

**Gold Standard for the Global Goals**  
**Key Project Information & Project Design Document (PDD)**



**Version 1.1 – August 2017**

## KEY PROJECT INFORMATION

Title of Project:	50 MW Kurnool Solar PV Power Project by M/s Prayatna Developers Pvt. Ltd. at Gani, Kurnool, AP.
Brief description of Project:	The project activity is a 50 MW solar power project, promoted by Prayatna Developers Pvt. Ltd. The purpose of the project activity is to generate clean electricity with utilization of solar energy.
Expected Implementation Date:	NA
Expected duration of Project:	25 years
Project Developer:	Prayatna Developers Pvt. Ltd.
Project Representative:	Infinite Solutions
Project Participants and any communities involved:	Prayatna Developers Pvt. Ltd.
Version of PDD:	03
Date of Version:	28/03/2019
Host Country / Location:	India
Certification Pathway (Project Certification/Impact Statements & Products)	Impact statements & products
Activity Requirements applied: (mark GS4GG if none relevant)	GS4GG
Methodologies applied:	ACM0002: Grid-connected electricity generation from renewable sources - Version 19.0
Product Requirements applied:	GS CER
Regular/Retroactive:	Retroactive
SDG Impacts:	1 - SDG 7 Affordable and Clean Energy 2 - SDG 8 Decent Work and Economic Growth 3 - SDG 13 Climate Action
Estimated amount of SDG Impact Certified	1. SDG 7: 96,798 MWh 2. SDG 8: Number (employees): 20 Number(Trainings): minimum 1 training The income to all the unskilled workers are made on day to day basis with the minimum being Rs. 350 per day. 3. SDG 13: 91,716 tCO2e per annum

## SECTION A. Description of project

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

The main purpose of the project activity is to generate electrical energy through sustainable means using solar power resources, the generated green electricity will contribute to climate change mitigation efforts. This project activity is a large scale solar project. is the project investor for this project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 91,716 tCO<sub>2e</sub> per annum, thereon displacing 96,798 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 plant.

The project activity is the installation of a new grid-connected renewable power plant/unit and this is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs. The land for the project activity is leased and a deed is signed between Andhra Pradesh Solar Power Corporation Pvt. Ltd. and Prayatna Developers Pvt. Ltd., dated 20/06/2016, for a period of 25 years.

The details of the project are mentioned in the table:

<b>Project Investors' Name</b>	<b>Prayatna Developers Pvt. Ltd.</b>
<b>Capacity in MW</b>	50
<b>Commissioning Date (20 MW)</b>	28/07/2017
<b>Commissioning Date (30 MW)</b>	17/07/2017
<b>PPA</b>	21/03/2016
<b>State</b>	Andhra Pradesh
<b>Grid</b>	NTPC Ltd.
<b>Types of Solar PV Modules</b>	Poly-crystalline

### Scenario existing prior to the implementation of the project activity

As the project activity is the installation of a new grid-connected renewable power plant/unit. The scenario existing prior to the implementation of project activity 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" (Version 07).

### Baseline Scenario

Baseline scenario and Scenario existing prior to the implementation of the project activity are both same.

### Sustainable Development

The National CDM Authority (NCDMA), which is the Designated National Authority (DNA) for the Government of India (GOI) under the Ministry of Environment, Forest and Climate Change (MoEFCC), has mentioned four indicators for the sustainable development in the interim approval guidelines for Clean Development Mechanism (CDM) projects from India .Thus the project's contribution towards sustainable development has been addressed based on the following sustainable development aspects:

- *Social well being*  
The project activity will provide job opportunity to local people during erection, commissioning and maintenance of the Solar power project. Frequency of visiting to villages and nearby areas by skilled, technical and industrialist has increased due to installation /site visit/operation and maintenance work related to solar panels at plant site. This directly and indirectly positively effects the economy of nearby populace.
- *Environmental well being*

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Solar power is one of the cleanest renewable energy powers and does not involve any fossil fuel. There are no GHG emissions. The impact on land, water, air and soil is negligible. Thus the project activity contributes to environmental well-being without causing any negative impact on the surrounding environment.

- *Economic well being*  
The project activity generates permanent and temporary employment opportunity within the vicinity of the project. The electricity supply in the nearby area improves which directly and indirectly improves the economy and life style of the area.
- *Technological well being*  
The project activity is step forward in harnessing the untapped solar potential and further diffusion of the Solar technology in the region. The project activity leads to the promotion and demonstrates the success of solar projects in the region which further motivate more investors to invest in Solar power projects. Hence, the project activity leads to technological well-being.

## A.2. Eligibility of the project under Gold Standard

The project activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

- The project applies methodology ACM0002, which is an approved methodology under Gold Standard.
- The project type is solar which is an eligible project type as it is in accordance with 1.1.1 a) and 1.1.1 b) of the Eligible Project Types & Scope under Renewable Energy Activity Requirements.
- The project activity results in displacement of electricity from thermal power stations while contributing to sustainable development of India. Hence, the project contributes to the Gold Standard Vision and Mission.
- Solar projects are an approved project type and do not require further approval from Gold Standard.
- This project activity is not associated with geo-engineering or energy generated from fossil fuel or nuclear, fossil fuel switch, nor does it enhances or prolongs such energy generation.

## General Eligibility Criteria under Renewable Energy Activity Requirements

*Project Type* : As discussed above, the project type is eligible.

*Project Location* : The project is located in India.

*Project scale* : The project activity is a 50 MW solar project and thus qualifies under large scale projects.

## A.3. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

The project participant has received certificate of incorporation from Ministry of Corporate Affairs (GOI) dated 23/06/2015; also the Power Purchase Agreement between Prayatna Developers Pvt. Ltd. and NTPC Ltd. dated 21/03/2016 demonstrate the PP as the legal owner. The contract dated 13/10/2016 for the supply of photovoltaic Modules between Prayatna Developers Pvt. Ltd. and Mundra solar PV limited also proves the legal ownership. Thus the project participant Prayatna Developers Pvt. Ltd. is the legal owner of the project and has the legal rights for the credits that shall be generated by this project activity.

## A.4. Location of project

### A.4.1. Host Country

India

### A.4.2. Region/State/Province etc.

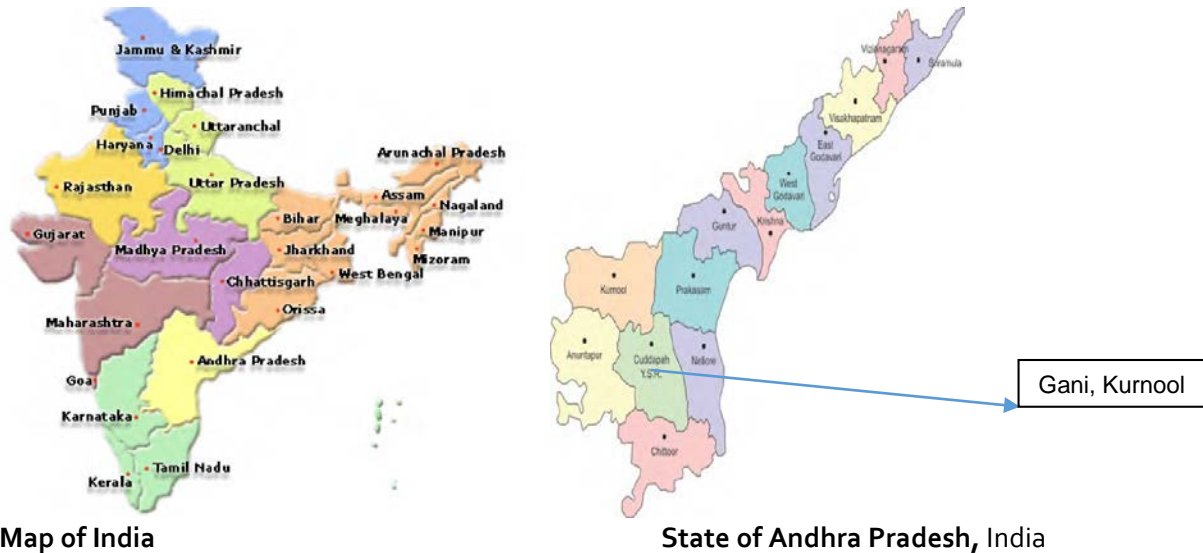
Andhra Pradesh

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## A.4.3. City/Town/Community etc.

Village : Gani-Sakunala  
District : Kurnool

## A.4.4. Physical/Geographical location



Map of India

State of Andhra Pradesh, India

The Project is located at Gani-Sakunala village of Kurnool district, in the Indian state of Andhra Pradesh. The site is well connected by state highway state highway (SH) NH-18 to Kurnool. The nearest commercial city remains Kurnool, which is approximately 42 km from the Project site location. Nearest major airport to the site remains Hyderabad, 253 km away; while the nearest railway station is at Kurnool, 42km away from the site. The project coordinates are 15°39'27.64"N, 78°16'10.58"E.

## A.5. Technologies and/or measures

The project activity aims to harness Solar energy through installation of 320Wp of Lion series Solar PV modules with total installed capacity of 50 MW. The facility aims at annually producing 1000MWp of silicon ingots / wafers, silicon solar cells and modules. In addition to PV modules, the Group also aims at developing manufacturing facility to produce EVA, back sheet, glass and junction box. The solar PV power plant will have solar PV modules, inverters, transformers and other protection system and supporting components.

The solar PV modules have a useful life of 25 years.

For monitoring equipment, their location and technical specifications, refer Section B.7.3. For Plant Load Factor (PLF), please refer Section B.6.3.

### Baseline Scenario

As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied methodology: "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.

### Purpose of the Project

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The purpose of the project activity is to generate electrical power using solar energy through operation of Solar Panels, thereby displacing non-renewable fossil resources resulting in sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations. Thus the renewable energy generation from Prayatna Developers Pvt. Ltd. Project will result in reduction of the greenhouse gas emissions.

The total installed capacity of the project activity is 50 MW. The annual GHG emission reduction through this project activity is 91,716 tCO<sub>2e</sub>.

Positive contribution of the project to the following Sustainable Development Goals:

1. **SDG13: Climate Action** : The project would lead to average reduction of approx. 91,716 tCO<sub>2</sub> per annum due to implementation of project activity.
2. **SDG 7: Affordable and Clean Energy** : The project is expected to generate average of 96,798 MWh of clean energy per annum
3. **SDG 8: Decent Work and Economic Growth** : The project provides employment to around 20 persons. The project leads to Trainings & workshops which are conducted for the staff of the project.

## A.6. Scale of the project

The renewable energy project activities with a maximum output capacity of 15 megawatts (or an appropriate equivalent) is small scale project activity and the Project activity with more than 15 MW is considered a large-scale CDM project activity.

As the project activity is 50 MW hence clearly it is Large Scale project.

## A.7. Funding sources of project

Private funding and funding from bank. The PP hereby confirms that there is no public funding from Annex 1 countries and no diversion of Official Development Assistance (ODA) involved in the project activity.

## A.8. Assessment that project complies with 'gender sensitive' requirements

**Question 1:** Does the project reflect the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy? Explain how.

**Response:** As per Gold Standard Gender Policy, para 13(i) "*Foundational gender-sensitive requirement - This strengthens Gold Standard's 'do no harm' approach and addresses safeguards to prevent or mitigate adverse impacts on women or men and girls and boys. Such action is mandatory for all projects seeking Gold Standard certification and includes compliance with the gender 'do no harm' safeguards, gender gap analysis and gender sensitive stakeholder consultations.*" The project being a renewable energy project is not gender sensitive project. The project does not adversely impact women or men.

**Question 2:** Does the project align with existing country policies, strategies and best practices? Explain how.

**Response:** India is party to "Convention on the Elimination of All Forms of Discrimination against Women"<sup>1</sup> and the project has aligned its policies which does not discriminate on gender.

**Question 3:** Does the project address the questions raised in the Gold Standard Safeguarding Principles & Requirements document? Explain how.

**Response:** The Project shall complete the following gender assessment questions below:

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<sup>1</sup> <http://hrlibrary.umn.edu/research/ratification-india.html>

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1. *Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?* No, the Project being a solar project does not reduce access to or control of resources for women.
2. *Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?* No, the Project beneficiaries in terms of employment and social upliftment of the area are common for both the gender. Further the project has carried out various CSR<sup>2</sup> activities<sup>3</sup> in line with their CSR policy leading to welfare of community at large.
3. *Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?* No, the CSR activities carried out by the project proponent are discussed with the community consisting both the genders.
4. *Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?* Yes the project takes into account gender roles and abilities of women/men. Job profile is allocated based on the type of work to be carried out.
5. *Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from engaging in other activities?* No, on the contrary the project leads to increased availability of electricity in the regional grid thereby uplifting the living standards.
6. *Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?* No, since the project is a renewable electricity generation project, thus it will not have discriminated against women.
7. *Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?* No, in fact, the project leads to improved electricity in the regional grid thereby leading to less usage of fuel for lighting.
8. *Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?* No, in fact, due to improved electricity availability the usage of fuel for lighting would be reduced as well as indoor air quality would be improved.

**Question 4:** Does the project apply the Gold Standard Stakeholder Consultation & Engagement Procedure Requirements? Explain how.

**Response:** Since the project is applying retroactively for GS registration, a Stakeholder consultation has been carried out accordingly dated 30/09/2016 in village Gani-Sukunala of district Kurnool, Andhra Pradesh. The project representative explained how such power projects help in providing clean energy and thereby help in mitigating impacts due to Global Warming and the impacts of solar power projects which lead to providing clean energy, increase in employment opportunities both long term and short term, increased income and thereby leading to improvement in living standard of the people.

The queries from the stakeholders and replies by the project representative and the assessment team are described in section E.2. "Summary of comments received".

The stakeholders shared full support for solar power project operations.

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<sup>2</sup> [www.adanipower.com/docs/download/csrapolicy](http://www.adanipower.com/docs/download/csrapolicy)

<sup>3</sup> <https://www.adanigreenenergy.com/csr.html>

## SECTION B. Application of selected approved Gold Standard methodology

### B.1. Reference of approved methodology

- Title** : Grid-connected electricity generation from renewable sources.  
**References** : Approved Large Scale Consolidated Methodology: ACM0002 “Grid-connected electricity generation from renewable sources” (Version 19.0, EB 100 Annex 6)<sup>4</sup>

ACM0002 draws upon the following tools which have been used in the PDD:

- Methodological Tool: Tool to calculate the emission factor for an electricity system - Version 07.0
- Methodological Tool: Tool for the demonstration and assessment of additionality - Version 07.0.0, EB 70 Annex 8<sup>5</sup>

### B.2. Applicability of methodology

As per para 2 of ACM0002 (Version 19.0, EB 100, Annex 6), “*This methodology applies to project activities that include retrofitting, rehabilitation (or refurbishment), replacement or capacity addition of an existing power plant or construction and operation of a Greenfield power plant*”. The project activity meets the applicability conditions of the approved consolidated baseline and monitoring methodology ACM0002, Version 19.0, Sectoral Scope 1, EB 100 for Greenfield projects as described below:

Applicability	Project activity vis-à-vis applicability Conditions
<p>This methodology is applicable to grid-connected renewable energy power generation project activities that:</p> <p>(a) Install a Greenfield power plant;                      (a) Involve a capacity addition to (an) existing plant(s);                      (b) Involve a retrofit of (an) existing operating plants/units;                      (c) Involve a rehabilitation of (an) existing plant(s)/unit(s); or                      (d) Involve a replacement of (an) existing plant(s)/unit(s).</p>	<p>The project activity is installation of a new grid connected Solar power plant/ unit at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant) and hence this criterion is applicable.</p>
<p>The methodology is applicable under the following conditions:</p> <p>(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>	<p>The proposed project activity is an installation of a new grid connected solar power plant/ unit and hence criteria under point (a) is met.</p> <p>The project does not involve any capacity additions, retrofits or replacements and therefore this criteria under point (b) is not applicable.</p>
<p>In case of hydro power plants, one of the following conditions shall apply:</p> <p>(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</p>	<p>The proposed project activity is an installation of a new grid connected solar power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.</p>

<sup>4</sup> <https://cdm.unfccc.int/methodologies/DB/8W400U6E7LFHHYH2C4JR1RJWWO4PVN>

<sup>5</sup> <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v7.0.0.pdf>

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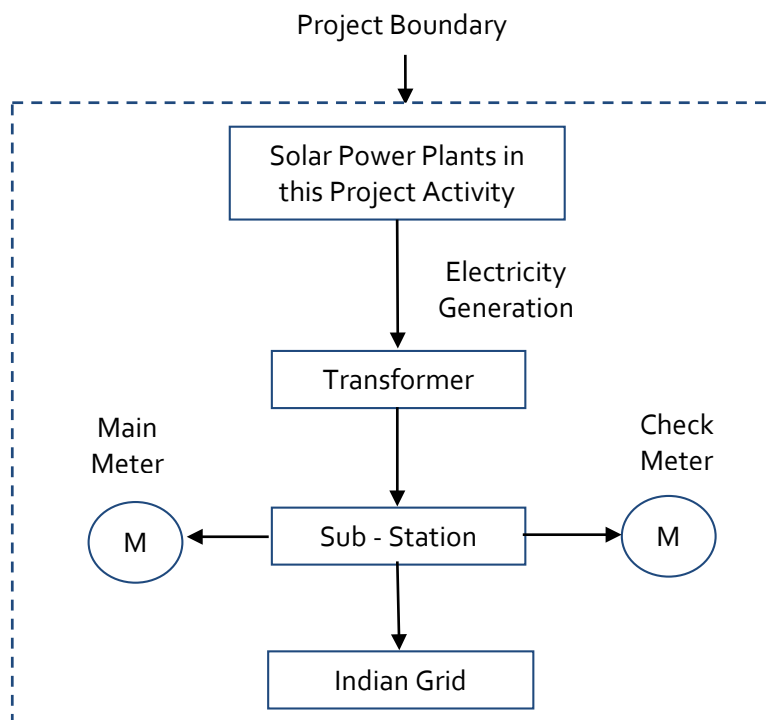
<p>power density calculated using equation (3), is greater than <math>4 \text{ W/m}^2</math> ; or</p> <p>(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (3), is greater than <math>4 \text{ W/m}^2</math> ; or</p> <p>(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (3), is lower than or equal to <math>4 \text{ W/m}^2</math> , all of the following conditions shall apply:</p> <p>(i) The power density calculated using the total installed capacity of the integrated project, as per equation (4), is greater than <math>4 \text{ W/m}^2</math> ;</p> <p>(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;</p> <p>(iii) Installed capacity of the power plant(s) with power density lower than or equal to <math>4 \text{ W/m}^2</math> shall be:</p> <p>a. Lower than or equal to 15 MW; and</p> <p>b. Less than 10 per cent of the total installed capacity of integrated hydro power project.</p>	
<p>In the case of integrated hydro power projects, project proponent shall:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• 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.</li> </ul>	<p>The proposed project activity is an installation of a new grid connected solar power plant/ unit and not Hydro power plant, therefore this criteria is not applicable for this project activity.</p>
<p>The methodology is not applicable to:</p> <p>(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;</p> <p>(b) Biomass fired power plants/units.</p>	<p>The project activity is installation of a new grid connected solar power project/ unit and does not involve switching from fossil fuel to renewable energy, therefore criterion described in point (a) is not relevant to the project activity. This is a solar power plant/ unit and not a biomass fired plant, therefore criterion described in point (b) is not applicable to the project activity.</p>
<p>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</p>	<p>The project activity is a new grid connected solar power plant/ unit and not a retrofits, replacement or capacity additions and therefore</p>

implementation of the project activity and undertaking business as usual maintenance".	this criterion is not applicable to the project activity.
<b>Applicability conditions of "Tool to calculate the emission factor for an electricity system", - Version 07.0</b>	
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).	This condition is applicable. OM, BM and CM are estimated using the tool under section B.6.3 for calculating baseline emissions.
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 IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 2: be met. Namely, the total capacity of off-grid Procedures related to off-grid power generation" should 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.	Since the project activity is grid connected, this condition is applicable and the emission factor has been calculated accordingly.
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.	The project activity is located in India, a non-Annex I country. Therefore, this criterion is not applicable for the project activity.
Under this tool, the value applied to the CO <sub>2</sub> emission factor of biofuels is zero.	The project activity is a grid connected solar power project/unit and does not involve emission from biofuels. Therefore, this criterion is not applicable.

### B.3. Project boundary

Project boundary has ascertained using para 20 of ACM0002 ( Version 19.0, EB EB 100, Annex 6) - *"The spatial extent of the project boundary includes the project power plant/unit and all power plants/units connected physically to the electricity system that the CDM project power plant is connected to."*

Hence the project boundary includes the Solar Project activity, sub-station, grid and all power plants connected to grid. The proposed project activity will evacuate power to the Indian grid.



Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Grid connected electricity generation	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 scenario	Greenfield Solar Power Project Activity	CO <sub>2</sub>	No	No CO <sub>2</sub> emissions are emitted from the project activity
		CH <sub>4</sub>	No	No, Project Activity does not emit CH <sub>4</sub>
		N <sub>2</sub> O	No	No, Project Activity does not emit N <sub>2</sub> O

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

As per the approved consolidated Methodology ACM0002 (Version 19.0, EB 100 Annex 6) 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 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 panels to harness the power generation from Solar source 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.

The combined margin (EF<sub>grid,CM,y</sub>) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) and build margin (BM), in accordance with the Tool to calculate the emission factor for an electricity system - Version 07 Calculations for this combined margin must be based on data from an official source<sup>6</sup> (where available) and made publically available. In India,

<sup>6</sup> [http://www.cea.nic.in/reports/others/thermal/tpece/cdm\\_co2/user\\_guide\\_ver13.pdf](http://www.cea.nic.in/reports/others/thermal/tpece/cdm_co2/user_guide_ver13.pdf)

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Central Electricity Authority (CEA), Government of India provides this data, and accordingly the same has been used.

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

Parameter	Value	Nomenclature	Source
EFgrid,CM,y	0.9475 tCO <sub>2</sub> /MWh	Combined margin CO <sub>2</sub> 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 <sub>2</sub> Emission Database, Version 13 published by Central Electricity Authority (CEA), Government of India in the month of June 2018.
EFgrid,OM,y	0.9726 tCO <sub>2</sub> /MWh	Operating margin CO <sub>2</sub> 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 <sub>2</sub> Emission Database, Version 13, published by Central Electricity Authority (CEA), Government of India.
EFgrid,BM,y	0.8723 tCO <sub>2</sub> /MWh	Build margin CO <sub>2</sub> emission factor for the project electricity system in year y	Baseline CO <sub>2</sub> Emission Database, Version 13, published by Central Electricity Authority (CEA), Government of India.

## B.5. Demonstration of additionality

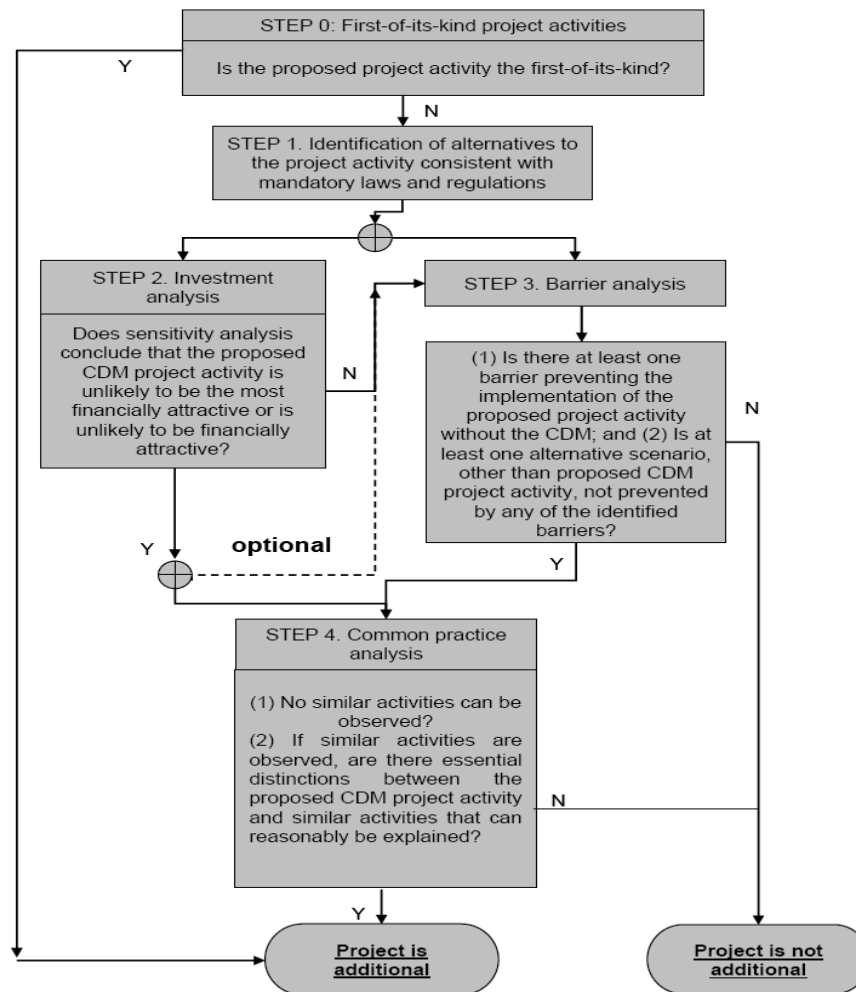
The table below is only applicable if the proposed project is deemed additional, as defined by the applied approved methodology or activity requirement or product requirement.

Specify the methodology or activity requirement or product requirement that establish deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Not Applicable
Describe how the proposed project meets the criteria for deemed additionality.	Not Applicable

The proposed CDM project generates power using solar energy which is a renewable, zero emission source of energy. Baseline considerations for the project are based on approved consolidated baseline methodology ACM0002 (Version 19.0).

Thus the project follows section 5.3.2 of the applied methodology which requires the project proponent to determine the additionality based on "Tool for the demonstration and assessment of additionality", Version 07.0.0.

The step-wise approach to establish additionality of the project activity has been followed, details of which are provided in the following paragraphs:



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

The proposed project activity is solar project; hence not the first of its kind. Hence, this step is not applicable.

## Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

As per the applied methodology ACM0002 version 19.0; Para 25, "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 per the applied methodology ACM0002 version 19.0; Para 25, 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

As per para 29 of "Tool for the demonstration and assessment of additionality" v7.0.0, it is determined that the proposed project activity is not an economically or financially feasible option.

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To conduct the investment analysis, Methodological tool: Investment analysis, version 9.0 (EB 101 annex 11) has been referred.

## **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 in line with para 32 of the Methodological tool: Investment analysis, version 9.0 (EB 9101 annex 11).

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 proponents have considered Post-Tax Equity IRR for investment analysis at the time of decision-making. As Project proponent is only interested in the returns project is generating on the portion of investment costs, which is financed by them in the form of equity.

As per Para 16 of EB101, Annex 11 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.

### ***Default Value Benchmark***

As per para 15 of EB62, Annex 5 the cost of equity is determined by selecting the values provided in the Appendix, i.e. Default values for cost of equity (expected return on equity) is presented below:  
Appendix A in EB62, Annex 5 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 11.75%

The Required return on equity (benchmark) was computed in the following manner:

$$\text{Nominal Benchmark}^7 = \{(1+\text{Real Benchmark}) \times (1+\text{Inflation rate})\} - 1$$

Where:

- Default value for Real Benchmark = 11.75% (as per Appendix of EB62, Annex 5)
- Inflation Rate forecast for by Reserve Bank of India (RBI) (i.e. Central Bank of India) for India.

### ***Benchmark estimation***

Appendix A in EB62, Annex 5 specifies default value of expected return on equity in real terms for Energy Industries (Group 1) in India = 11.75%

Inflation Forecast for India as per RBI website<sup>8</sup> and corresponding benchmark values:

Project Promoters' Name	Inflation Forecast	Benchmark
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<sup>7</sup> As per Pg. 320 of Corporate Finance, Second Edition of Aswath Damodaran

<sup>8</sup> <https://rbi.org.in/Scripts/PublicationsView.aspx?id=17759>

	5 Years	10 Years	5 Years	10 Years
Prayatna Developers Pvt. Ltd.	4.80%	4.70%	17.11%	17.00%

As a conservative approach, benchmark of 17.34% has been selected for this project activity.

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

Considering the input values, Equity IRR is given below:

Project Promoters' Name	Equity IRR without CDM	Benchmark (Equity IRR)
Prayatna Developers Pvt. Ltd.	8.98%	17.00%

The project activity cannot be considered as financially attractive as the equity IRR for the project activity is less than the Benchmark.

### Sub-step 2d: Sensitivity Analysis

Addressing Guidance 20 & 21 of EB62, Annex 5, following factors has been subjected to sensitivity analysis:

1. PLF
2. O&M Cost
3. Project Cost
4. 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."

The results of sensitivity analysis are as follows:

Variation %	-10%	Normal	10%	Breaching Value
PLF	6.54%	8.98%	11.54%	27.26%
O&M	9.31%	8.98%	8.65%	-258.19%
Project Cost	11.80%	8.98%	6.79%	-21.46%
Tariff Rate	6.54%	8.98%	11.54%	27.26%

The results of sensitivity analysis show that even with a variation of +10% & -10% in project cost, O&M cost, PLF and Tariff Rate, Equity IRR is significantly lower than the benchmark. And it is evident from the results given above; the project remains additional even under the most favourable conditions.

	Probability to breach the benchmark
PLF	PLF considered in financials is as per "Guidelines for the reporting and validation of Plant load factors" stated in EB48 Annex1 <sup>16</sup> .  Variation in PLF of more than 10% is unlikely to happen as the PLF has been reported as per the Third Party Report based.
O&M	The sensitivity analysis reveals that O&M will breach the benchmark at negative values and is hypothetical case. Since the O&M cost is subject to escalation and also subject to inflationary pressure, any reduction in the O&M costs is highly unlikely. Hence, the reduction in the O&M cost is highly unlikely.
Project Cost	Estimated Project Cost for financial analysis is considered as available at the time of decision making. However, even if we consider the actual cost of the project even then the benchmark is not breached. Moreover the Sensitivity is carried out for +/-10%.
Tariff Rate	The tariff is determined by PPA which is fixed for the entire project life of 25 years. Hence, there is no probability to get variation for the same.

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## Outcome of Step 2:

This substantiates that the investment is not financially attractive (Equity IRR for the project activity is less than the Benchmark Equity IRR). 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%	97.50	MWp
Capacity of the proposed project activity	65	MWp
-50%	32.50	MWp

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<sup>9</sup> (CDM and non-CDM) is carried out as per sub-steps of Step (2) as follows:

- As the project is located in Andhra Pradesh, state of India, therefore, the applicable geographical area is Andhra Pradesh 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, all projects applying same measure (b) as the proposed project activity 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 32.50 MWp to 97.50 MWp.
- The start date of the project activity is 13/10/2016. As Kyoto Protocol was ratified by India on 26/08/2002<sup>10</sup>, therefore projects which had started commercial operation between 26/08/2002 to 13/10/2016, have been identified

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As per Indian Solar Power Directory 2017

<sup>10</sup> [http://unfccc.int/kyoto\\_protocol/status\\_of\\_ratification/items/2613.php](http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php)

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

$$N_{\text{solar}} = 2$$

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  $N_{\text{all}}$ .

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  $N_{\text{diff}}$ .

As per the tool on Common Practice, the project activities have been separated from the different technologies on the basis two criteria:

1. Size of Installation
2. Investment climate on the date of the investment decision

Hence, projects where either of the conditions is satisfied those projects are counted for calculating  $N_{\text{diff}}$  projects.

Thus:

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

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

Outcome of Step 5:

As,

- i.  $F = 0$ ; is less than 0.2, and
- ii.  $N_{\text{all}} - N_{\text{diff}} = 0$ ; is less than 3, thus:

The proposed project activity is not a "common practice" within a sector in the applicable geographical area.

## Demonstration of Parallel and continuing actions

Moreover, CDM Project Standard Version 09.0, Section 6.5 states that "For a proposed CDM project activity with a start date on or after 02/08/2008, project participants shall inform the host Party's designated national authority (DNA) and the secretariat of their intention to seek CDM status in accordance with the Project cycle procedure".

In line with the above guidance, all the project investors have intimated the UNFCCC and host party DNA i.e. National CDM Authority (NCDMA) of its intention to seek CDM for the proposed project activity in a defined F-CDM form within 180 days (refer table below). Hence, it can be clearly established that CDM was also seriously considered in the decision to proceed with the proposed project activity.

Project Participants' Name	Start date	F-CDM Date
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Prayatna Developers Pvt. Ltd.	13/10/2016	06/04/2017
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## B.6. Sustainable Development Goals (SDG) outcomes

### B.6.1. Relevant target for each of the three SDGs

Item	Goals and Targets	Indicators
<b>SDG 7: Affordable and Clean Energy</b>	7.2: By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1: Renewable energy share in the total final energy consumption
	Target: 96,798 MWh per annum	
<b>SDG 8: Decent Work and Economic Growth</b>	8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	8.5.1: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities
	Target: <ul style="list-style-type: none"> <li>• Training: 1 nos annually</li> <li>• Employment of 20 staff</li> </ul>	
<b>SDG 13: Climate Action</b>	13.2: Integrate climate change measures into national policies, strategies and planning	13.2.1: Number of countries that have communicated establishment or operationalization of an integrated policy/strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)
	Target: 91,716 tCO <sub>2</sub> per annum	

### B.6.2. Explanation of methodological choices/approaches for estimating the SDG outcome

The company has a Corporate Social Responsibility Policy<sup>11</sup> in place. In sync with the overall policy, the company conducts regular surveys during construction as well as O&M phases in the villages near project locations to check the requirement of facilities by the villages. Based on the surveys, PP identifies and works on several scope(s) of developmental activities such as health camps, distribution of furniture & sports kits in schools, toilet requirements in government schools, drinking water requirements etc. For this project activity, following SDGs are expected to be impacted:

#### SDG 7 : Affordable and Clean Energy

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity

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generated by the project per annum. The project is expected to generate 96,798 MWh of clean energy per annum.

## SDG 8: Decent Work and Economic Growth

The project leads to Trainings & workshops which are conducted for the O&M staff of the project, by their respective companies. Apart from other trainings/workshops that may be organized, the following are also carried out;

- HSE Training Record
- Regular Drill Record
- Handling of Equipment Training
- Soft Skill Training

It is expected that a minimum of 1 training (either of the above) would be carried out annually.

The project will also provide employment to approximately 20 persons including O&M staff, management, outsourced jobs as well as security guards during the O&M phase.

## SDG13 : Climate Action :

The project leads to mitigation of 91,716 tCO<sub>2</sub> per annum.

As per the approved consolidated Methodology ACM0002 (Version 19.0, EB 100 Annex 6), Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y$$

Where:

ER<sub>y</sub> = Emission reductions in year y (t CO<sub>2</sub>e/yr)

BE<sub>y</sub> = Baseline emissions in year y (t CO<sub>2</sub>/yr)

PE<sub>y</sub> = Project emissions in year y (t CO<sub>2</sub>e/yr)

### Baseline Emissions:

Baseline Emissions for the amount of electricity supplied by project activity, BE<sub>y</sub> is calculated as

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

Where:

BE<sub>y</sub> = Baseline emissions in year y (t CO<sub>2</sub>/yr)

EG<sub>PJ,y</sub> = 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/yr)

EF<sub>grid,CM,y</sub> = 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)

Calculation of EG<sub>PJ,y</sub>

The calculation of EG<sub>PJ,y</sub> is different for

- a) Greenfield plants,
- b) Retrofits and replacements, and
- c) Capacity additions

The project activity is the installation of solarmills and it is a green field project. So the formula in option (a) i.e., greenfield plants is used to calculate the value of EG<sub>PJ,y</sub>. In accordance with para 46 of the applied methodology:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$  = 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/yr)

$EG_{facility,y}$  = Quantity of net electricity generation supplied by the project plant/unit to the grid in year y (MWh/yr)

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation. Emission reductions due to the project activity are considered to be equivalent to the baseline emissions, since the solar project would not lead to any project emission and leakage emissions. Emission reductions are related to the electricity exported by the project and the emission coefficient of the grid system.

Baseline emission factor is calculated as combined margin, consisting of a combination of operating margin and build margin factors according to the procedures prescribed in the latest tool for calculating the emission factor for an electricity system. The steps of calculation are as follows:

**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 been synchronized and called as Indian Grid.

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

Option I is opted for the project activity i.e. only grid connected power plants are included in the calculation.

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

According to the tool, the calculation of the operating margin emission factor is based on one of the following methods:

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

Any of the four methods can be used for calculating OM. However, the simple adjusted OM and dispatch data analysis OM cannot be currently applied in India due to lack of necessary data however, 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 Share of Low Cost / Must-Run (% of Net Generation) in the generation profile of the different grids in India in the last five years is as follows:

**Share of Must-Run (Hydro/Nuclear) (% of Net Generation)**

	2012-13	2013-14	2014-15	2015-16	2016-17
India	16.9%	18.6%	16.8%	15.1%	14.6%

Source: CO<sub>2</sub> Baseline Database for the Indian Power Sector - Central Electricity Authority (CEA)

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The above data 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 regional grid is less than 50% of the total generation. Hence the Simple OM method can be used to calculate the Operating Margin Emission factor. The average operating margin method cannot be applied, as low cost/ must run resources constitute less than 50% of total grid generation.

The project proponent has chosen an ex ante option for calculation of the OM with a 3-year generation weighted average, based on the most recent data available, without requirement to monitor and recalculate the emissions factor during the crediting period.

### 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. It may be calculated:

- Based on the net electricity generation, and a CO<sub>2</sub> emission factor of each power unit. (Option A), or
- 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 (option B)

The Central Electricity Authority, Ministry of Power, Government of India has published a database of Carbon Dioxide Emission from the power sector in India based on detailed authenticated information obtained from all operating power stations in the country. This database i.e. The CO<sub>2</sub> Baseline Database provides information about the Combined Margin Emission Factors of the Indian grid. The Combined Margin in the CEA database is calculated ex ante using the guidelines provided by the UNFCCC in the "Tool to calculate the emission factor for an electricity system". We have, therefore, used the Combined Margin data published in the CEA database, for calculating the Baseline Emission Factor.

The CEA database uses the option A i.e. data on net electricity generation and CO<sub>2</sub> emission factor for each power unit, the average efficiency of each power unit and the fuel type(s) used in each power unit, to calculate the OM of the different regional grids.

$$EF_{grid,OMsimple,y} = \frac{\sum (EG_{m,y} \times EF_{EL,m,y})}{\sum EG_{m,y}}$$

Where:

$EF_{grid,OMsimple,y}$  : Simple operating margin CO<sub>2</sub> emission factor in year y (tCO<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 (tCO<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 in step 3

In India, the Central Electricity Authority (CEA) has estimated the baseline emission factor for the power sector. This data has also been endorsed by the DNA and is the most authentic information available in the public domain.

Following tables shows the simple OM and Net generation<sup>12</sup> respectively for the recent three years:

Simple Operating Margin Emission Factors (tCO <sub>2</sub> /MWh) (incl. Imports)		
2014-15	2015-16	2016-17
0.9903	0.9655	0.9636

<sup>12</sup> CO<sub>2</sub> Baseline Database for the Indian Power Sector, Version 13, June 2018

Net Generation in Operating Margin (MWh) (incl. imports)		
2014-15	2015-16	2016-17
8,08,417	8,71,753	9,16,278

Therefore the 3 years net generation weighted OM average for Indian grid comes out to be 0.9726 tCO<sub>2</sub>/MWh

The emission factor of each power unit m has been determined as follows:

$$EF_{EL,m,y} = (\sum FC_{i,m,y} \times NCV_{i,y} \times EF_{CO_2,i,y}) / EG_{m,y}$$

Where:

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

$FC_{i,m,y}$  : Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)

$NCV_{i,y}$  : Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)

$EF_{CO_2,i,y}$  : CO<sub>2</sub> emission factor of fossil fuel type i in year y (tCO<sub>2</sub>/GJ)

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

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

i : All fossil fuel types combusted in power unit m in year y

y : The relevant year as per the data vintage chosen in step 3

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

The sample group of power units m used to calculate the build margin consists of either:

- The set of five power units that have been built most recently, or
- The set of power capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently.

Project participants should use the set of power units that comprises the larger annual generation. Accordingly, the CEA database calculates the build margin as the average emissions intensity of the 20% most recent capacity additions in the grid based on net generation. The build margin emission factor has been calculated ex-ante based on the most recent information available on units already built for sample group m at the time of PDD submission to the DOE for validation. This option does not require monitoring the emission factor during the crediting period.

The build margin emissions factor is the generation-weighted average emission factor of all power units m during the most recent year y for which power generation data is available, calculated as follows:

$$EF_{grid,BM,y} = (\sum EG_{m,y} \times EF_{EL,m,y}) / \sum EG_{m,y}$$

Where:

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

m : Power units included in the build margin

y : Most recent historical year for which power generation data is available

The CO<sub>2</sub> emission factor of each power unit m ( $EF_{EL,m,y}$ ) is determined as per the procedures given in step 4 (a) for the simple OM, using option A1 for y most recent historical year for which power generation data is available, and using for m the power units included in the build margin.

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Build margin emission factor is calculated, ex-ante as per the most recent data available<sup>12</sup>. So, build margin emission factor for Indian grid for 2016-2017 is 0.8723 tCO<sub>2</sub>/MWh

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

The emission factor  $EF_y$  of the grid is represented as a combination of the Operating Margin (OM) and the Build Margin (BM). Considering the emission factors for these two margins as  $EF_{OM,y}$  and  $EF_{BM,y}$  then the  $EF_y$  is given by:

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

Where:

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

According to "Tool to calculate the emission factor for an electricity system" the weights for OM and BM are 0.75 and 0.25 respectively.

Using the values for operating and build margin emission factor provided in the CEA database and their respective weights for calculation of combined margin emission factor, the baseline carbon emission factor (CM) is 0.9475 tCO<sub>2e</sub>/MWh.

## Project Emission

As per the ACM0002 ver-19.0, Project Emission for most renewable energy power generation project activities,  $PE_y = 0$ . However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF,y} + PE_{GP,y} + PE_{HP,y}$$

Where:

- $PE_y$  = Project emissions in year y (tCO<sub>2e</sub>/yr)
- $PE_{FF,y}$  = Project emissions from fossil fuel consumption in year y (tCO<sub>2</sub>/yr)
- $PE_{GP,y}$  = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (tCO<sub>2e</sub>/yr)
- $PE_{HP,y}$  = Project emissions from water reservoirs of hydro power plants in year y (tCO<sub>2e</sub>/yr).

The project activity involves the generation of electricity from the installation of solar turbines. Hence, as per ACM0002, Version 19.0, there is no project emission for solarmill projects. Therefore, project emissions are zero.

## Leakage Emissions

No leakage emissions are considered in the project activity. The main emissions potentially giving rise to leakage in the context of electric sector projects are emissions arising due to activities such as power plant construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). Since the emissions sources are small, it is neglected.

### **B.6.3. Data and parameters fixed ex ante for monitoring contribution to each of the three SDGs**

<b>Relevant SDG Indicator</b>	<b>SDG13 : Climate Action</b>
<b>Data/parameter</b>	$EF_{OM,y}$
<b>Unit</b>	tCO <sub>2e</sub> /MWh

<b>Description</b>	Operating Margin Emission Factor of Indian Grid
<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018 <sup>12</sup>
<b>Value(s) applied</b>	0.9726
<b>Choice of data or Measurement methods and procedures</b>	Calculated as per "Tool to calculate the emission factor for an electricity system," as 3-year generation weighted average using data for the years 2014-2015, 2015-2016 & 2016-17. The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of data</b>	The data is used to calculate baseline emission reductions.
<b>Additional comment</b>	This parameter is fixed ex-ante for the entire crediting period.

<b>Relevant SDG Indicator</b>	<b>SDG13 : Climate Action</b>
<b>Data/parameter</b>	EF <sub>BM,y</sub>
<b>Unit</b>	tCO <sub>2e</sub> /MWh
<b>Description</b>	Build Margin Emission Factor of Indian Grid
<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018 <sup>12</sup>
<b>Value(s) applied</b>	0.8723
<b>Choice of data or Measurement methods and procedures</b>	Calculated as per "Tool to calculate the emission factor for an electricity system,". The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of data</b>	The data is used to calculate baseline emission reductions.
<b>Additional comment</b>	This parameter is fixed ex-ante for the entire crediting period.

<b>Relevant SDG Indicator</b>	<b>SDG13 : Climate Action</b>
<b>Data/parameter</b>	EF <sub>CM,y</sub>
<b>Unit</b>	tCO <sub>2e</sub> /MWh
<b>Description</b>	Combined Margin Emission Factor of Indian Grid
<b>Source of data</b>	Calculated from CEA database, Version 13, June 2018 <sup>12</sup>
<b>Value(s) applied</b>	0.9475
<b>Choice of data or Measurement methods and procedures</b>	Calculated as per "Tool to calculate the emission factor for an electricity system,". The data is obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Purpose of data</b>	The data is used to calculate baseline emission reductions.
<b>Additional comment</b>	-

#### B.6.4. Ex ante estimation of outcomes linked to each of the three SDGs

*SDG 7: Affordable and Clean Energy* - Project expected to generate 96,798 MWh clean energy every year

*SDG 8: Decent Work and Economic Growth* - Minimum 1 training to be carried out for O&M staff annually.

The project will also provide employment to approximately 20 persons.

*SDG13 : Climate Action* - The project leads to mitigation of 91,716 tCO<sub>2</sub> per annum.

#### Calculation of Outcome for SDG13 : Climate Action

##### Baseline emissions

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The baseline emissions are the product of electrical energy baseline  $EG_{PJ,y}$  expressed in MWh of electricity produced by the renewable generating unit multiplied by an emission factor.

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

Where,

$EG_{PJ,y}$  = Total quantity of net electricity delivered to the Indian grid.

$EF_{grid,CM,y}$  = Combined margin CO<sub>2</sub> emission factor for grid connected power generation in year y  
= 0.9475 t CO<sub>2</sub>/MWh.

Project Participant	Capacity	PLF (%)	Generated Power (MWh/year)	Baseline Emission Factor (tCO <sub>2</sub> /MWh)	Baseline emissions (tCO <sub>2</sub> / year)
Prayatna Developers Pvt. Ltd.	50 MW	22.10%	96,798	0.9475	91,716

$$BE_y = 96,798 * 0.9475 \text{ t CO}_2/\text{year} = 91,716 \text{ tCO}_2/\text{year}$$

## Project emissions

$$PE_y = 0$$

## Leakage

No leakage emissions are applicable.

## Emission reductions

$$ER_y = BE_y - PE_y = 91,716 - 0 = 91,716 \text{ tCO}_2/\text{year}$$

### B.6.5. Summary of ex ante estimates of each SDG outcome

#### SDG 7: Affordable and Clean Energy

Year	Baseline estimate (MWh)	Project estimate (MWh)	Net benefit (MWh)
Year 1	0 MWh	96,798	96,798
Year 2	0 MWh	96,798	96,798
Year 3	0 MWh	96,798	96,798
Year 4	0 MWh	96,798	96,798
Year 5	0 MWh	96,798	96,798
<b>Total</b>	0 MWh	483,990	483,990
<b>Total number of crediting years</b>	<b>5 Years</b>		
<b>Annual average over the crediting period</b>	0 MWh	96,798	96,798

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation hence in baseline, the affordable and Clean Energy generated was 0. Since the project is solar energy therefore the Affordable and Clean Energy produced by the project is 96,798 MWh per year.

## SDG 8: Decent Work and Economic Growth

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Year 2	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Year 3	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Year 4	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Year 5	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
<b>Total</b>	0 Training, 0 Jobs	5 Trainings, 20 Jobs	5 Trainings, 20 Jobs
<b>Total number of crediting years</b>	<b>5 Years</b>		
<b>Annual average over the crediting period</b>	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs

There was no training in the baseline however the training and jobs generated by the project activity is 1 and 20 jobs.

## SDG13 : Climate Action

Year	Baseline estimate tCO <sub>2</sub>	Project estimate tCO <sub>2</sub>	Net benefit tCO <sub>2</sub>
Year 1	91,716	0 tCO <sub>2</sub>	91,716
Year 2	91,716	0 tCO <sub>2</sub>	91,716
Year 3	91,716	0 tCO <sub>2</sub>	91,716
Year 4	91,716	0 tCO <sub>2</sub>	91,716
Year 5	91,716	0 tCO <sub>2</sub>	91,716
<b>Total</b>	458,581	0 tCO <sub>2</sub>	458,581
<b>Total number of crediting years</b>	<b>5 Years</b>		
<b>Annual average over the crediting period</b>	91,716	0 tCO <sub>2</sub>	91,716

The proposed project activity falls under Indian grid, which constitutes of both fossil fuels and non-fossil fuels sources of electricity generation hence in baseline, the estimated emission is 91,716 tCO<sub>2</sub> per year. Since the project is solar energy therefore the project does not emit any GHG.

### B.7. Monitoring plan

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

<b>Relevant SDG Indicator</b>	<b>SDG 7.2.1 : Affordable and Clean Energy</b>
<b>Data / Parameter</b>	E <sub>GP,y</sub>
<b>Unit</b>	MWh
<b>Description</b>	Quantity of net electricity supplied to the grid
<b>Source of data</b>	Generation statement provided by APSPDCL every month.
<b>Value(s) applied</b>	96,798 MWh

<b>Measurement methods and procedures</b>	<p>Data Type: Measured  Monitoring equipment: Energy Meters of accuracy class 0.25  Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually.  Archiving Policy: Paper &amp;/or Electronic  Calibration frequency: Once in 5 years as per CEA guidelines<sup>13</sup></p> <p>Electricity exported/imported to the grid is in kWh. However for the calculation purpose electricity exported is converted in MWh. 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 Monthly Meter reading reports provided by APSPDCL Kurnool as per below equation:</p> $EG_{P,y} = EG_{Export} - EG_{Import}$ <p>Cross Checking:  Quantity of net electricity supplied to the grid will be cross checked from the Invoices/ Monthly Bill raised by the Project Participant to NTPC Limited.</p>
<b>Monitoring frequency</b>	Monthly
<b>QA/QC procedures</b>	Calibration of all the meters will be undertaken once every year and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.25.
<b>Purpose of data</b>	The Data/Parameter is required to calculate the baseline emission
<b>Additional comment</b>	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

<b>Relevant SDG Indicator</b>	<b>SDG 8.5.1 : Decent Work and Economic Growth</b>
<b>Data / Parameter</b>	Quality of employment
<b>Unit</b>	Number (employees) Number (Trainings) INR (salary)
<b>Description</b>	Number of Trainings provided to employees & O&M staff Number of project employees Salary given to the employees of the project.
<b>Source of data</b>	Training Records (HSE & HR) & Employee feedback forms Salary Slip of the project employees.

<sup>13</sup> [http://www.aegcl.co.in/Metering\\_Regulations\\_Of\\_CEA\\_17\\_03\\_506.pdf](http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_506.pdf), page 12

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<b>Value(s) applied</b>	<p>Some of the trainings &amp; workshops that are given to the respective O&amp;M staffs by Gamesa or PP.</p> <ul style="list-style-type: none"> <li>• HSE Training Record</li> <li>• Regular Drill Record</li> <li>• Handling of Equipment Training</li> <li>• Soft Skill Training</li> </ul> <p>The training programmes help in making the workforce efficient and skilled at their job. This not only helps the company but adds to growth of individual employees. Thus, the project has a positive impact on the parameter.</p> <p>The total number of staff (including O&amp;M staff, management, outsourced jobs as well as security guards) employed by Prayatna Developers Private Limited during O&amp;M phase of the project activity will be 20.</p> <p>The parameter has a positive impact as the project results in direct employment and income generation.</p>
<b>Measurement methods and procedures</b>	<ul style="list-style-type: none"> <li>• Training Attendance sheets and records.</li> <li>• Employment Records</li> <li>• Salary slip of the employees</li> </ul>
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	<p>The number of persons employed would be mentioned in the plant register, which can be crossed checked with daily attendance register.</p> <p>Salary slip can be checked for earnings of female and male employees</p>
<b>Purpose of data</b>	Continuation of regular trainings/workshops for employees & O&M staffs
<b>Additional comment</b>	-

<b>Relevant SDG Indicator</b>	<b>SDG13.2.1 : Climate Action</b>
<b>Data / Parameter</b>	Air quality
<b>Unit</b>	tCO <sub>2</sub>
<b>Description</b>	Reduction in CO <sub>2</sub> emission reduction due to implementation of project activity
<b>Source of data</b>	Calculated as per "Tool to calculate the emission factor for an electricity system,". The data are obtained from "CO <sub>2</sub> Baseline Database for Indian Power Sector" version 13.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
<b>Value(s) applied</b>	91,716 tCO <sub>2</sub> emission reductions estimated per annum
<b>Measurement methods and procedures</b>	Calculated from CEA database and Energy Generation
<b>Monitoring frequency</b>	Annually
<b>QA/QC procedures</b>	A check meter is also installed near to the export meter to cross check the electricity exported to the grid. The check meter reading would also be used in case of failure of export meter
<b>Purpose of data</b>	Calculation of baseline emissions
<b>Additional comment</b>	-

### B.7.2. Sampling plan

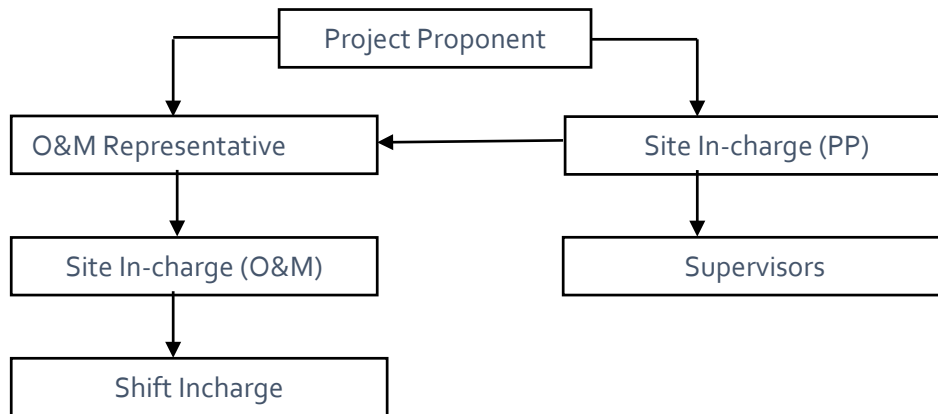
Sampling is not required for the given project activity.

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## B.7.3. Other elements of monitoring plan

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities and is proposed for grid-connected solar power project/ unit being implemented in Andhra Pradesh, India. The monitoring plan, which will be implemented by the project participant 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 monitoring, measurement, reporting and reviewing of the data rests with the project participant.



**Responsibilities of Site Incharge (PP):** Overall functioning and maintenance of the project activity, the Site incharge shall coordinate with the O&M operator as well as the site supervisors.

**Responsibilities of O&M Representative:** Co-ordination between Site incharge of the O&M operator as well as the project participant and further report to PP head office.

**Responsibilities of Site In-charge (O&M Operator):** Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

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

### 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 APSPCL Kurnool in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the APSPCL Kurnool, AP Transco Ghani 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 PP or PP representative is available during meter reading, the calculations of net electricity supplied to grid is completely under purview of APSPCL Kurnool officer and PP do not have any control on it. Also accuracy class of meters and calibration frequency is under purview of APSPCL Kurnool officer and PP do not have any control on it. PP got the monthly credit report from where net electricity supplied to grid is obtained and used for emission reduction calculations.

### Data collection and archiving

Export & Import readings from the meters will be collected under the supervision of the authorized representatives of PP. The net electricity supplied to grid would be calculated based on export & import

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readings. Export and Import data would be recorded and stored in electronic &/or Paper format. The records are checked periodically by the Head (Operations) and discussed thoroughly with the O&M Team. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of GS CERs for the project activity whichever occurs later.

## **Mismatch in Monitoring Period and the Billing Period**

In case the dates of a particular monitoring period do not match with the dates of the billing period, the net electricity exported to the grid would be calculated from:

$$D = (A/B)*C$$

Where,

A = Difference of number of days which are not matching of billing period and monitoring period.

B = Number of days of the billing period/ month which was not matched with the monitoring period.

C = Net Electricity supplied to the grid for that given billing period/ month.

The calculated value after apportioning would be used for calculation of emission reductions during that period.

## **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 unlikely event of failure of all Main, Check as well as Standby meter installed at Substation, where all the faulty meters are required to be repaired or replaced simultaneously, the export & import readings from Main, Check & Standby Meters installed at the inter-connection point at the project site will be used for monitoring of net electricity exported to the grid.

## **Personnel training**

In order to ensure a proper functioning of the project activity and a proper monitoring of emission reductions, the staff (CDM team) will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan.

## **SECTION C. Duration and crediting period**

### **C.1. Duration of project**

#### **C.1.1. Start date of project**

13/10/2016 as per the date of signed earliest contract between Prayatna Developers Pvt. Ltd. and Mundra Solar PV Limited.

#### **C.1.2. Expected operational lifetime of project**

25 years

### **C.2. Crediting period of project**

#### **C.2.1. Start date of crediting period**

20/06/2017 or two years prior to the date of Project Design Certification, whichever is later.

#### **C.2.2. Total length of crediting period**

5 years (Renewable twice).

### D.1. Analysis of social, economic and environmental impacts

Safeguarding principles	Assessment questions	Assessment of relevance to the project (Yes/potentially/no)	Justification	Mitigation measure (if required)
3.2 Gender Equality and Women's Rights	<p>The Project shall complete the following gender assessment questions in order to inform Requirements, below:</p> <ol style="list-style-type: none"> <li>1. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits?</li> <li>2. Is there a possibility that the Project can adversely affect men and women in marginalised or vulnerable communities (e.g., potential increased burden on women or social isolation of men)?</li> <li>3. Is there a possibility that the Project might not take into account gender roles and the abilities of women or men to participate in the decisions/designs of the project's activities (such as lack of time, child care duties, low literacy or educational levels, or societal discrimination)?</li> <li>4. Does the Project take into account gender roles and the abilities of women or men to benefit from the Project's activities (e.g., Does the project criteria ensure that it includes minority groups or landless peoples)?</li> <li>5. Does the Project design contribute to an increase in women's workload that adds to their care responsibilities or that prevents them from</li> </ol>	No	<ol style="list-style-type: none"> <li>1. The project does not decrease women's access to or control of resources.</li> <li>2. No, there is no possibility of adverse effect.</li> <li>3. No, the Project does not consider gender roles and in fact actively engages both women and men. Community meetings are scheduled considering participation</li> </ol>	Not Required

	<p>engaging in other activities?</p> <p>6. Would the Project potentially reproduce or further deepen discrimination against women based on gender, for instance, regarding their full participation in design and implementation or access to opportunities and benefits?</p> <p>7. Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and priorities of women and men in accessing and managing environmental goods and services?</p> <p>8. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards?</p> <p>The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women.</p> <p>1. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.</p> <p>2. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.</p> <p>3. Restriction of women's rights or access to resources (natural or economic).</p>		<p>by both Men and Women.</p> <p>4. The project does not discriminate on basis of gender, caste or religion.</p> <p>5. No the Project was not designed to increase women's workload nor add care responsibilities.</p> <p>6. There is no place for discrimination against women in this Project. The project does not discriminate on basis of gender, caste or religion.</p>	
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	<p>4. Recognise women's ownership rights regardless of marital status - adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources.</p> <p>Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work, specifically:</p> <ol style="list-style-type: none"> <li>1. Where appropriate for the implementation of a Project, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.</li> <li>2. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.</li> <li>3. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits.</li> </ol> <p>The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.</p>		<p>7. The Project will not limit women's ability regarding natural resources. The project being solar power project thus does not have any major impact on natural resources of the region.</p> <p>8. No the Project will not expose women and girls to further risks or hazards.</p> <p>The project proponent has a grievance cell which would look into complaints.</p> <p>1. There is no such risk for the project. Participation in the project is 100% voluntary.</p>	
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			<p>The project proponent has a grievance cell which would look into complaints.</p> <p>2. The project does not involve in slavery, imprisonment or coercion of women and girls.</p> <p>3. The Project will not restrict women's rights or access regarding natural resources. The project proponent does not discriminate on gender, caste, religion etc.</p> <p>4. Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc.</p>	
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			<p>Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions</p> <ol style="list-style-type: none"> <li>1. The project proponent has a stipulated CSR policy, Appointment Policy, Domestic travel policy, Leave Policy and Timekeeping/ Attendance Policy that takes into account participation by both men and women. Further, the CSR projects designed are implemented for equal participation of both men and women.</li> <li>2. There is no limit on the access to Project participation and benefits from either of these conditions.</li> </ol>	
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			<p>3. There are no such conditions that limit the access of women or men for participation.</p> <p>The project is aligned to India's strategy for elimination of all discrimination. India ratified the International Convention on the Elimination of All Forms of Racial Discrimination on 03/12/1968 with certain reservation<sup>14</sup>.</p>	
3.4.3 Land Tenure and Other Rights	<p>1. The Project Developer shall identify all such sites/matters potentially affected by the Project. For all such sites/matters identified the Project shall respect and safeguard:</p> <p>(a) Legal rights, or</p> <p>(b) Customary rights, or</p> <p>(c) Special cultural, ecological, economic, religious or spiritual significance of people shall be demonstrably promoted/protected.</p> <p>2. Changes in legal arrangements must be in line with relevant law and regulation and must be carried out in strict adherence with such laws. All</p>	No	<p>1. The proponent obtained necessary prior approval from Power Grid Corporation of India for establishing the plant and the Govt of India, Central Electricity Authority for construction of transmission line. The project does not involve</p>	

<sup>14</sup> [http://nhrc.nic.in/documents/india\\_ratification\\_status.pdf](http://nhrc.nic.in/documents/india_ratification_status.pdf)

	<p>legal disputes must be resolved prior to Project being carried out in such areas. All such changes must be demonstrated as having been agreed with free, prior and informed consent.</p> <p>3. The Project Developer must hold uncontested land title for the entire Project Boundary to complete Project Design Certification.</p>		<p>and is not complicit in involuntary resettlement in any way.</p> <p>2. The project has all the legal, customary rights on the land.</p> <p>3. The project developers holds the land title for the all the land covered in the project activity.</p>	
<p>3.6.2 Negative Economic Consequences</p>	<p>1. The Project Developer shall demonstrate the financial sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period.</p> <p>2. The Projects shall consider economic impacts and demonstrate a consideration of potential risks to the local economy and how these have been taken into account in Project design, implementation, operation and after the Project. Particular focus shall be</p>	<p>No</p>	<p>1. Financial Sustainability of the project has been discussed under Section B.5 above. The calculations are for the entire life of the project.</p>	

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	given to vulnerable and marginalised social groups in targeted communities and that benefits are socially-inclusive and sustainable.		2. There are no negative economic impacts or potential risks to the local economy due to the project activity.	
4.1.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The project is a solar power project and does not lead to any greenhouse gas emissions in project scenario.	
4.1.2 Energy Supply	Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project is connected to the grid, as well as being a solar power project it will be a net provider of power to the local grid.	
4.2.1 Impact on natural water patterns and flow	Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability, flooding potential, lack of aquatic connectivity or water scarcity?	No	The project being a solar power project will not have any such impacts.	
4.2.1 Erosion and/or water body stability	1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion? If 'Yes' or 'Potentially' proceed to question 2. 2. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No	1. No the Project activity has no effect on soil conditions because it has no waste coming out.  2. The project area is not susceptible to excessive erosion or	

			water body instability.	
4.2.3 Landscape modification and soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project does not involve the use of land and soil for production of crops or other products.	
4.3.2 Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to solar, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The Project will not be susceptible to or lead to increased vulnerability to solar, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions.	
4.3.3 Genetic Resources	Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)?	No	The project does not have any impact by used of GMOs.	
4.3.4 Release of pollutants	Could the Project potentially result in the release of pollutants to the environment?	No	The project being a solar power project does not lead to release of any pollutants.	
4.3.5 Hazardous and Non-hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	The project is renewable energy technology. The project does not involve generation of Hazardous and Non-hazardous Waste. Standard procedure is followed at site during operation and maintenance.	

4.3.6 Pesticides and fertilizers	Will the Project involve the application of pesticides and/or fertilisers?	No	The Project will not involve the application of pesticides and/or fertilisers.	
4.3.7 Harvesting of forests	Will the Project involve the harvesting of forests?	No	The Project does not involve the harvesting of forests.	
4.3.8 Food	Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	The Project does not have any impact on the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives.	
4.3.9 Animal Husbandry	Will the Project involve animal husbandry?	No	The Project will not involve animal husbandry.	

## SECTION E. Local stakeholder consultation

### E.1. Solicitation of comments from stakeholders

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

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

All the stakeholders have been invited through public notice dated 24/09/2016 which were displayed to the nearby areas. Further, stakeholders were invited individually to attend the stakeholders meeting. The meeting was held on 30/09/2016.

In the introductory speech, the representatives of Project Participant welcomed the gathering and given a brief about the project activity. Subsequent to the introductory speech, stakeholders were explained about the electricity generation from solar project is an environmental friendly power generation technology contributing to reduction in GHG emissions. They were also explained about the benefits of the solar power projects like, increasing energy availability and improving quality of power and its assistance to the local population by providing employment opportunities to both skilled & unskilled labours.

Apart from this, a Local Stakeholder Feedback round will be carried out inline with the requirements of Gold Standard process. The SFR round is planned on 1<sup>st</sup> week of May 2019 and the website for comments will be open for 60 days after SFR.

## E.2. Summary of comments received

The Stakeholder Feedback Round and all the documents would be made available to public through website for a minimum of 2 months before Validation is finalized to allow time for stakeholders to review and comment. The stakeholders shall be intimated for the SFR round, along with the invitations they shall be provided with a public link where all the project related documents shall be available for 60 day period. They are free to comment either online or during the actual SFR meeting.

### Once the 60 day period is completed only then the validation shall be finalized.

The representative of project participant explained about the power generation process from this proposed solar power Plant and emphasised on the positive impacts that this project would leave on the local community via:

- This would create employment opportunity for a large number of people during construction period and continued employment opportunities for the local skill set over the project life time.
- This would improve the standard of living of the local community
- In addition as this project would utilise available solar resource to generate power and there would be no associated emissions which would help in maintaining the environment clean.

The villagers raised various queries and clarification provided is as summarised below:

Name of the stakeholder:	Balachandran P.
<b>Comment 1:</b> What kind of job opportunities would be made available to the villagers?	
Response: Mr. Bhavesh explained that employment opportunities are available in both technical and non-technical areas. For technical jobs qualified persons have been employed, however for non-technical jobs like security and transportation, construction, etc. preference has been for employment of local persons during the construction phase. However, he emphasized that during the entire life of the project, if any local gains the requisite skills through ITI, etc. he would be given preference in case of any employment opportunities.	

Name of the stakeholder:	N. G. Ranga
<b>Concerns: 2.</b> Any impact on agriculture due to the Solar machines?	
Reply from PP/ PP Representative: Mr. Bhavesh explained very clearly that there is no impact of solar machines on the solar or water pattern and hence on the agricultural activities per se. He also explained that in case such activities (construction of solar mills) were harmful, the government would not have allowed the construction of the project. On the contrary, the government promotes construction of solar projects which implies that such projects are not harmful at all.	

Name of the stakeholder:	Kaluri Chandra mauli
<b>Concerns: 3.</b> How will the project be beneficial for the locals going forward?	
Reply from PP/ PP Representative: Mr. Bhavesh explained that due to increased generation and supply of electricity in the grid, such projects have helped reduce the power shortage and has resulted in power outages. Going forward as well, this project along with any other upcoming projects would further help reduce the shortfall of electricity. Apart from this, Mr. Pavan informed the villagers that the company has a CSR policy in place and has already been doing a lot of social activities in project areas. In the future, if the villagers have any specific requirement, they can convey the same to the Company through the Sarpanch and the company would positively try and work out ways to see if that can be implemented.	

Name of the stakeholder:	Md. Rasul
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Concerns: Any harm to agriculture due to earthing of electricity? Reply from PP/ PP Representative: Mr. Bhavesh clearly explained that there is no such impact.
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Name of the stakeholder:	Pingali Venkayya
Concerns: Can we take electricity directly from the power cables? Reply from PP/ PP Representative: Mr. Bhavesh explained to the villagers that this electricity is being supplied to the government and so any such act would amount to theft of electricity. He urged the villagers not to try doing this as this is not just illegal but also very dangerous.	

Name of the stakeholder:	Pingali Venkayya
Concerns: Is it possible to construct the road from the village connecting the highway? Reply from PP/ PP Representative: Mr. Bhavesh told the gathering that this request will be conveyed to their CSR team which will do a socio-economic analysis of such a road and the best possible will be done by the company.	

Name of the stakeholder:	Rama Swami
Concerns: The Sarpanch enquired what the company could do in terms of cleanliness of the villages, in line with the Swachh Bharat Mission of the Prime Minister? Reply from PP/ PP Representative: Mr. Bhavesh said that he will discuss this with the CSR team and they can try to provide sanitation facilities, dustbins at prominent places, public toilets etc. The Sarpanch volunteered to take care of the disposal of such waste in case the company can provide such facilities.	

### E.3. Report on consideration of comments received

There were no negative comments raised by the stakeholders and they were totally in support for setting up of these kinds of projects in the region.

## Appendix 1. Contact information of project participants

Organization name	Prayatna Developers Pvt. Ltd.
Registration number with relevant authority	U70101GJ2015PTC083634
Street/P.O. Box	Judges Bungalow Road, Bodakdev
Building	Sambhav Press Building
City	Ahmedabad
State/Region	Gujarat
Postcode	380001
Country	India
Telephone	+91 79 2555 7429
Fax	
E-mail	<a href="mailto:cs@adani.com">cs@adani.com</a>
Website	<a href="http://www.adani.com/">http://www.adani.com/</a>
Contact person	D Trivedi
Title	Sr. Manager - Business Development
Salutation	Mr.
Last name	
Middle name	
First name	
Department	Solar
Mobile	+91 79 2555 7429
Direct fax	
Direct tel.	
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## Appendix 2. Summary of post registration design changes

### Revision History

Version	Date	Remarks
1.1	24 August 2017	Updated to include section A.8 on 'gender sensitive' requirements
1	10 July 2017	Initial adoption