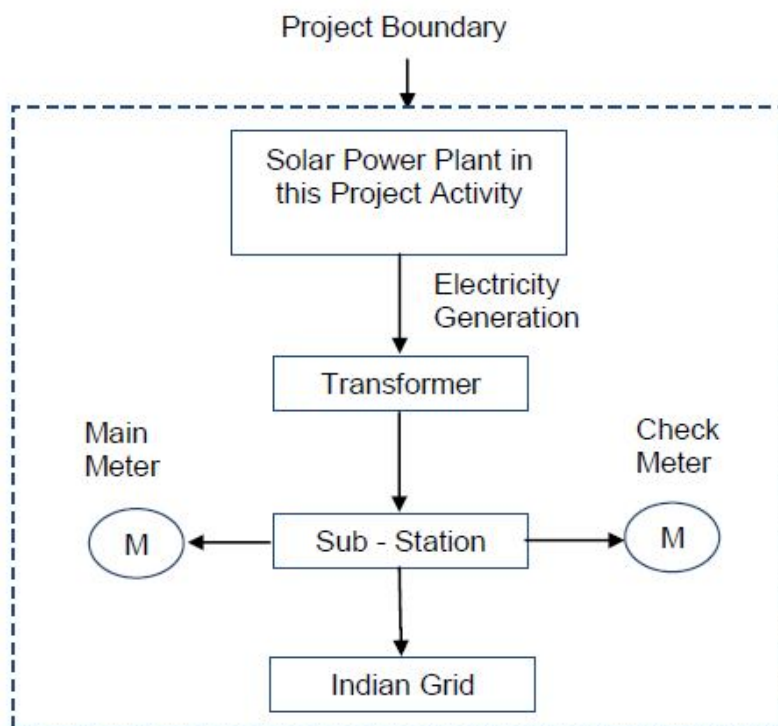
The project activity qualifies as Type I during every year of the crediting period in accordance with applicable provisions for project activity eligibility as discussed above. Also the total installed capacity of project activity is 100 MW which is applicable as per large scale project activities methodology ACM0002: Grid-connected electricity generation from renewable sources Version 19. The project capacity will always remain the same and hence the project activity will always be a large scale project activities throughout the crediting period and thereafter.

2.3 Project Boundary

As per ACM0002 version 19 - “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”.

The project boundary includes the solar project, sub-stations, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid. Therefore the entire Indian grid and

all connected power plants have been considered in the project boundary for the proposed VCS project activity.



Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation.	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield SOLAR Power Project Activity.	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		Other	No	Project activity does not emit other forms of GHG emissions

2.4 Baseline Scenario

As per the approved consolidated methodology ACM0002, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

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, as reflected in the combined margin (CM) calculations described in the “Tool to calculate the emission factor for an electricity system”

The project activity involves setting up of solar projects to harness the power of sun to produce electricity and supply to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants.

In the absence of the project activity, the equivalent amount of power would have been drawn from the Indian grid. Hence, the baseline for the project activity is the equivalent amount of power from the Indian grid.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) (having weightage 75%) and build margin (BM) (having weightage 25%). Calculations for this combined margin must be based on data from an official source (where available) and made publically available.

The combined margin of the Indian grid used for the project activity is as follows:

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	0.94751 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 13 published by Central Electricity Authority (CEA), Government of India
$EF_{grid,OM,y}$	0.9726 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2014-15, 2015-16 & 2016-17,) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 13, published by Central Electricity Authority (CEA), Government of India
$EF_{grid,BM,y}$	0.8723 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 13, published by Central Electricity Authority (CEA), Government of India.

2.5 Additionality

The additionality of the proposed project activity is demonstrated using an investment analysis as according to the steps described in the ‘Tool for the demonstration and assessment of additionality’ (version 07.0.0).

Step 0. Demonstration whether the proposed project activity is the first-of-its-kind.

This step is not applied to the project activity since it is not first-of-its-kind, hence the additionality of the project will be demonstrated in next steps below.

Step1. Identification of alternatives to the proposed project activity consistent with current laws and regulations

As per the applied methodology ACM0002 version 19; Para 22, if the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid connected power plant and by the addition of new generation sources.

As the baseline scenario is prescribed by applied methodology, hence no further analysis is carried out to identify alternatives.

Step 2: Investment Analysis**Sub-step 2a: Determine appropriate analysis method**

As per "Tool for the demonstration and assessment of additionality" (version 07.0.0), for financial analysis of the project, the following three options are available:

Option I: Simple Cost Analysis

Option II: Investment Comparison Analysis

Option III: Benchmark Analysis

The project will generate revenues from sale of electricity, therefore Option I is not applicable. Option II also does not apply since there is no comparable investment alternative available to the project participant. The most appropriate financial analysis method is therefore option III: the benchmark analysis, where the returns on investment in the project activity are compared to benchmark returns that are available to any investors in the country.

Sub-step 2b: Option III. Apply benchmark analysis

Project Participants have considered Post-Tax Equity IRR for investment analysis at the time of investment decision. As per Para 16 of EB 92, Annex 5 states that "...Required/expected returns on equity are appropriate benchmarks for an equity IRR. Therefore, the Expected return on equity is considered appropriate benchmark."

Accordingly, the post-tax Equity IRR has been considered as the relevant financial indicator for Investment Analysis and has been compared against a default value of benchmark return (Cost of Equity).

Sub-step 2c: Calculation and comparison of financial indicators (only applicable to Options II and III):

Considering conservative approach in input values, an equity IRR⁸s has been estimated and compared with the benchmark.

The results shows that the proposed project activity cannot be considered as financially attractive proposition without an external revenue support as the equity IRR for the project activity is less than the expected Benchmark.

⁸ This is the listing version of the PD, therefore only the approach and outcome is being provided. The detailed IRR calculation sheet will be submitted to DOE during the validation process and results will be demonstrated in the PD.

Sub-step 2d: Sensitivity Analysis

Addressing Guidance 28 & 29 of EB92, Annex 5, following factors has been subjected to sensitivity analysis:

- PLF
- O&M Cost
- Project Cost
- Tariff

The rationale of sensitivity is, "The ultimate objective of the sensitivity analysis is to determine the likelihood of the occurrence of a scenario other than the scenario presented, in order to provide a cross-check on the suitability of the assumptions used in the development of the investment analysis."

A sensitivity analysis has been performed and the results of show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate, the Equity IRR remains well below the proposed benchmark. Thus, the project remains additional even under the most favourable conditions.

Outcome of Step 2:

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark) for the investor. Thus, it can be easily concluded that project activity is additional & is not business as usual scenario.

Step 3: Barrier analysis

Barrier analysis has not been used.

Step 4: Common practice analysis

Stepwise approach for common practice analysis has been carried out as per Methodological tool "Common Practice", version 03.1 EB84, Annex 7:

Step (1): calculate applicable capacity or output range as +/-50% of the total design capacity or output of the proposed project activity.

Range	Capacity	Unit
+50%	150	MW
Capacity of the proposed project activity	100	MW
-50%	50	MW

Step (2): identify similar projects (both CDM and non-CDM) which fulfil all of the following conditions:

- The projects are located in the applicable geographical area;
- The projects apply the same measure as the proposed project activity;
- The projects use the same energy source/fuel and feedstock as the proposed project activity, if a technology switch measure is implemented by the proposed project activity;
- The plants in which the projects are implemented produce goods or services with comparable quality, properties and applications areas (e.g. clinker) as the proposed project plant;
- The capacity or output of the projects is within the applicable capacity or output range calculated in Step 1;
- The projects started commercial operation before the project design document (CDM-PDD) is published for global stakeholder consultation or before the start date of proposed project activity, whichever is earlier for the proposed project activity.

Identification of the similar projects (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

- As the project is located in Rajasthan state of India, therefore, projects in the geographical area of Rajasthan have been chosen for analysis.
- The project activity is a green-field solar power project and uses measure (b) “Switch of technology with or without change of energy source including energy efficiency improvement as well as use of renewable energies”. Therefore, projects applying same measure (b) are candidates for similar projects.
- The energy source used by the project activity is solar. Hence, only solar energy projects have been considered for analysis.
- The project activity produces electricity; therefore, all power plants that produce electricity are candidates for similar projects.
- The capacity range of the projects is within the applicable capacity range from 50 MW to 150 MW.
- The start date of the project activity is Sep-2017, i.e. the earliest Purchase Order Date. Therefore projects, which have started commercial operation before 01-Sep-2017, have been considered for analysis.

Numbers of Similar projects identified, which fulfil above-mentioned conditioned are

$N_{\text{solar}} = 0$

Step (3): Within the projects identified in Step 2, identify those that are neither registered CDM project activities, project activities submitted for registration, nor project activities undergoing validation. Note their number N_{all} .

CDM project activities, which have got registered or are under validation have been excluded in this step. The list of the power plants identified is provided to the DOE. After excluding the registered and under validation projects the total number of projects,

$N_{\text{all}} = 0$

Step (4): Within similar projects identified in Step 3, identify those that apply technologies that are different to the technology applied in the proposed project activity. Note their number N_{diff} .

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis of Investment climate on the date of the investment decision.

Hence, projects where this condition is satisfied projects are counted for calculating N_{diff} projects.

$N_{\text{diff}} = 0$

Step (5): Calculate factor $F = 1 - N_{\text{diff}}/N_{\text{all}}$ representing the share of similar projects (penetration rate of the measure/technology) using a measure/technology similar to the measure/technology used in the proposed project activity that deliver the same output or capacity as the proposed project activity.

Calculate:

$$F = 1 - N_{\text{diff}}/N_{\text{all}}$$

$$F = 1 - (0/0) = \text{Undefined}$$

Outcome of Step 4:

As,

- $F = 0$; is not less than 0.2
- $N_{\text{all}} - N_{\text{diff}} = 0$; is less than 3

As the project activity does not satisfy condition (i) and (ii) both, the proposed project activity is not a “common practice” within a sector in the applicable geographical area.

The above discussions show that solar power development is not a common practice and the project activity is not financially attractive; hence the project activity is additional.

2.6 Methodology Deviations

Not applicable.

3 ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

As per the approved consolidated Methodology ACM0002 (Version 19) para 42, *Baseline emissions include only CO₂ emissions from electricity generation in fossil fuel fired 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. The baseline emissions are to be calculated as follows:*

$$BE_y = EG_{PJ,y} \times EF_{grid,CM,y} \dots\dots\dots(1)$$

Where:

- BE_y = Baseline emissions in year y (tCO₂)
- $EG_{PJ,y}$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the GS VER project activity in year y (MWh/yr)
- $EF_{grid,CM,y}$ = Combined Margin CO₂ 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" (tCO₂/MWh).

The methodology provides following approaches for emission factor calculations:

- (a) *Combined margin (CM), consisting of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the approved methodology "Tool to calculate the emission factor for an electricity system".*

OR

- (b) *The weighted average emissions (in t CO₂/MWh) of the current generation mix. The data of the year in which project generation occurs must be used.*

Option (a) has been considered to calculate the grid emission factor as per the 'Tool to calculate the emission factor for an electricity system' since data is available from an official source.

CO₂ Baseline Database for the Indian Power Sector, Version 13, published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

As per *Methodological tool: Tool to calculate the emission factor for an electricity system* (Version 06.0, EB 97, Annex 7), following six steps have been followed:

- (a) **Step 1:** Identify the relevant electricity systems;
- (b) **Step 2:** Choose whether to include off-grid power plants in the project electricity system (optional);
- (c) **Step 3:** Select a method to determine the operating margin (OM);
- (d) **Step 4:** Calculate the operating margin emission factor according to the selected method;
- (e) **Step 5:** Calculate the build margin (BM) emission factor;
- (f) **Step 6:** Calculate the combined margin (CM) emission factor.

Step 1: Identify the relevant electricity systems

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems.” It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used.” Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern. However, all the 5 zones have now been synchronized and called as Indian Grid.

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.

The Project Participant has chosen only grid power plants in the calculation.

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

The calculation of the operating margin emission factor ($EF_{grid,OM,y}$) is based on one of the following methods, which are described under Step 4:

- (a) Simple OM; or
- (b) Simple adjusted OM; or
- (c) Dispatch data analysis OM; or
- (d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/ must-run sources. In the context of the methodology low cost/must-run resources typically include hydro, geothermal, wind, low cost biomass, nuclear and solar generation.

The CEA database 2018 clearly shows that the percentage of total grid generation by low-cost/ must-run plants (on the basis of average of five most recent years) for the Indian grid is less than 50 % of the total generation. Thus the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (t CO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

- (a) **Ex ante option:** if the ex ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

OR

- (b) **Ex post option:** if the ex post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

PP has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the CDM-PDD to the DOE for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

Step 4: Calculate the operating margin emission factor ($EF_{grid,OMSimple,y}$) according to the selected method

The operating margin emission factor has been calculated using a 3 year data vintage:

Net Generation in Operating Margin (MWh) (incl. imports)		
2014-15	2015-16	2016-17
808,417,293	871,753,243	916,277,834

Simple Operating Margin Emission Factors (tCO ₂ /MWh) (incl. Imports)		
2014-15	2015-16	2016-17
0.99	0.97	0.96

Weighted Generation Operating Margin (t CO₂/MWh)	0.9726
--	--------

Step 5: Calculate the build margin (BM) emission factor ($EF_{grid,BM,y}$)

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 06.0, EB 97, Annex 7) para 73:

In terms of vintage of data, project participants can choose between one of the following two options:

*(a) **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 (here it's the VCS-PD submitted for listing). For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.*

*(b) **Option 2** - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.*

Option 1 as described above is chosen by PP to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of VCS-PD and is fixed for the entire crediting period.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
	2016-17
Indian Grid	0.8723

Step 6: Calculate the combined margin (CM) emission factor ($EF_{grid,CM,y}$)

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 06.0, EB 97, Annex 7) para 82 :

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

- (a) Weighted average CM; or
- (b) Simplified CM.

PP has chosen option (a) i.e., weighted average CM to calculate the combined margin emission factor for the project activity.

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:

$EF_{grid,BM,y}$	=	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EF_{grid,OM,y}$	=	Operating margin CO ₂ emission factor in year y (tCO ₂ /MWh)
w_{OM}	=	Weighting of operating margin emissions factor (per cent)
w_{BM}	=	Weighting of build margin emissions factor (per cent)

The following default values should be used for w_{OM} and w_{BM} :

Wind and solar power generation project activities: w_{OM} = 0.75 and w_{BM} = 0.25 (owing to their intermittent and non-dispatchable nature) for the first crediting period and for subsequent crediting periods

$$\begin{aligned} \text{Therefore, } EF_{grid,CM,y} &= 0.9726*0.75 + 0.8723*0.25 \\ &= \mathbf{0.94751} \text{ t CO}_2\text{e/MWh} \end{aligned}$$

Baseline emission factor (EF_y) :

The baseline emission factor is calculated using the combined margin approach as described in Step 6 above:

$$\text{Therefore, } EF_y = EF_{grid,CM,y} = 0.94751 \text{ t CO}_2\text{e/MWh.}$$

3.2 Project Emissions

Project Emissions

For most renewable power generation projects activities $PE_y = 0$.

As per applied methodology only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a solar power project, there is no such emission source associated.

Hence, $PE_y = 0$

3.3 Leakage

Leakage Emissions:

As per ACM0002 no Leakage emissions are considered. The main emission potentially giving rise to leakage in the context of electrical sector projects is emission arising due to activities arising such as power plant construction and upstream emission from fossil fuel use (e.g. extraction, processing, and transport). These emission sources are neglected.

Hence, $LE_y = 0$

3.4 Estimated Net GHG Emission Reductions and Removals

As per methodology ACM0002 (version 19) net GHG emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

ER_y = Emission reductions in year y (tCO₂e/yr)

BE_y = Baseline emissions in year y (tCO₂e/yr)

PE_y = Project emissions in year y (tCO₂e/yr)

Ex-ante calculation (estimated) of net GHG emission reductions:

Ex-ante emission reduction calculations with de-ration of 0.5% in generation are calculated based on current project activity instances to be included in the project activity under consideration. Summary of ex-ante emission reduction calculations is as follows:

Year	Estimated baseline emissions or removals (tCO ₂ e)	Estimated project emissions or removals (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated net GHG emission reductions or removals (tCO ₂ e)
Year 1	1,49,403	0	0	1,49,403
Year 2	1,48,656	0	0	1,48,656
Year 3	1,47,913	0	0	1,47,913
Year 4	1,47,174	0	0	1,47,174
Year 5	1,46,438	0	0	1,46,438
Year 6	1,45,705	0	0	1,45,705
Year 7	1,44,977	0	0	1,44,977
Year 8	1,44,252	0	0	1,44,252
Year 9	1,43,531	0	0	1,43,531
Year 10	1,42,813	0	0	1,42,813
Total	14,60,862	0	0	14,60,862

4 MONITORING

4.1 Data and Parameters Available at Validation

Data / Parameter	$EF_{grid, CM, y}$
Data unit	t CO ₂ /MWh
Description	Combined margin emission factor for Indian grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system"
Source of data	CO ₂ baseline database (Version 13.0) published by CEA on June 2018
Value applied:	0.94751
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated using OM and BM values as per Version 7.0 of methodological tool to calculate the emission factor for an electricity system and using data base of CEA.
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid, OM, y}$
Data unit	t CO ₂ /MWh
Description	Simple operating margin emission factor for Indian grid
Source of data	CO ₂ baseline database (Version 13.0) published by CEA on June 2018
Value applied:	0.9726
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated by taking weighted average of Simple Operating Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system", version 07.0.0
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

Data / Parameter	$EF_{grid, BM, y}$
Data unit	t CO ₂ /MWh
Description	Simple build margin emission factor for Indian grid
Source of data	CO ₂ baseline database (Version 13.0) published by CEA June 2018
Value applied:	0.8723
Justification of choice of data or description of measurement methods and procedures applied	This value is calculated by taking weighted average of Simple build Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system", version 07.0.0
Purpose of Data	For the calculation of Emission Factor of the grid
Comments	This parameter is fixed ex-ante for the entire crediting period.

4.2 Data and Parameters Monitored

Data / Parameter	$EG_{P,J,y}$
Data unit	MWh
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y
Source of data	Joint Meter Reading note given by Rajasthan DISCOM
Description of measurement methods and procedures 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 & Electronic Calibration frequency: Once in 5 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>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 Rajasthan Discom as per below equation:</p> $EG_{P,J,y} = EG_{Export} - EG_{Import}$ <p>The calculation is done by DISCOM and the Project Developer has no control over the authority for the calculation. Based on the joint meter reading certificates/credit notes, the project shall raise the invoice.</p> <p>The electricity exported to the grid by the project activity connected to the sub-station is measured by energy meters of accuracy class 0.2s. The electricity exported will be measured continuously using Main & Check meters.</p> <p>Export readings of Main, Check meters shall be taken on monthly basis by authorized officer of Rajasthan DISCOM in the presence of Project Developer or representative.</p> <p>Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid.</p>
Frequency of monitoring/recording	Monthly
Value applied:	1,54,179 (average projected value has been considered)
Monitoring equipment	<p>The two parameters, import and export to the grid, are measured at the same location near the connection to the grid, through standard electricity metering instrument.</p> <p>The metering instruments will be installed at the grid-connected point to measure the amount of electricity going from and to the grid. The readings of electricity will be continuously measured by metering instrument itself and monthly recorded.</p>
QA/QC procedures applied	This data will be directly used for calculation of emission reductions. Measurement results of electricity supplied to the grid

	and that delivered from the grid to the project will be crosschecked with records for sold electricity. The meter(s) will be calibrated annually in accordance with national standards and procedures.
Purpose of data	The Data/Parameter is required to calculate the baseline emission.
Calculation method	N/A
Comments	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

4.3 Monitoring Plan

Aim of monitoring:

The monitoring methodology specified in the methodology requires that the project-monitoring plan to consist of monitoring of quantity of net electricity supplied to the grid in the year y . In order to monitor the mitigation of GHG due to the project activity, the total energy exported needs to be measured. The net energy supplied to grid by the project activity multiplied by emission factor for regional grid, would form the baseline for the project activity.

Since the baseline emission factor is based on an ex-ante determination, monitoring of this parameter is not required. The sole parameter for monitoring is the net electricity exported to the grid.

Monitoring roles and responsibilities

The proposed operational and management structure implemented for data monitoring is as follows:

The monitoring plan is developed in accordance with the modalities and procedures for project activity and is proposed for grid-connected solar power project being implemented in Rajasthan, India. The monitoring plan, which will be implemented by the project proponent 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 rests with the project proponent. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipments for this project activity. The team comprises of the following members:

Responsibilities of O & M Head: Overall functioning and maintenance of the project activity and overall responsibility of compliance with the Monitoring Plan.

Responsibilities of Plant In-charge: Responsibility for Maintains the data records, ensures completeness of data, and reliability of data. Regularly verifying the monthly energy generation date with energy sales receipt or installed meters reading for identification of any discrepancies in data collection and taking suitable action to rectify them.

Responsibilities of Shift In-charge:

- Responsibility for day to day data collection and maintains day to day log book for monitored data.
- Responsibility for monthly and annual report generation and quality assurance of the data/reports and preliminary check of data for any discrepancies.

QA/QC procedures: The energy meters at the feeders are maintained and owned by Rajasthan DISCOM. Neither the project proponent nor the site personnel have any control over it. The records will be cross-checked with the records of sold electricity to the Rajasthan DISCOM. The meters are calibrated by DISCOM at-least once in five years.

Data Measurement: The export and import energy will be measured continuously using above mentioned Main & Check meters. Export & Import readings of Main & Check meters shall be taken on monthly basis by authorized officer of Rajasthan DISCOM in the presence of Project Developer or their representative. The meter reading will be taken jointly and signed by the representatives of the Rajasthan DISCOM and project investors. Based on the readings, invoices will be raised by project investors. These invoices can be used for cross checking the meter readings taken for the project activity. It is to be noted though developer or their representative is available during meter reading, the calculations of net electricity supplied to grid is completely under purview of Rajasthan DISCOM officer and developer do not have any control on it. Also accuracy class of meters and calibration frequency is under purview of Rajasthan DISCOM officer and developer does not have any control on it. Project developer gets the monthly credit report from where net electricity supplied to grid is obtained and used for emission reduction calculations.

Data Archiving:

Monthly data shall be archived electronically and in paper form and stored for the entire crediting period and two years thereafter.

Emergency preparedness:

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized.

In the event that the main meter, which is used to record the net electricity exported by the project, is found to be faulty it will be repaired or replaced and the data from the check meter will be used in its place. In the unlikely event that the check meter fails it will also be repaired or replaced.

Training and maintenance requirements:

Training on the machine is an essential pre-requisite, to ensure necessary safety of man and machine. Further, in order to maximize the output from the solar plants, it is extremely essential, that the engineers and technicians understand the machines and keep them in good health. In order to ensure, that O&M team is deft at handling technical snags on top of the turbine, the necessity of ensuring that they are capable of climbing the tower with absolute ease and comfort has been established. Each and every site personnel is provided with proper training to meet the requirements of the Operations and maintenance. This ultimately leads to creativity in problem solving.

Personnel training:

In order to ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the project staff will be trained as per project requirements.

Apportioning:

In case of mismatch of date between the start date of the billing cycle and the start date of monitoring period the data will be apportioned in line to the daily generation values for the said mismatch period.

5 SAFEGUARDS

5.1 No Net Harm

There were no harm identified from the project and hence no mitigations measures are applicable.

5.2 Environmental Impact

According to Indian regulation, the implementation of the renewable energy power project does not require an Environmental Impact Assessment (EIA). As all the project activity instances involved in the grouped project activity involves installation of the renewable energy power project and as the Indian

regulation on the Environmental Impact Assessment is the same for all the renewable energy Power Projects, it is decided to analyze the environmental impacts at the grouped project activity Level.

As per the Ministry of Environment and Forests (Government of India) notification dated September 14, 2006 regarding the requirement of environmental Impact Assessment (EIA) studies as per the Environmental Protection Rule, 1986 (Published in the Gazette of India, Extraordinary, Part-II, and Section 3, Sub-section (ii) Ministry of Environment and Forests), any project developer in India needs to file an application to the Ministry of Environment and Forests (including a public hearing and an EIA) in case the proposed industry or project is listed in a predefined list. The renewable energy power Projects are not included in this list and thus an EIA is not required. Hence, environmental impact analysis is not required for the grouped project activity and also for the project activity instances.

5.3 Local Stakeholder Consultation

The PP has proposed to conduct a Stakeholders Consultation in the month of December 2018 (a tentative proposed date is 14th-15th Dec). The local stakeholder's consultation will be conducted as per the standard guidelines and requirements followed under CDM & VCS mechanism. The invitations will be sent to the relevant stakeholder of the regions in the vicinity along with public display of invitation letters for the stakeholder consultation so that maximum number of local stakeholder can be accounted.

Identified local stakeholders at the project site:

- Local villagers,
- Panchayat members,
- Shopkeepers, suppliers, vendors and representatives of project developer.
- Employees.

The stakeholders will be made aware about the project activity and shall discuss about the various benefits arising out of the project activity. A feedback round will be held in which the views of the local stakeholders will be addressed.

Summary of comments received will be documented & provided in the VCS PD under the next version. Report on consideration of comments received will be documented & provided in the VCS PD.

5.4 Public Comments

The project will be listed on VCS registry and the further details & comment will be documented. (The current version of the VCS PD shall be submitted at VCS registry interface for Public Comments).

6 ACHIEVED GHG EMISSION REDUCTIONS AND REMOVALS

6.1 Data and Parameters Monitored

Data / Parameter	EG _{facility,y}
Data unit	MWh/year
Description	Quantity of net electricity supplied (MWh) to the grid as a result of the implementation of the project activity instances in this monitoring period (i.e. 01 Sep 2018 - 31 Oct 2018).
Value applied:	45,404
Comments	Quantity of net electricity supplied (MWh) to the grid is the difference of export and import

6.2 Baseline Emissions

As per description earlier under this document:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

EF_{grid,CM,y} : Combined margin CO₂ 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" (tCO₂/MWh) (i.e., 0.9475 tCO₂/MWh).

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

BE_y : Baseline emissions in year y (tCO₂e/yr)

Here,

Monitoring Period:	Total Net Power Generated (MWh)	Baseline Emission Factor (tCO ₂ e/MWh)	Total Emission Reduction (tCO ₂ e/ year)
01 Sep 2018 to 31 Oct 2018	45,404	0.9475	43,020

6.3 Project Emissions

Nil.

6.4 Leakage

Nil.

6.5 Net GHG Emission Reductions and Removals

As per the applied methodology, emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where,

ER_y = Emission Reduction in $tCO_2/year$

BE_y = Baseline emission in $tCO_2/year$

PE_y = Project emissions in $tCO_2/year$

LE_y = Leakage Emissions in $tCO_2/year$.

Year	Baseline emissions or removals (tCO_2e)	Project emissions or removals (tCO_2e)	Leakage emissions (tCO_2e)	Net GHG emission reductions or removals (tCO_2e)
2018	43,020	0	0	43,020
Total	43,020	0	0	43,020