

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:	05
Date of Version:	12/12/2020
Host Country / Location:	India
Certification Pathway (Project Certification/Impact Statements & Products)	Impact statements & products
Activity Requirements applied: (mark GS4GG if none relevant)	Renewable Energy activity requirement
Methodologies applied:	ACM0002: Grid-connected electricity generation from renewable sources - Version 20.0
Product Requirements applied:	GHG Emissions Reductions & Sequestration Product Requirements
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: 95,073 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: 89,549 tCO ₂ e 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. Prayatna Developers Pvt. Ltd. is the project investor for this project activity. The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 89,549 tCO₂e per annum, thereon displacing 95,073 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 involves installation of 05 projects of 10 MW_{AC} each, totalling to 50 MW_{AC} solar power project under Jawaharlal Nehru National Solar Mission (JNNSM) Phase-II, Batch-II, Tranche – I, State Specific Bundling Scheme (under DCR1 Category). The projects are installed in the same project boundary at Village: Gani-Sakunala, District: Kurnool, State: Andhra Pradesh.

The electricity generated from project activity will be sold under the Power Purchase Agreement (PPA), signed with NTPC Ltd.. NTPC has been identified by the Government of India (GoI) as the Implementation Agency for setting up of Grid-connected Solar PV Power Projects under State Specific Bundling Scheme under the National Solar Mission of Government of India (GoI) and NTPC Vidyut Vyapar Nigam Limited (NVTN) on behalf of NTPC will purchase Solar Power from Solar Power Developer, and sell it to Discoms. The electricity generated from the project activity will be evacuated through 220 kV Gani sub-station located at Gani-Sakunala Village in Kurnool District for consumption in the Indian Electricity Grid.

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:

Project Investors' Name	Prayatna Developers Pvt. Ltd.
Capacity in MW	50
Commissioning Date	28/06/2017
Phase-I Installation (30 MW)	28/06/2017
Phase-II Installation (20 MW)	15/07/2017
PPA	21/03/2016
Start Date	13/10/2016
Local Stakeholder Consultation as per CDM	30/09/2016
Project registered under CDM	27/08/2020
SFR Date	23/05/2019
State	Andhra Pradesh
Grid	NTPC Ltd.
Types of Solar PV Modules	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

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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*
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 type is a 60 MW large scale Solar Power Plants which generates power using Solar Energy. The project activity belongs to the type of Renewable energy that generate and deliver power to the Indian grid. The project applies methodology ACM0002 Version 20, which is an approved methodology under Gold Standard. The project have been been submitted to GS4GG for preliminary review before 24th January 2020 and hence meets the eligibility criteria published in latest version 1.2 of Renewable Energy activity Requirement.

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

Eligibility Criteria Category	Description	Justification	Criterion met?
Types of Project	The project type is a large scale Solar Power Plants which generates power using Solar Energy. The project activity belongs to the type of Renewable energy that generate and deliver power to the Indian grid. The project applies methodology ACM0002 Version 20, which is an approved methodology under Gold Standard.	The Solar Power Plant Project is conceived as a grid connected large solar power plant within the category of renewable energy supply. See section A.1.	Yes
Location of Project:	The Project is located at Gani-Sakunala village of Kurnool district, in the Indian state of Andhra Pradesh with an installed capacity of 50 MW. Further details have been provided in section A.4 of this report.	The Power purchase agreement between Prayatna Developers Private Limited and NTPC. It has been submitted to the DOE.	Yes
Project Area, Project Boundary and Scale:	Project Area and Boundary are defined in line with the applicable Methodologies ACM0002. The project activity includes 50 MW installed capacity and is greenfield large solar power plants with an installed capacity above or equal to 15 MW to be qualified as a large scale solar plant (in accordance with UNFCCC rules).	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. The project has an installed capacity of 50 MW which is more than 15 MW, therefore applies as a Large-Scale project. See section A.1	Yes
Host Country Requirements:	The project activity follows the Social well being, Environmental well being, Economic well being and Technological well being.	The Host country approval has been submitted to the DOE.	Yes
Contact Details:	Project Participant: Prayatna Developers Pvt. Ltd. Name of the contact person: Mr. Dhaval Trivedi Email: dhaval.trivedi@adani.com	GS4GG-Cover Letter CDM MOC ¹	
Legal Ownership and Other Rights:	The project activity is being developed by Prayatna Developers Pvt. Ltd.	The commissioning certificates and the PPA is in the name of the Prayatna Developers Pvt. Ltd. and has been submitted to the DOE.	Yes

¹ file:///C:/Users/HP/Downloads/PA9111%20CDM-MOC-FORM%20Annex%202%20form%20(2).pdf

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<p>Official Development Assistance (ODA) Declaration:</p>	<p>The project had 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.</p>	<p>The Project Owner declares that the project has not directly or indirectly received or benefited from official development assistance. An ODA declaration (i.e. GS Annex D) has been submitted to DOE.</p>	<p>Yes</p>
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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.

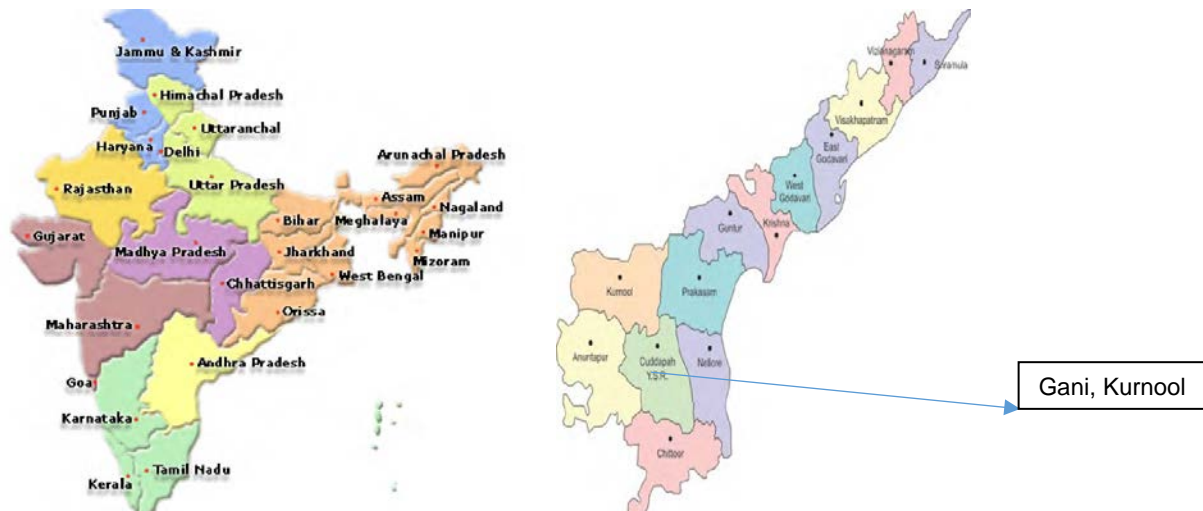
Andhra Pradesh

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, 42 km 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.

A. Solar PV modules:

Module Supplier	Module Model	Capacity (p)	Number	Total Capacity (MWp)
Adani	Poly C-Si	290	726	0.21
Adani	Poly C-Si	295	2948	0.87
Adani	Poly C-Si	300	13552	4.07
Adani	Poly C-Si	305	18722	5.71
Adani	Poly C-Si	310	13552	4.20
Adani	Poly C-Si	315	64724	20.39
Adani	Poly C-Si	320	84348	26.99
Adani	Poly C-Si	325	13948	4.53
Waree	Poly C-Si	300	4864	1.46
			Total Capacity in MWp	68.43

B. Invertor

S.No.	Make	
1.	Manufacturer	Huawei
2	Model	SUN2000-43KTL
3	Rated Capacity	43 KW, 52.5 KVA
4	No. of Inverters	1163
5	Rated Input Voltage (Max.Input Voltage)	500 V

C. Transformer

S. No	Make	
1	Manufacturer	T&R
2	Capacity	5MVA
3	No. of Transformers 10	10
4	Voltage Ratio	500/33 KV

D. Metering Equipment Details

S.No.	Make	Sub-Station	Solar Plant End
1	Manufacturer	Secure Make	Secure Make
2	Type	ABT meters	ABT meters
3	Accuracy Level	0.2s	0.2s
4	Total no of meter	3*2=6	2*2 = 4

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

The purpose of the project activity is to generate electrical power using solar energy through operation of Solar Panels, there by displacing non-renewable fossil resources resulting to 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 89,549 tCO_{2e}.

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

1. **SDG13: Climate Action** : The project would lead to average reduction of approx. 89,549 tCO₂ per annum due to implementation of project activity.
2. **SDG 7: Affordable and Clean Energy** : The project is expected to generate average of 95,073 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.

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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 Women²” 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:

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 CSR³ activities⁴ 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

² <http://hrlibrary.umn.edu/research/ratification-india.html>

³ www.adanipower.com/docs/download/csrpolicy

⁴ <https://www.adanigreenenergy.com/csr.html>

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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. No negative comments were received. Moreover, the Stakeholder Feedback Round has also been conducted on 23/05/2019 at project site, connected to NH18, Gani Sakunala Village in Kurnool district, AP. The stakeholders from all categories suggested by Gold standard were invited to the meeting, the same has been documented as per the guidelines.

According to the requirement of "GS4GG Gold Standard for the Global Goals Stakeholder Consultation & Engagement Procedure, Requirements & Guidelines" Stakeholder Feedback Round has been conducted at the project site which was attended by local stakeholders & the DOE. The expert stakeholders have been intimated for the SFR round and along with the invitations they were provided with a public link where all the project related documents are available. All the documents have been made available to public through website <http://infisolutions.org/services/carbon-mgt-services/kurnool-ap-adani/> for 2 months i.e. from 09/05/2019 to 08/07/2019 for stakeholders to review and comment. They were free to comment either online or during the actual SFR meeting. There were no negative comments from the stakeholders through any means of communication channels (E mails, Phone calls, Grievance Register available at the project site). The documentation is available permanently to stakeholders at project site & company’s website.

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 20.0, EB 105 Annex 3)⁵

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 8⁶

B.2. Applicability of methodology

As per para 2 of ACM0002 (Version 20.0, EB 105, Annex 3), “*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 20.0, Sectoral Scope 1, EB 105 for Greenfield projects as described below:

Applicability	Project activity vis-à-vis applicability Conditions
This methodology is applicable to grid-connected renewable energy power generation project activities that: (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).	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.
The methodology is applicable under the following conditions:	

⁵ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

⁶ <https://cdm.unfccc.int/methodologies/PAMethodologies/tools/am-tool-01-v7.0.0.pdf>

<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;</p> <p>(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</p> <p>(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density calculated using equation (3), is greater than 4 W/m^2 ; 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 4 W/m^2 ; 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 4 W/m^2 , 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 4 W/m^2 ;</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 4 W/m^2 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>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>In the case of integrated hydro power projects, project proponent shall:</p> <ul style="list-style-type: none"> • 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 • Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum five years prior to implementation of CDM project activity. 	<p>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>

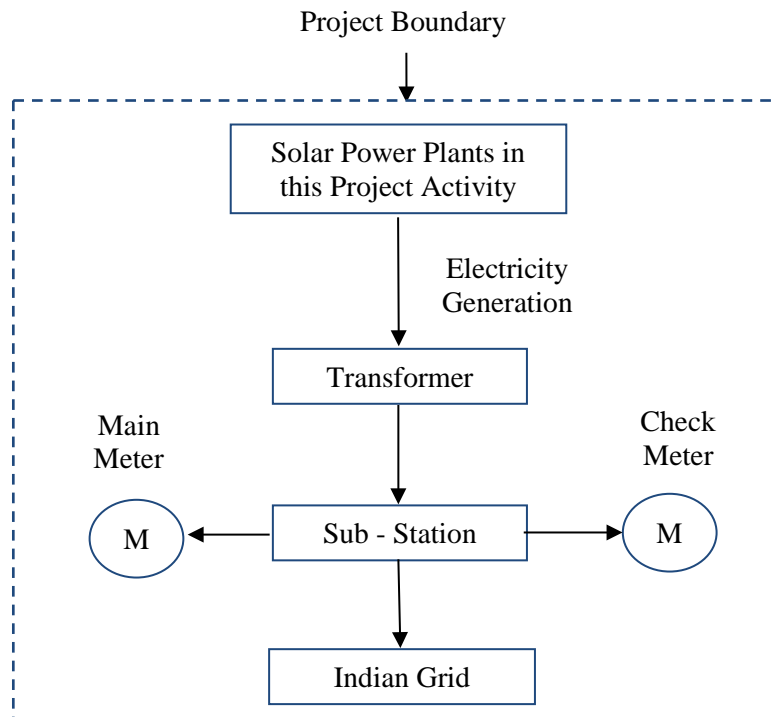
<p>The methodology is not applicable to:</p> <p>(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site;</p> <p>(b) Biomass fired power plants/units.</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 implementation of the project activity and undertaking business as usual maintenance”.</p>	<p>The project activity is a new grid connected solar power plant/ unit and not a retrofits, replacement or capacity additions and therefore this criterion is not applicable to the project activity.</p>
<p>Applicability conditions of “Tool to calculate the emission factor for an electricity system”, - Version 07.0</p>	
<p>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).</p>	<p>This condition is applicable. OM, BM and CM are estimated using the tool under section B.6.3 for calculating baseline emissions.</p>
<p>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.</p>	<p>Since the project activity is grid connected, this condition is applicable and the emission factor has been calculated accordingly.</p>
<p>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.</p>	<p>The project activity is located in India, a non-Annex I country. Therefore, this criterion is not applicable for the project activity.</p>
<p>Under this tool, the value applied to the CO2 emission factor of biofuels is zero.</p>	<p>The project activity is a grid connected solar power project/ unit and does not involve emission from biofuels. Therefore, this criterion is not applicable.</p>

B.3. Project boundary

Project boundary has ascertained using para 20 of ACM0002 (Version 20.0, EB EB 105, Annex 3) - “*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.*”

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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 ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project scenario	Greenfield Solar Power Project Activity	CO ₂	No	No CO ₂ emissions are emitted from the project activity
		CH ₄	No	No, Project Activity does not emit CH ₄
		N ₂ O	No	No, Project Activity does not emit N ₂ O

B.4. Establishment and description of baseline scenario

As the project activity is the installation of a new grid-connected solar power plant, according to ACM0002 Version 20, the baseline scenario is the following:

If the project activity is the installation of a Greenfield power plant, the baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in “TOOL07: Tool to calculate the emission factor for an electricity system”.

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CO2 Baseline Database for the Indian Power Sector, Version 15, Dec 2019 published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.

Although CO2 Baseline Database version 13.0 has been used in CDM PDD, but here in GS, version 15.0 is being used for conservativeness.

As per Methodological tool: Tool to calculate the emission factor for an electricity system (Version 07.0, EB 100, Annex 4), following six steps have been followed:

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

Step 1: Identify the relevant electricity systems

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations

should be used”. Keeping this into consideration, the Central Electricity Authority (CEA), Government of India has divided the Indian Power Sector into five regional grids viz. Northern, Eastern, Western, North-eastern and Southern.

However since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e. at same frequency. Consequently, the Northern, Eastern, Western and

North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronised with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	North-Eastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telangana

Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

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)

	2014-15	2015-16	2016-17	2017-18	2018-19
India	16.8%	15.1%	14.6%	14.3%	14.5%

Source: CO2 Baseline Database for the Indian Power Sector - Central Electricity Authority (CEA)

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 CO2 emissions per unit net electricity generation (tCO2/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 CO2 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 CO2 Baseline Database provides information about the Combined Margin Emission Factors of the Indian grid. The Combined Margin in the CEA database

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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 CO2 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.

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

Where:

- $EF_{\text{grid,OMsimple},y}$: Simple operating margin CO2 emission factor in year y (tCO2/MWh)
- $EG_{m,y}$: Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
- $EF_{\text{EL},m,y}$: CO2 emission factor of power unit m in year y (tCO2/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 generation⁷ respectively for the recent three years:

Simple Operating Margin Emission Factors (t CO2/MWh) (incl. Imports)			
	2016-17	2017-18	2018-19
Indian Grid	0.9636	0.9543	0.9685
Net Generation in Operating Margin (GWh) (incl. imports)			
	2016-17	2017-18	2018-19
Indian Grid	916,278	960,693	995,957

Therefore the 3 years net generation weighted OM average for Indian grid comes out to be 0.9622 tCO2/MWh

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

$$EF_{\text{EL},m,y} = (\sum i FC_{i,m,y} \times NCV_{i,y} \times EF_{\text{CO2},i,y}) / EG_{m,y}$$

Where:

- $EF_{\text{EL},m,y}$: CO2 emission factor of power unit m in year y (tCO2/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)
- $EF_{\text{CO2},i,y}$: CO2 emission factor of fossil fuel type i in year y (tCO2/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:

- a) The set of five power units that have been built most recently, or

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b) 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 CO2 emission factor in year y (tCO2/MWh)
- $EG_{m,y}$ Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
- $EF_{EL,m,y}$ CO2 emission factor of power unit m in year y (tCO2/MWh)
- m Power units included in the build margin
- y Most recent historical year for which power generation data is available

The CO2 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.

Build margin emission factor is calculated, ex-ante as per the most recent data available⁸. So, build margin emission factor for Indian grid for 2018-19 is 0.8811 tCO2/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:

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

Where:

- $EF_{grid,BM,y}$ = Build margin CO2 emission factor in year y (t CO2/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO2 emission factor in year y (t CO2/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 0.9419 tCO2e/MWh.

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

Parameter	Value	Nomenclature	Source
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⁸ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

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EF _{grid,CM,y}	0.9419tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 15 published by Central Electricity Authority (CEA), Government of India in the month of December 2019.
EF _{grid,OM,y}	0.9622 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2016-17, 2017-18 & 2018-19) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 15, published by Central Electricity Authority (CEA), Government of India.
EF _{grid,BM,y}	0.8811 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 15, published by Central Electricity Authority (CEA), Government of India.

Project Emission

As per the ACM0002 ver-20.0, 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 (tCO₂e/yr)

PE_{FF,y} = Project emissions from fossil fuel consumption in year y (tCO₂/yr)

PE_{GP,y} = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (tCO₂e/yr)

PE_{HP,y} = Project emissions from water reservoirs of hydro power plants in year y (tCO₂e/yr).

The project activity involves the generation of electricity from the installation of solar turbines. Hence, as per ACM0002, Version 20.0, there is no project emission for solar projects. Therefore, project emissions are zero. Hence PE_y = 0

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.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

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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 20.0).

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 project is registered under CDM. For Additionality, CDM registered PDD (UN10581) can be referred.⁹

B.6. Sustainable Development Goals (SDG) outcomes

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

Item	Goals and Targets	Indicators
SDG 7: Affordable and Clean Energy	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: 95,073 MWh per annum	
SDG 8: Decent Work and Economic Growth	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"> • Training: 1 nos annually • Employment of 20 staff 	
SDG 13: Climate Action	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: 89,549 tCO2 per annum	

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

The company has a Corporate Social Responsibility Policy¹⁰ 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

⁹ <https://cdm.unfccc.int/Projects/DB/Plus1597922977.27/view>

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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 generated by the project per annum. The project is expected to generate 95,073 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 89,549 tCO₂ per annum.

SDG Goal	Methodological choices/approaches for estimating the SDG outcome
SDG 7 –Affordable and Clean Energy: Ensure access to affordable, reliable, sustainable and modern energy for all	<p>Measurement Method: - Electricity produced and supplied to the grid is monitored through energy meter. Net electricity is calculated by state electricity board and PP on monthly basis and provided in the share certificate/monthly report or equivalent. The other parameters used for net electricity supplied to grid are mentioned in monitoring plan.</p> <p>QA/QC Process: This parameter is monitored monthly and value of parameter will be cross checked with invoices.</p>
SDG 8 – Decent Work and Economic Growth: Promote inclusive and sustainable economic growth, employment and decent work for all	<p>Measurement Method: - Trainings and employment generation is monitored through training records, staff register or letter from O&M contractor for training and employment details or HSE/HR records.</p> <p>QA/QC Process: This parameter is based on records, data and no any QA/QC procedure required. The DOE can confirm this parameter with interview with PP or Site incharge or employees for training and employment generation.</p>
SDG 13 – Climate Action : Take urgent action to combat climate change and its impacts	<p>Measurement Method: - The emission reduction parameter is calculated as product of net electricity supplied to grid and grid emission factor. The grid emission factor is ex-ante parameter and determined based on data obtained from “CO₂ Baseline Database for Indian Power Sector” version 15, published by the Central Electricity Authority, Ministry of Power, Government of India. This is in line with “Tool to calculate the emission factor for an electricity system, version 7”. The emission reductions are calculated as per registered PDD and as per methodology requirement.</p> <p>QA/QC Process: This parameter is calculated, and no any QA/QC procedure required.</p>

As per the approved consolidated Methodology ACM0002 (Version 20.0, EB 105 Annex 3), Emission reductions are calculated as follows:

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$$ER_y = BE_y - PE_y$$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)

BE_y = Baseline emissions in year y (t CO₂/yr)

PE_y = Project emissions in year y (t CO₂e/yr)

Baseline Emissions:

Baseline Emissions for the amount of electricity supplied by project activity, BE_y is calculated as

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

Where:

BE_y = Baseline emissions in year y (t CO₂/yr)

$EG_{PJ,y}$ = 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)

$EF_{grid,CM,y}$ = Combined margin CO₂ emission factor for grid connected power generation in year y calculated using the latest version of the “Tool to calculate the emission factor for an electricity system” (t CO₂/MWh)

Calculation of $EG_{PJ,y}$

The calculation of $EG_{PJ,y}$ is different for

- Greenfield plants,
- Retrofits and replacements, and
- Capacity additions

The project activity is the installation of solar panels and it is a green field project. So the formula in option (a) i.e., greenfield plants is used to calculate the value of $EG_{PJ,y}$. 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,

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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)

	2014-15	2015-16	2016-17	2017-18	2018-19
India	16.8%	15.1%	14.6%	14.3%	14.5%

Source: CO2 Baseline Database for the Indian Power Sector - Central Electricity Authority (CEA)

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 CO2 emissions per unit net electricity generation (tCO2/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 CO2 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 CO2 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.

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The CEA database uses the option A i.e. data on net electricity generation and CO2 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.

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

Where:

$EF_{grid,OMsimple,y}$: Simple operating margin CO2 emission factor in year y (tCO2/MWh)

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

$EF_{EL,m,y}$: CO2 emission factor of power unit m in year y (tCO2/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 generation¹¹ respectively for the recent three years:

Net Generation in Operating Margin (MWh) (incl. Imports)			
	2016-17	2017-18	2018-19
Indian Grid	916,278	960,693	995,957

Simple Operating Margin (tCO2/MWh) (incl. Imports)			
	2016-17	2017-18	2018-19
Indian Grid	0.9636	0.9543	0.9685

Weighted Generation Operating Margin	
Indian Grid	0.9622

Therefore the 3 years net generation weighted OM average for Indian grid comes out to be 0.9622 tCO2/MWh

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

$$EF_{EL,m,y} = (\Sigma FC_{i,m,y} \times NCV_{i,y} \times EF_{CO2,i,y}) / EG_{m,y}$$

Where:

$EF_{EL,m,y}$: CO2 emission factor of power unit m in year y (tCO2/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)

$EF_{CO2,i,y}$: CO2 emission factor of fossil fuel type i in year y (tCO2/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

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 07.0, EB 100, Annex 4) para 72:

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

(a) **Option 1** - for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of CDM-PDD submission to the DOE for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option does not require monitoring the emission factor during the crediting period.

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

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

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
	2018-19
Indian Grid	0.8811

Build margin emission factor is calculated, ex-ante as per the most recent data available **Error! Bookmark not defined.** So, build margin emission factor for Indian grid for 2018-2019 is 0.8811 tCO₂/MWh

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

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 07.0, EB 100, Annex 4) para 81:

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

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

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

The combined margin emissions factor is calculated as follows:

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

Where:

- $EF_{grid,BM,y}$ = Build margin CO₂ emission factor in year y (t CO₂/MWh)
- $EF_{grid,OM,y}$ = Operating margin CO₂ emission factor in year y (t CO₂/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.

$$\begin{aligned} \text{Therefore, } EF_{grid,CM,y} &= 0.9622*0.75 + 0.8811*0.25 \\ &= 0.9419 \text{ t CO}_2\text{/MWh} \end{aligned}$$

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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 0.9419 tCO₂e/MWh.

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

Parameter	Value	Nomenclature	Source
EF _{grid,CM,y}	0.9419 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 15 published by Central Electricity Authority (CEA), Government of India in the month of Dec'2019.
EF _{grid,OM,y}	0.9622 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 year (2016-17, 2017-18 & 2018-19) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 15, published by Central Electricity Authority (CEA), Government of India.
EF _{grid,BM,y}	0.8811 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline CO ₂ Emission Database, Version 15, published by Central Electricity Authority (CEA), Government of India.

Project Participant	Capacity	PLF (%)	Annual Generated Power in the 1 st crediting period (MWh/year)	Baseline Emission Factor (tCO ₂ /MWh)	Baseline emissions (tCO ₂ /year)	Average Annual Generated Power with degradation from 2nd year onwards (0.6%) (MWh/year)	Average Baseline emissions with degradation from 2nd year onwards (0.5%) (tCO ₂ /MWh)
Prayatna Developers Pvt. Ltd.	216 MW	22.10	96,798	0.9419	91,174	95,073	89,549

$BE_y = 351,366 * 0.9419 \text{ t CO}_2/\text{year} = 330,952 \text{ tCO}_2/\text{year}$ (average value after considering degradation from 2nd year onwards)

Project Emission:

As per the ACM0002 ver. 20.0, 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 (tCO₂e/yr)

PE_{FF,y} = Project emissions from fossil fuel consumption in year y (tCO₂/yr)

PE_{GP,y} = Project emissions from the operation of geothermal power plants due to the release of non condensable gases in year y (tCO₂e/yr)

PE_{HP,y} = Project emissions from water reservoirs of hydro power plants in year y (tCO₂e/yr).

The project activity involves the generation of electricity from the installation of solar panels. Hence, as per ACM0002, Version 20.0, there is no project emission for solar 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

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construction and upstream emissions from fossil fuel use (e.g. extraction, processing, transport). Since the emissions sources are small, it is neglected.

SDG Goal	Values Estimated
SDG 7	95,073 MWh
SDG 8	20 Number of employees 1 Number of Trainings
SDG 13	89,549 tCO ₂ e per annum

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

Relevant SDG Indicator	SDG13.2.1 : Climate Action
Data/parameter	EF _{OM,y}
Unit	tCO ₂ e/MWh
Description	Operating Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 15, December 2019 ¹²
Value(s) applied	0.9622
Choice of data or Measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system,” as 3-year generation weighted average using data for the years 2016-17, 2017-18 & 2018-19. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 15.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13.2.1 : Climate Action
Data/parameter	EF _{BM, y}
Unit	tCO ₂ e/MWh
Description	Build Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 15, Dec 2019
Value(s) applied	0.8811
Choice of data or Measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data are obtained from “CO ₂ Baseline Database for Indian Power Sector” version 15.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	This parameter is fixed ex-ante for the entire crediting period.

Relevant SDG Indicator	SDG13.2.1 : Climate Action
Data/parameter	EF _{CM, y}
Unit	tCO ₂ e/MWh
Description	Combined Margin Emission Factor of Indian Grid
Source of data	Calculated from CEA database, Version 15, Dec 2019
Value(s) applied	0.9419

¹² <http://cea.nic.in/tpeandce.html>

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Choice of data or Measurement methods and procedures	Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data is obtained from “CO2 Baseline Database for Indian Power Sector” version 15.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Purpose of data	The data is used to calculate baseline emission reductions.
Additional comment	-

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 95,073 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 89,549 tCO2 per annum.

Calculation of Outcome for SDG13 : Climate Action

Baseline emissions

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 CO2 emission factor for grid connected power generation in year y
= 0.9419 t CO2/MWh.

Project Participant	Capacity	PLF (%)	Generated Power (MWh/year)	Annual degradation from 2nd year onwards (%)	Baseline Emission Factor (tCO2/MWh)	Baseline emissions (tCO2/ year)
Prayatna Developers Pvt. Ltd.	50 MW	22.10	96,798	0.60%	0.9419	91,174

$$BE_y = 96,798 * 0.9419 \text{ t CO}_2/\text{year} = 91,174 \text{ tCO}_2/\text{year}$$

Project emissions

$$PE_y = 0$$

Leakage

No leakage emissions are applicable.

Emission reductions

$$ER_y = BE_y - PE_y = 91,174 - 0 = 91,174 \text{ tCO}_2/\text{year}$$

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	96,217	96,217
Year 3	0 MWh	95,640	95,640
Year 4	0 MWh	95,066	95,066

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Year 5	0 MWh	94,496	94,496
Year 6	0 MWh	93,929	93,929
Year 7	0 MWh	93,365	93,365
Total	0 MWh	665,511	665,511
Total number of crediting years	7 Years		
Annual average over the crediting period	0 MWh	95,073	95,073

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 95,073 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
Year 6	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Year 7	0 Training, 0 Jobs	1 Training, 20 Jobs	1 Training, 20 Jobs
Total	0 Training, 0 Jobs	7 Trainings, 20 Jobs	7 Trainings, 20 Jobs
Total number of crediting years	7 Years		
Annual average over the crediting period	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 tCO2	Project estimate tCO2	Net benefit tCO2
Year 1	91,174	0 tCO2	91,174
Year 2	90,627	0 tCO2	90,627
Year 3	90,083	0 tCO2	90,083
Year 4	89,543	0 tCO2	89,543
Year 5	89,005	0 tCO2	89,005
Year 6	88,471	0 tCO2	88,471
Year 7	87,941	0 tCO2	87,941
Total	626,845	0 tCO2	626,845
Total number of crediting years	7 Years		

Annual average over the crediting period	89,549	0 tCO2	89,549
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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 89,549 tCO2 per year. Since the project is solar energy therefore there is no consumption of fossil fuel and thus the project does not emit any GHG.

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Relevant SDG Indicator	SDG 7.2.1 : Affordable and Clean Energy																				
Data / Parameter	$EG_{PJ,y}$																				
Unit	MWh																				
Description	Quantity of net electricity supplied to the grid																				
Source of data	Generation statement provided by APSPDCL every month.																				
Value(s) applied	95,073 MWh																				
Measurement methods and procedures	<p>Data Type: Measured Monitoring equipment: Energy Meters of accuracy class 0.2s Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually. Archiving Policy: Paper &/or Electronic Calibration frequency: Once in 5 years as per CEA guidelines¹³</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> $EG_{PJ,y} = EG_{Export} - EG_{Import}$ <p>Projects activity comprises of installation of 10 Energy meters at four different substations, 4 Energy meters (1 main meter and 1 check meter) at two 33kV Feeder Line and 6 Energy meters (1 main meter, 1 check meter, 1 stand meter) at two 220kV Feeder Line connected to Pooing Sub Station.</p> <table border="1" data-bbox="545 1554 1355 1729"> <thead> <tr> <th>S.No.</th> <th>Make</th> <th>Sub-Station</th> <th>Solar Plant End</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Manufacturer</td> <td>Secure Make</td> <td>Secure Make</td> </tr> <tr> <td>2</td> <td>Type</td> <td>ABT meters</td> <td>ABT meters</td> </tr> <tr> <td>3</td> <td>Accuracy Level</td> <td>0.2s</td> <td>0.2s</td> </tr> <tr> <td>4</td> <td>Total no of meter</td> <td>3*2=6</td> <td>2*2 = 4</td> </tr> </tbody> </table> <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>	S.No.	Make	Sub-Station	Solar Plant End	1	Manufacturer	Secure Make	Secure Make	2	Type	ABT meters	ABT meters	3	Accuracy Level	0.2s	0.2s	4	Total no of meter	3*2=6	2*2 = 4
S.No.	Make	Sub-Station	Solar Plant End																		
1	Manufacturer	Secure Make	Secure Make																		
2	Type	ABT meters	ABT meters																		
3	Accuracy Level	0.2s	0.2s																		
4	Total no of meter	3*2=6	2*2 = 4																		
Monitoring frequency	Monthly																				

¹³ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_506.pdf , page 12

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QA/QC procedures	Calibration of all the meters will be undertaken once every five year and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2s. 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.
Purpose of data	The Data/Parameter is required to calculate the baseline emission
Additional comment	Data will be archived electronically for a period of 2 years beyond the end of crediting period.

Relevant SDG Indicator	SDG 8.5.1 : Decent Work and Economic Growth
Data / Parameter	Quality of employment
Unit	Number(Trainings) INR (salary)
Description	Number of Trainings provided to employees & O&M staff Salary given to the employees of the project.
Source of data	Training Records (HSE & HR) & Employee feedback forms Salary Slip of the project employees.
Value(s) applied	Some of the trainings & workshops that are given to the respective O&M staffs by Gamesa or PP. <ul style="list-style-type: none"> • HSE Training Record • Regular Drill Record • Handling of Equipment Training • Soft Skill Training <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. The parameter has a positive impact as the project results in direct employment and income generation.</p>
Measurement methods and procedures	<ul style="list-style-type: none"> • Training Attendance sheets and records. • Salary slip of the employees
Monitoring frequency	Annually
QA/QC procedures	Salary slip can be checked for earnings of female and male employees The trainings held can be crosschecked with the training documents maintained at site.
Purpose of data	Continuation of regular trainings/workshops for employees & O&M staffs
Additional comment	-

Relevant SDG Indicator	SDG 8.5.1 : Decent Work and Economic Growth
Data / Parameter	Quantitative employment
Unit	Number of O&M staffs involved in the project
Description	Total employment generated due to the implementation of project activity
Source of data	Plant employment records

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Value(s) applied	<p>The total number of O&M staffs employed</p> <p>The total number of staff (including O&M staff, management, outsourced jobs as well as security guards) employed by the O&M service provider and Project Proponent for the operation & maintenance of the project activity are around 20.</p> <p>All the 20 employees are local working in the site. Out of which 2 are skilled and 18 are unskilled.</p> <p>The parameter has a positive impact as the project results in direct employment and income generation.</p>
Measurement methods and procedures	Employment Records
Monitoring frequency	Annually
QA/QC procedures	The number of persons employed would be mentioned in the plant register, which can be crossed checked with daily attendance register.
Purpose of data	To monitor the contribution to SDG 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all)
Additional comment	-

Relevant SDG Indicator	SDG13.2.1 : Climate Action
Data / Parameter	Air quality
Unit	tCO2
Description	Reduction in CO2 emission reduction due to implementation of project activity
Source of data	Calculated as per “Tool to calculate the emission factor for an electricity system,”. The data are obtained from “CO2 Baseline Database for Indian Power Sector” version 15.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	89,549 tCO2 emission reductions estimated per annum
Measurement methods and procedures	Calculated from CEA database and Energy Generation
Monitoring frequency	Annually
QA/QC procedures	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
Purpose of data	Calculation of baseline emissions
Additional comment	-

Relevant SDG Indicator	Safeguarding principal 4.3.5:
Data / Parameter	<ul style="list-style-type: none"> • Hazardous and Non-hazardous Waste
Unit	-
Description	The manufacture, trade, release, and use of hazardous and non-hazardous chemicals and/or materials
Source of data	Plant Records
Value(s) applied	0
Measurement methods and procedures	Manual

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Monitoring frequency	Once in a Monitoring period
QA/QC procedures	The waste will be disposed to the waste handlers and the firm will comply with all the local laws for monitoring and disposal.
Purpose of data	Analysis of safeguarding principle
Additional comment	-

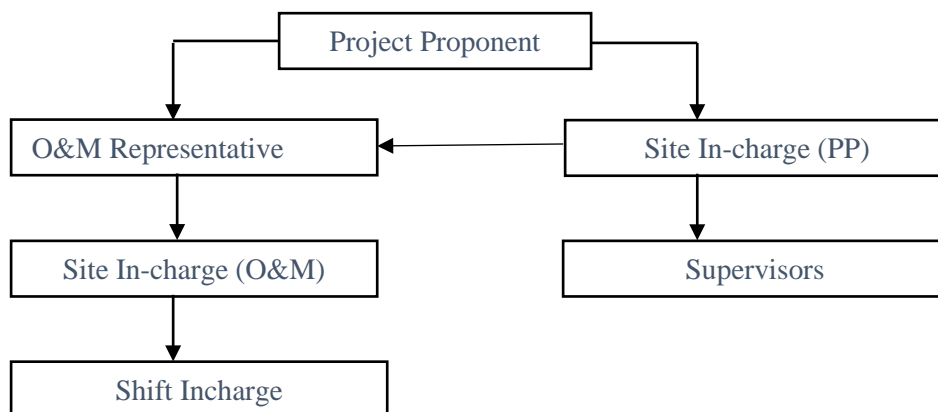
B.7.2. Sampling plan

Sampling is not required for the given project activity.

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

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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 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

16/11/2018 or two years prior to the date of Project Design Certification, whichever is later.

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C.2.2. Total length of crediting period

7 years 00 Months for first crediting period. Which will be renewed twice (2), totalling to length of crediting period is 15 years (renewable twice)¹⁴

SECTION D. Safeguarding principles assessment

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)
Principle 1.- Human Rights	1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights. The Project shall not discriminate with regards to participation and inclusion.	No	<p>1. During construction and operation of the project the project proponent respected all the human rights. The project is not in any kind of conflict with the livelihood of local people. Project proponent had conducted stakeholder's consultation and sought their opinion.</p> <p>b. Project activities are not expected to cause any human rights abuse. As a member of United Nations¹⁵ and part of UN Agreement on Human Rights¹⁶, it is ensured by law in India that no action can be taken against human rights. The India ratified the same as per web link¹⁷ given below</p> <p>The project will not employ any personnel based on gender, race, religion, sexual orientation or any other basis. As the Constitution of the host country prohibits discrimination on the basis of a person's race, sex, religion, place of birth, or social status.</p> <p>The host country has signed the Convention 100 (equal remuneration) and convention</p>	Not Required

¹⁴ PP has applied under CDM Mechanism as well. Hence, para 6.1.10 of GHG Emissions Reduction & Sequestration Product requirements states that "CDM Project Crediting Cycle: the project cycle shall mirror the CDM Cycle in terms of any Certification Renewals (e.g. 7 years)."

¹⁵ <https://labour.gov.in/ncandilasdivision/india-ilo>

¹⁶ <https://www.ilo.org/newdelhi/lang--en/index.htm>

¹⁷ https://tbinternet.ohchr.org/_layouts/15/TreatyBodyExternal/Treaty.aspx?CountryID=79&Lang=EN

			111 (discrimination in employment /occupation) under the ILO Declaration on Fundamental Principles and rights ¹⁸ .	
Principle 2. - Gender Equality and Women's Rights	<p>The Project shall complete the following gender assessment questions in order to inform Requirements, below:</p> <p>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?</p> <p>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)?</p> <p>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)?</p> <p>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</p>	No	<p>The project does not decrease women's access to or control of resources.</p> <ol style="list-style-type: none"> No, the Project does not reduce women's access to or control of resources, entitlements and benefits. The project will benefit to local community regardless of gender. No, there is no possibility of adverse effect on the local community.. No, the Project does not consider gender roles and in fact actively engages both women and men. Community meetings are scheduled considering participation by both Men and Women¹⁹. The project does not discriminate on basis of gender, caste or religion and therefore equally serve to all.²⁰. The project abide by the Factories Act that prohibits any form of discrimination and is in accordance with the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) , India ratified it on 09/07/1993 with certain reservations²¹ and International Convention on the Elimination of all Forms of Racial Discrimination; India ratified the convention on 03/12/1968 with certain reservation²² No the Project was not designed to increase women's workload nor add care responsibilities. There is no place for discrimination against women in this Project. The project does nto discriminate on basis of gender, caste or religion. 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. 	Not Required

¹⁸ <http://www.mfcindia.org/main/bgpapers/bgpapers2013/am/bgpap2013c.pdf>

¹⁹ <https://labour.gov.in/sites/default/files/Equal%20Remuneration%20Rules,%201976.pdf>

²⁰ https://labour.gov.in/sites/default/files/equal_remuneration_act_1976.pdf

²¹ <https://www.un.org/womenwatch/daw/cedaw/> and

https://nhrc.nic.in/documents/india_ratification_status.pdf

²² http://nhrc.nic.in/documents/india_ratification_status.pdf and <http://www.refworld.org/docid/3ae6b3940.html>

	<p>groups or landless peoples)?</p> <p>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?</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</p>	<p>8. No the Project will not expose women and girls to further risks or hazards. 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. 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> <p>Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions</p> <p>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.</p> <p>2. There is no limit on the access to Project participation and benefits from either of these conditions.</p> <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 reservation²³.</p>	
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²³http://nhrc.nic.in/documents/india_ratification_status.pdf

	<p>women - address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.</p> <ol style="list-style-type: none"> 2. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls. 3. Restriction of women's rights or access to resources (natural or economic). 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>Projects shall apply the principles of nondiscrimination, equal treatment, and equal pay for equal work, specifically:</p> <ol style="list-style-type: none"> 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. 2. Introduce conditions that ensure the participation of women or men in 		
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	<p>Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.</p> <p>3. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits.</p> <p>The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.</p>			
<p>Principle 3 – Community Health, Safety & Working Conditions</p>	<p>3.3.1 The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.</p>	<p>No</p>	<p>The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments” - PP ensures safe access and planned prevention to avoid any kind of accident. The HSE (Health and Safety Executive) states that best practice when installing and operation of wind turbines requires trained, dedicated working at height maintenance teams to access risks and select appropriate equipment before any work is carried out. All the safety and hygiene measures are being ensured in order maintain a safe and healthy environment for the workers at site. In case of any emergency, the site incharge will ensure to take adequate action and preventive measures to avoid any miss happening. Necessary health and safety measures will be taken during construction and operation phase, relevant staff will be trained to be able to work with safety. The project is in compliance with all relevant local and national laws.</p> <p>The project proponent is committed to the employee's workplace health & safety during all phases of the project. All employees will attend health & safety trainings. This is issued in the Labour code on Occupational Safety, Health and Working Conditions and UN Agreement on Human Rights²⁴.</p>	<p>Workplace Health & Safety trainings will be conducted regularly during the project operation .</p>

²⁴ <https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx>

<p>Principal 4. Cultural Heritage, Indigenous Peoples, Displacement and Resettlement</p> <p>4.1 Sites of Cultural and Historical Heritage</p> <p>4.2 Forced Eviction and Displacement</p> <p>4.3 Land Tenure and Other Rights</p> <p>4.4 Indigenous Peoples</p>	<p>4.1 Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g., knowledge, innovations, or practices)?</p> <p>4.2 Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?</p> <p>4.3 a. Does the Project require any change to land tenure arrangements and/or other rights?</p> <p>b. For Projects involving land-use tenure, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership?</p> <p>4.4 Are indigenous peoples present in or within the area of</p>	<p>4.1 This is a registered Large -Scale CDM Wind power project, there are no protected archeological and cultural heritage sites are reported within the project footprint”. As per the list of cultural heritage sites in India²⁵ by UNESCO, it is clear that the project site is not a cultural heritage site. Law on Cultural heritage is protected against alteration, damage or removal by the “law on cultural heritage²⁶”. Compliance with India's commitment to International Covenant on Economic, Social and Cultural Rights 10.04.79 will ensure no damage to critical cultural heritage.</p> <p>4.2 The project has received the necessary approvals from the local authorities and does not lead to any resettlement. India (the Ministry of Rural development have the “The National Rehabilitation and Resettlement Policy, 2007²⁷.”</p> <p>4.3 a. Project does not require any change to land tenure arrangements and/or other rights during the project lifetime.</p> <p>b. There are no uncertainties regarding land tenure, access rights, usage rights or land ownership. The Land for the project has been approved by the several local Authorities.</p> <p>4.4 The project is located at site where there are no any peoples residing. The project is located at barren land. The project location is more than 2 km from the nearest residential area, thus project activity do not have impact on Indigenous Peoples</p>	<p>Not required</p>
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²⁵ <http://whc.unesco.org/en/statesparties/in>

²⁶ <https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf>

²⁷ <https://dolr.gov.in/sites/default/files/National%20Rehabilitation%20%26%20Resettlement%20Policy%2C%202007.pdf>

	influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?			
Principle 5 - Corruption	3.5.1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	3.5.1 The project is renewable energy technology and does not contribute to or reinforce corruption of any kind. Indulgence in corruption is an illegal activity in the host country and the local labor compliance takes into account of the same PP does not involve and is not complicit in any kind of corruption. The project abides by the United Nations Convention Against Corruption. ²⁸ India has ratified UN convention against Corruption in 2011 ²⁹ is made on 09.05.11.	
Economic safeguarding guidelines	3.6.1. The Project Developer shall ensure that there is no forced labour and that all employment is in compliance with national labour and occupational health and safety laws, with obligations under international law, and consistency with the principles and standards embodied in the International Labour Organization (ILO) fundamental conventions. Where these are contradictory and a breach of one or other cannot be avoided, then guidance shall be sought from Gold Standard. a. Workers shall be able to establish and join labour organisations.	No	3.6.1. Forced labor is an illegal activity in the host country and the local labor compliance takes into account of the same. Further, India is a party to ILO and forced labour is illegal in India. The india have laws in place prohibiting forced and compulsory labor ³⁰ The project respects fundamental right of employee. There is law in India since 1926 by The Trade Unions Act, 1926 ³¹ which protects rights of industrial trade unions and their members. The agreements are in place for permanent employees The project prefers the local employment and culture is maintained at project site. The country have strict prohibition for child labour ³² Thus project does not involve child labour during construction and operation of project activity.	Not Required

²⁸ <http://www.unodc.org/unodc/en/corruption/ratification-status.html>

²⁹ https://treaties.un.org/Pages/ViewDetails.aspx?src=IND&mtmsg_no=XVIII-14&chapter=18&clang=en#EndDec

³⁰ <https://labour.gov.in/>

³¹ <http://ncw.nic.in/acts/TheTradeUnionsAct1926.pdf>

³² https://indianchild.com/child_labour_law_in_india.htm

	<p>b. Working agreements with all individual workers shall be documented and implemented. These shall at minimum comprise:</p> <p>(a) Working hours (must not exceed 48 hours per week on a regular basis), AND</p> <p>(b) Duties and tasks, AND</p> <p>(c) Remuneration (must include provision for payment of overtime), AND</p> <p>(d) Modalities on health insurance, AND</p> <p>(e) Modalities on termination of the contract with provision for voluntary resignation by employee, AND</p> <p>(f) Provision for annual leave of not less than 10 days per year, not including sick and casual leave.</p> <p>4. The Project Developer shall justify that the employment model applied is locally and culturally appropriate.</p> <p>5. Child labour, as defined by the ILO Minimum Age Convention is not allowed.</p> <p>The Project Developer shall use adequate and verifiable mechanisms for age verification in recruitment procedures. Exceptions are children for work on their families' property as long as:</p>		<p>The project follows the health , safety and environment guidelines at project site. The project ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures.</p>	
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	<p>(a) Their compulsory schooling (minimum of 6 schooling years) is not hindered, AND</p> <p>(b) The tasks they perform do not harm their physical and mental development, AND</p> <p>(c) The opinions and recommendations of an Expert Stakeholder shall be sought and demonstrated as being included in the Project design.</p> <p>6. The Project Developer shall ensure the use of appropriate equipment, training of workers, documentation and reporting of accidents and incidents, and emergency preparedness and response measures.</p>			
<p>3.6.2 Negative Economic Consequences</p>	<p>Is project involves 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 given to vulnerable and</p>	<p>No</p>	<p>No potential risks to the local economy. The financial sustainability of the Projects implemented, also including those that will occur beyond the Project Certification period.</p> <p>The financial sustainability is demonstrated in registered PDD and these calculations are for entire lifetime of project activity.</p> <p>The project does not involve any negative impacts and no any potential risk to local economy. The project leads to economic development of the local area by means of generating employment opportunities for local people either directly or indirectly.</p>	<p>Not Applicable</p>

	marginalised social groups in targeted communities and that benefits are socially inclusive and sustainable.			
Principle 7 Climate and Energy		No	The project reduces Greenhouse Gas (GHG) emissions and fossil fuel usage compared to the baseline scenario.	Not required
7.1 Emissions	Will the Project increase greenhouse gas emissions over the Baseline Scenario?		On the contrary the project generates renewable energy and supplies electricity to the grid. The auxiliary consumption is measured by deduction of power supplied to the grid from the total power generated by the plant. However, it's to be noted that the auxiliary power consumed by the plant is generated as renewable energy and thereby no emission involved. Hence, it's not required to be monitored.	
7.2 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?			
Principle 8 - Water		No		Not required
8.1. Impact on Natural Water Patterns/Flows	a. 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?		a. The project being arenewable power project thus there is no impact of water resources. The plant area does not have large rivers and streams flow. Thus it does not affect the natural or preexisting pattern of watercourses, ground-water and/or the watershed(s).	
8.2 Erosion and/or Water Body Instability	b. 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.		b. The project is renewable energy technology and does not affect Erosion and/or water body stability c. No. the risk of erosion is unlikely by the project.	

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	c. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?			
Principle 9 - Environment, Ecology and Land Use 9.1. Landscape Modification and Soil	Does the Project involve the use of land and soil for production of crops or other products?	No	The project proponent has implemented Environment Health Safety and Social guideline which takes into account the same. The project activity involves barren land and does not involve use of land and soil for production of crops or other products.	Not Required
9.2. Vulnerability to Natural Disaster	Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	The project is renewable energy technology. Thus this section is not Applicable.	Not Required
9.3. 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 is renewable energy technology. Thus this section is not Applicable	Not Required
9.4. Release of pollutants	Could the project potentially result in the release of pollutants to the environment?	No	The project has received environmental clearance from the State Pollution control Board. Further the EHSS guidelines takes into account the same. The project does not lead to release of any hazardous substances that pose threat to the environment. Rather it aims at reducing the air pollution that is prevalent due to use of fossil fuel power plants. The project promotes environmental protection through the use of cleaner technology. The project abides by the stipulations of the Indian Environment Protection Act 1986 ³³ The report on "Developmental Impacts and Sustainable Governance Aspects of	Not Required

³³ <http://envfor.nic.in/legis/env/env1.html>

			Renewable Energy Projects” prepared by MNRE dated September 2013 ³⁴ clearly mentions that Solar farms operations do not result in direct air pollution, noise pollution.	
9.5. Hazardous and Non hazardous Waste	Will the Project involve the manufacture, trade, release, and/ or use of hazardous and nonhazardous chemicals and/or materials?	No	The project is renewable energy technology. The project does not involve generation of Hazardous and Non-hazardous Waste.	Not Required
9.6. Pesticides & Fertilisers	Will the Project involve the application of pesticides and/or fertilisers?	No	The project is renewable energy technology. Thus this principle is Not Applicable.	Not Required
9.7. Harvesting of Forests	Will the Project involve the harvesting of forests?	No	The project is renewable energy technology. Thus this principle is Not Applicable.	Not Required
9.8. 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 is renewable energy technology. Thus this principle is Not Applicable.	Not Required
9.9. Animal husbandry	Will the Project involve animal husbandry?	No	The Project does not involve animal husbandry. Thus Not Applicable	Not Required
9.10 High Conservation Value Areas and Critical Habitats	Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	Being Solar project, it does not affect or alter largely intact or HCV ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified. It is confirmed that the project is not in the proximity of any critical natural heritage site on the World Heritage list which can be checked in Host country ratification of the World Heritage Convention (1977): http://whc.unesco.org/en/statesparties/ The project has been developed with transparent communication with local communities. Further an ESIA study has been carried out for the project.	Not Required
9.11 Endangered Species	Are there any endangered species identified as potentially being present within the Project boundary (including those that	No	1. There are no endangered species identified as potentially being present within the Project boundary. 2. The Project does not impact other areas where endangered species may be present through	Not Required

³⁴ <http://mnre.gov.in/file-manager/UserFiles/report-on-developmental-impacts-of-RE.pdf>

	<p>may route through the area)?</p> <p>Does the Project potentially impact other areas where endangered species may be present through transboundary affects?</p>	<p>transboundary affects.</p> <p>There is no any adverse impact on Bio adversivity due to project implementation. Please refer page 29, table 3.4.3 of report on “Developmental Impacts and Sustainable Governance Aspects of Renewable Energy Projects” prepared by MNRE dated September 2013.</p> <p>Further an ESIA study has been carried out for the project.</p>	
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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 was conducted by the project owner and Infinite Solutions, who is the consultant to the GS project cycle, taking into account the characteristics and possible impacts of the project activity. Below stakeholders from all categories suggested by Gold standard were invited to the meeting dated 23/05/2019, the same has been documented as per the guidelines:

1. Local villagers,
2. Community members,
3. O&M operators and employees,
4. Local government bodies,
5. Apart from these the stakeholders as identified by Gold standard Board, i.e. Gold standard partnered NGOs and DNA of India (MoEF) were also invited.

The following were the types of invitations for Stakeholders Feedback Round (SFR):

- Public announcement in the village on 15th May 2019
- Email sent to the GS nominated NGO stakeholders on 9th May 2019.

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According to the requirement of "GS4GG Gold Standard for the Global Goals Stakeholder Consultation & Engagement Procedure, Requirements & Guidelines" Stakeholder Feedback Round has been conducted at the project site, connected to NH18, GaniSakunala Village in Kurnool district, AP which was attended by local stakeholders & the DOE. The expert stakeholders have been intimated for the SFR round and along with the invitations they were provided with a public link where all the project related documents are available. All the documents have been made available to public through <http://infisolutions.org/kurnool-ap-adani/> for 2 months i.e. from 9th May 2019 to 9th July 2019 before Validation is finalized to allow time for stakeholders to review and comment. They were free to comment either online or during the actual SFR meeting. There were no negative comments from the stakeholders through any means of communication channels (emails, Phone calls, Grievance Register available at the project site). The documentation is available permanently to stakeholders at project site & company's website.

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.
Comment 1: What kind of job opportunities would be made available to the villagers?	
Response: PP 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
Concerns: 2. Any impact on agriculture due to the Solar machines?	
Reply from PP/ PP Representative: PP 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
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Concerns: 3. How will the project be beneficial for the locals going forward?

Reply from PP/ PP Representative: PP 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: PP clearly explained that there is no such impact.

Name of the stakeholder:	Pingali Venkayya
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Concerns: Can we take electricity directly from the power cables?

Reply from PP/ PP Representative: PP 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
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Concerns: Is it possible to construct the road from the village connecting the highway?

Reply from PP/ PP Representative: PP 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
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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: PP 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.

ANNEX:I: **SFR Minutes of Meeting**

Agenda of the Meeting:

The SFR round was planned as part of the Gold Standard registration process. The objective of the SFR is to interact with the Stakeholders and identify their concerns/comments/suggestions for better functioning of the project. A meeting with the stakeholders was planned on 23rd May 2019. The agenda for the meeting was as follows;

- Introduction of Parampujya Solar Energy Private Limited (PDPL), the Project Participant.
- Solar power project details
- About GS and CDM mechanism
- Benefits from the solar power project
- Grievance Mechanism for stakeholders
- Yearly monitoring process for Sustainable development
- Feedback/Questions from Stakeholders
- Question and Answer session.

Location of the LSC meeting:

Project Site: Village: Gani Sakunala, District: Kurnool, Andhra Pradesh

Meeting details: 23rd May 2019.

Identification of Stakeholders:

The Stakeholder feedback round has been planned to consider and receive feedback from all the possible stakeholders to the project, i.e. local villagers, farmers, community members, O&M suppliers, local government bodies, O&M operators and employees. Apart from these the stakeholders as identified by Gold standard Board, i.e. Gold standard partnered NGOs and DNA of India (MoEF) were also invited.

Invitations to Stakeholders:

The Stakeholder feedback round has been planned at the project site, i.e. Email invitations were sent to GS partnered NGO's and MoEF dated 09/05/2019, while individual invitations public notices were put up at plant site, Local School in the village, at the Sub-station and other public areas of nearby village on date 15/05/2019.

Minutes of Meeting:

Mr. Alpesh Gedia, Associate Manager Adani Group, mediated the meeting and started the meeting by welcoming all the stakeholders and then explained the agenda for the meeting and why this feedback round is being carried out in both local and English Language. He briefly explained how this project applies to CDM and Gold standards mechanism. He explained how such power projects help in providing clean energy and thereby help in mitigating impacts due to Global Warming. He briefly explained the gist of Gold standards prerequisites and sustainability projects in the country. Further, he explained 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.

He also discussed the sustainable development matrix parameters with the impacts on each by the project along with the monitoring plan for the sustainable development indicators related to the project activity. In the process it was also explained that the impacts assessment process would be done yearly.

He also explained how the project participants (PDPL) proposes to set up a Grievance procedure where any comment/suggestion could be provided. In line with the Annex W of GS Requirement– he explained how Parampujya Solar Energy Private Limited proposes to establish continuous input and grievance procedure. He called upon Mr. Raviteja Sarraju to further discuss about the project and CSR activity.

Mr. Raviteja Sarraju informed about Adani group and project in the area being undertaken and how the area has been benefitted by operation of power projects. He further explained the CSR Policy and projects being carried out as well as planned. On project specific case he explained the whole process right from inception of the project till the current execution levels and future proposed steps and expected commissioning. He shared the long-term vision of the company regarding CSR activities to be developed in parallel to the project implementation.

Benefits from the solar power project are summarized as below:

- Employment: Due to the project there would be employment opportunities for both construction phase as well as operational phase.
- Training: Adani group has initiated various trainings in the vicinity of its ongoing projects.
- Social development: With increased economic activity and employment opportunities the project would lead to overall social and financial development of the area.
- Infrastructure development: The project would lead to infrastructure development in the area, like roads, electricity situation etc.
- Technological benefits: The project employs the best in class technology available and helps promoting latest technology.

ANNEX-II: Grievance Mechanism

Methods	Details	Reason for Selection
Continuous Input/Grievance Expression	<p>Input/Grievance Register to be maintained at project site office.</p> <p>The format of receiving inputs/complaints is as per GS requirements and is attached as annex 1.</p> <p>The inputs/grievance received shall be processed in line with the procedure as described in Annex2.</p>	<p>The administrative office of the plant is located in the plant premises. Thus, it is appropriate publicly accessible location at which local stakeholders can provide their feedback on the project.</p>
Process Book	<p>The format of receiving inputs/complaints is as per GS requirements and is attached as annex 1.</p> <p>The inputs/grievance received shall be processed in line with the procedure as described in Annex2.</p>	<p>The local stakeholder shall be informed about the process book during the SFR. Further, a public notice shall be posted at the site informing the stakeholders about the grievance procedure.</p>
Telephone access	<p>Mr. Raviteja Sarraju, an employee of the company who is based at the project location is responsible and his mobile number +91 9100020371 shall be available for any stakeholder to comment.</p> <p>The comments mentioned shall be recorded in the grievance register</p>	<p>For those who are unable to travel to site or are not literate, they may contact the Project Implementer via telephone.</p> <p>Persons dialing this telephone number will have access to a Project representative who speaks both English and the local language, Hindi.</p>

	and shall be processed in line with procedure described in Annex 2.	The stakeholders may also contact the DOE appointed for the Validation, i.e. Mr. Ravikant Soni (+91- 9818561801)
Internet/email access	<p>Email address:</p> <ol style="list-style-type: none"> 1. Mr. Alpesh Gedia: alpeshk.gedia@adani.com 2. Gold Standard: info@sustain-cert.com <p>DOE: Mr. Ravikant Soni ravikant.soni@climensys.com</p> <p>The comments mentioned shall be recorded in the grievance register and shall be processed in line with procedure described in Annex 2.</p>	<p>Two email id of the project Implementer has been provided for continuous input / grievance for the convenience of stakeholders with internet access.</p> <p>Email address for the Gold Standard's has also been provided along with the details of the DOE (Auditor) for the project.</p>
Nominated Independent Mediator	<p>No Independent mediator is assigned.</p> <p>However, Mr. Raviteja Sarraju, an employee of company has been assigned as the point of contact for all the local issues.</p> <p>The comments mentioned shall be recorded in the grievance register and shall be processed in line with procedure described in Annex 2.</p>	<p>The use of a Nominated Independent Mediator is not being employed. As the use of the process book, telephone and internet will sufficiently capture feedback as necessary.</p> <p>However a local employee shall be available in case stakeholders have any comments.</p>

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	cs@adani.com
Website	http://www.adani.com/
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.	
Personal e-mail	cs@adani.com

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