

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



Version 1.1 – August 2017

KEY PROJECT INFORMATION

Title of Project:	216 MWacAdani Green Energy (Tamilnadu) Solar Power Project
Brief description of Project:	The project activity is a 216 MW solar power project, promoted by Adani Green Energy (Tamilnadu) Limited. The purpose of the project activity is to generate clean electricity with utilization of solar energy.
Expected Implementation Date: Expected duration of Project:	NA 25 years
Project Developer:	Adani Green Energy (Tamilnadu) Limited
Project Representative:	Infinite Solutions
Project Participants and any communities involved:	Adani Green Energy (Tamilnadu) Limited.
Version of PDD: Date of Version:	06 04/09/2020
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(Affordable and Clean Energy): 353,123 MWh/year 2. SDG 8: (Decent Work and Economic Growth): Number (employees): 20 persons 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(Climate Action): 332,606 tCO ₂ e per annum

SECTION A. Description of project

A.1. Purpose and general description of project

The main purpose of this project activity is to generate clean form of electricity through renewable solar energy source for sale of electricity to the grid. Adani Green Energy (Tamilnadu) Limited (AGETL) is the promoter of the proposed project activity.

The project activity involves installation of 216 MWAC (corresponding to 259.20 MWp) solar power project. The project is installed in the same project boundary at Village: Sangapadai & Pudukottai, Tehsil: Kamuthi, District: Ramanthapuram, State: Tamil Nadu.

The electricity generated from project activity is sold under the Power Purchase Agreement (PPA), signed with Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) wholly owned by the Government of Tamil Nadu. The electricity generated from the project activity has been evacuated through 230 kV sub-station located at Kamuthi for consumption in the Indian Electricity Grid.

The project will replace anthropogenic emissions of greenhouse gases (GHG's) estimated to be approximately 332,606 tCO₂e per annum, thereon displacing average 353,123 MWh/year amount of electricity from the generation-mix of power plants connected to the Indian electricity grid, which is mainly dominated by thermal/fossil fuel-based power plant.

The project activity is the installation of a new grid-connected renewable power plant/unit and this is not a CPA that has been excluded from a registered CDM PoA as a result of erroneous inclusion of CPAs.

The details of the project are mentioned in the table:

Project Investors' Name	Adani Green Energy (Tamilnadu) Limited
Capacity in MW	216
Commissioning Date	11/03/2016
PPA	04/07/2015
State	Tamil Nadu

Prior to the project activity, the land was private land. For the implementation of the project, the land was purchased from the land owners. All the sale deed between land owner and the Project proponent i.e. Kamuthi Renewable Energy Ltd. are available with the PP.

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 the same.

Sustainable Development

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

- *Social well being*
The project activity is providing 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 plant 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 activity meets the eligibility criteria as per section 3.1.1 of GS4GG Principles & Requirements document as described below.

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

General Eligibility Criteria under Renewable Energy Activity Requirements

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

Project Location : The project is located in India.

Project scale : The project activity is a 216 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 consent to establish from TN pollution control board; also the Power Purchase Agreement demonstrate the PP as the legal owner. Thus the project participant Adani Green Energy (Tamilnadu) Limited 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.

Tamil Nadu

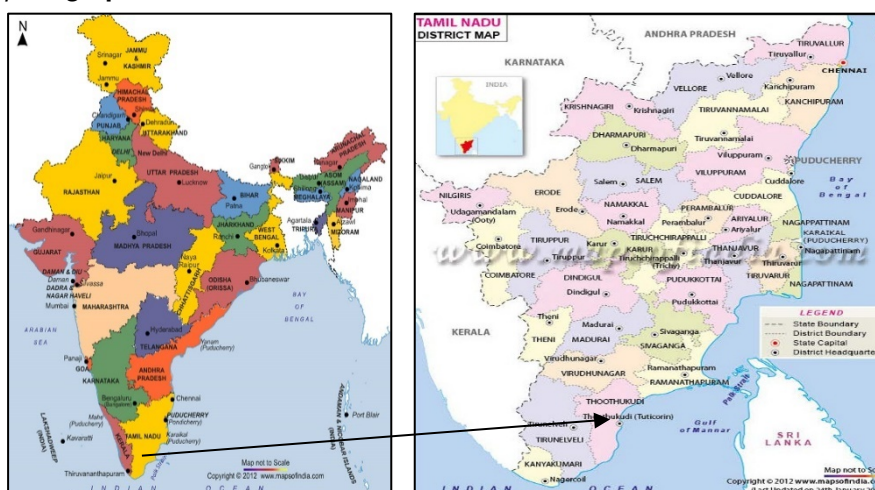
A.4.3. City/Town/Community etc.

Villages: Sangapadai & Pudukottai

Tehsil : Kamuthi

District : Ramanthpuram

A.4.4. Physical/Geographical location



The Project is located at Village Kamuthi, Tehsil: Kamuthi, Dist. Ramanthpuram, Tamil Nadu. The site is well connected by state highway state highway (SH) 47 up to Arruppukottai and further national highway NH48 connects to Madurai. The nearest commercial city remains Madurai, which is approximately 90km from the Project site location. Nearest railway station is at Tiruchuli which is 25km from the site and Madurai is the closest airport approximately 90km from the site. The project coordinates are 9° 20' 36.32" N, 78° 23' 17.54" E.

A.5. Technologies and/or measures

The project activity aims to harness solar energy through installation of PV with total installed capacity of 216MWac. The solar PV power plant will have solar PV modules, inverters, transformers and other protection system and supporting components.

Technical Specifications at the time of commissioning and during CDM validation and registration of project activity

A. Solar PV modules:

Module Supplier	Module Model	Capacity (p)	Number	Total Capacity (MWp)
Canadian	Poly C-Si	310	53280	16.5168
Canadian	Poly C-Si	315	226560	71.3664
Canadian	Poly C-Si	320	28160	9.0112

GCL	Poly C-Si	310	640	0.1984
GCL	Poly C-Si	315	58400	18.396
Hanwha	Poly C-Si	310	480	0.1488
Suntech	Poly C-Si	310	187360	58.0816
Suntech	Poly C-Si	315	264320	83.2608
Suntech	Poly C-Si	320	320	0.1024
Trina Solar	Poly C-Si	310	10560	3.2736
Trina Solar	Poly C-Si	315	160	0.0504

B. Inverters:

S.No.	Make		
1.	Manufacturer	ABB	Hitachi
2.	Model	PVS800	NPi201
3.	Rated Capacity	1000 KW	1250 KW
4.	No. of Inverters	16	160
5	Rated Input Voltage(Max.Input Voltage)	380 V	350 V

C. Transformers

S.No.	Make			
1.	Manufacturer	T&R	SChneider	SChneider
3.	Capacity	108/120 MVA	4 MVA	5 MVA
4.	No. of Transformers	2	4	40
5.	Voltage Ratio	33/230 KV	0.380/33 KV	0.350/33 KV

D. Metering Equipment Details

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

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

In case of degradation / damage / destroy of any equipment in future:

At a given time in the future, the equipment of the same capacity might not be available with the supplier or in the market. So, the equipment of available capacity is installed keeping the overall output capacity of the project within the project capacity as in registered PDD.

Thus, the changes in project activity specifications information will not affect the design of project activity, the applicability of methodology, additionality of project activity and scale of project activity. And there would be no need to revise PDD in case of equipment configuration changes as the overall output capacity of the project is within the project capacity as in registered PDD. It is to be noted that in case of future replacement, the equipment's replaced or changes made in the project will be transparently reflected in the monitoring report.

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

Baseline Scenario

As the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following as per applied methodology: "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in the "Tool to calculate the emission factor for an electricity system".

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

Purpose of the Project

The purpose of the project activity is to generate electrical power using solar energy through operation of Solar Panels, thereby displacing non-renewable fossil resources resulting 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 Adani Green Energy (Tamilnadu) Limited Project will result in reduction of the greenhouse gas emissions.

The total installed capacity of the project activity is 216 MW. The annual GHG emission reduction through this project activity is 332,606 tCO₂e.

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

1. **SDG 13: Climate Action** :The project would lead to average reduction of approx. 332,606 tCO₂ per annum due to implementation of project activity.
2. **SDG 7: Affordable and Clean Energy** : The project is expected to generate average of 353,123 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 216 MW hence clearly it is Large Scale project.

A.7. Funding sources of project

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

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

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

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

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

Response: India is party to "Convention on the Elimination of All Forms of Discrimination against Women"¹ 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

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

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beneficiaries in terms of employment and social upliftment of the area are common for both the gender. Further the project has carried out various CSR² activities 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. Here women have also been provided opportunities to comment on the design of the project.
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 10/06/2015 in village Kamuthi of district Ramanthapuram, Tamilnadu.

The project representative explained how such power projects help in providing clean energy and thereby help in mitigating impacts due to Global Warming and the impacts of solar power projects which lead to providing clean energy, increase in employment opportunities both long term and short term, increased income and thereby leading to improvement in living standard of the people.

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

The stakeholders shared full support for solar power project operations.

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)³

² www.adanipower.com/docs/download/csrpolicy

² <https://www.adanigreenenergy.com/csr.html>

³ <https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG>

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 8⁴

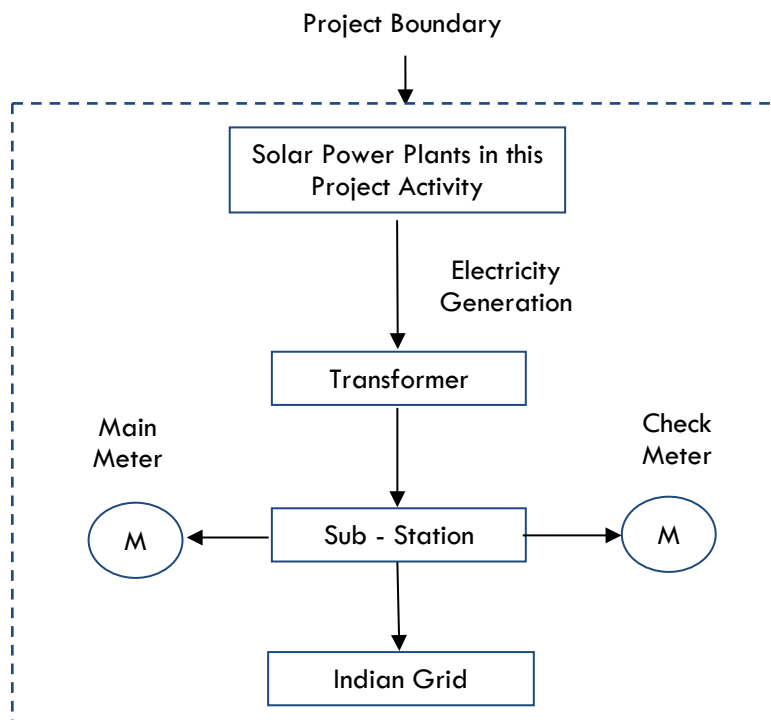
B.2. Applicability of methodology

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. The same has been described in the CDM PDD.

B.3. Project boundary

Project boundary has ascertained using para 20 of ACM0002 (Version 20.0, EB EB105, 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.”

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



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

Source		GHGs	Included?	Justification/Explanation
Baseline	Gridconnectedelectricitygeneration	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
Project	GreenfieldSolarPowerProjectActivity	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 wind 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".

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:

- Simple OM; or
- Simple adjusted OM; or
- Dispatch data analysis OM; or
- 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:

- average of the five most recent years, or
- 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.

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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.

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 show the simple OM and Net generation⁵ respectively for the recent three years:

Simple Operating Margin Emission Factors (t CO ₂ /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:

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

Where:

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

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$FC_{i,m,y}$	: Amount of fossil fuel type i consumed by power unit m in year y (Mass or volume unit)
$NCV_{i,y}$	: Net calorific value (energy content) of fossil fuel type i in year y (GJ / mass or volume unit)
$EF_{CO_2,i,y}$	: CO ₂ emission factor of fossil fuel type i in year y (tCO ₂ /GJ)
$EG_{m,y}$	: Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
m	: All power units serving the grid in year y except low-cost / must-run power units
i	: All fossil fuel types combusted in power unit m in year y
y	: The relevant year as per the data vintage chosen in step 3

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

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

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

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

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

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

Where:

$EF_{grid,BM,y}$	Build margin CO ₂ emission factor in year y (tCO ₂ /MWh)
$EG_{m,y}$	Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$	CO ₂ emission factor of power unit m in year y (tCO ₂ /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 available⁵. 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:

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

Where:

$EF_{grid,BM,y}$	= Build margin CO ₂ emission factor in year y (t CO ₂ /MWh)
$EF_{grid,OM,y}$	= Operating margin CO ₂ emission factor in year y (t CO ₂ /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
EFgrid,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.
EFgrid,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 and 2018-19) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 15, published by Central Electricity Authority (CEA), Government of India.
EFgrid,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

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 under RfR (Request for registration) under CDM. For Additionality, CDM PDD (UN10583) can be referred.⁶

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B.6. Sustainable Development Goals (SDG) outcomes

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

Item	Goals and Targets	Indicators
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⁶ <https://cdm.unfccc.int/Projects/Validation/DB/NDH4VJWJ5V306A60CB7BR5FW5HG80T/view.html>

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: 353,123 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 • No. of trainings provided to the employees per year • Employment generated due to project activity
	Target: • 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: 332,606 tCO2 per annum	

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

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

SDG 7 : Affordable and Clean Energy

The baseline for the project is no project, thus leading to generation in the relevant grid which is dominated by fossil fuel. The clean energy generated by the project is calculated based on the amount of electricity generated by the project per annum. The project is expected to generate 353,123 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
- Soft Skill Training

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

The project activity provides employment to 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 332,606 tCO₂ per annum.

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

$$ER_y = BE_y - PE_y$$

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)

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

Relevant SDG Indicator	SDG13 : 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 ⁷ , Dec 2019
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 and 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 : 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 : Climate Action
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⁷ <http://cea.nic.in/tpeandce.html>

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
Choice of data or Measurement methods and procedures	The combined margin emissions factor is calculated as follows: $EF_{grid, CM, y} = EF_{grid, OM, y} * W_{OM} + EF_{grid, BM, y} * W_{BM}$ Where: $EF_{grid, BM, y}$ = Build margin CO₂ emission factor in year y (tCO₂/MWh) $EF_{grid, OM, y}$ = Operating margin CO₂ emission factor in year y (tCO₂/MWh) W_{OM} = Weighting of operating margin emissions factor (%) = 75% W_{BM} = Weighting of build margin emissions factor (%) = 25%
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

<i>SDG 7: Affordable and Clean Energy</i>	- Project expected to generate 363,052 MWh clean energy every year
<i>SDG 8: Decent Work and Economic Growth</i>	- Minimum 1 training to be carried out for O&M staff annually. The project is also providing employment to 20 persons.
<i>SDG13 : Climate Action</i>	- The project leads to mitigation of 332,606 tCO ₂ 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 CO ₂ emission factor for grid connected power generation in year y = 0.9419 t CO ₂ /MWh.

Project Participant	Capacity	PLF (%)	Average Annual Generated Power in the 1st crediting period (MWh/year)	Baseline Emission Factor (tCO ₂ /MWh)	Baseline emissions (tCO ₂ / year)
Adani Green Energy (Tamilnadu) Limited	216 MW	18.85%	353,123	0.9419	332,606

$$BE_y = 353,123 * 0.9419 \text{ t CO}_2/\text{year} = 332,606 \text{ tCO}_2/\text{year}$$

Project emissions

$$PE_y = 0$$

Leakage

No leakage emissions are applicable.

Emission reductions

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	356,672	356,672
Year 2	0 MWh	354,889	354,889
Year 3	0 MWh	353,114	353,114
Year 4	0 MWh	351,349	351,349
Year 5	0 MWh	349,592	349,592
Total	0 MWh	1,765,616	1,765,616
Total number of crediting years	5 Years		
Annual average over the crediting period	0 MWh	353,123	353,123

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 353,123 MWh.

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
Total	0 Training, 0 Jobs	5 Trainings, 20 Jobs	5 Trainings, 20 Jobs
Total number of crediting years	5 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 tCO ₂	Project estimate tCO ₂	Net benefit tCO ₂
Year 1	335,950	0 tCO ₂	335,950
Year 2	334,270	0 tCO ₂	334,270
Year 3	332,598	0 tCO ₂	332,598
Year 4	330,935	0 tCO ₂	330,935
Year 5	329,281	0 tCO ₂	329,281

Total	1,663,034	0 tCO ₂	1,663,034
Total number of crediting years	5 Years		
Annual average over the crediting period	332,606	0 tCO ₂	332,606

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 332,606 tCO₂ per year. Since the project is solar energy therefore the project does not emit any GHG.

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

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 TANGEDCO every month.
Value(s) applied	353,123 MWh
Measurement methods and procedures	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 guidelines⁸ 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 and electricity imported from the grid obtained from Monthly Meter reading reports provided by TANGEDCO (Ramnad Electricity Distribution Circle) as per below equation: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ The calculation is done by Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) and the PP has no say in the calculation. Based on the Monthly generation Statement issued by TANGEDCO the project shall raise the invoice. The electricity exported to the grid by the project activity connected to the sub-station is measured by electronic trivector meters of accuracy class 0.2s. The electricity exported will be measured continuously using Main & Check meters. Export readings of Main & Check meters shall be taken on monthly basis by authorized officer of TANGEDCO in the presence of PP or representative of PP. 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 Ramnad Electricity Distribution Circle, TANGEDCO.
Monitoring frequency	Monthly

⁸http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2166.pdf , page 12

QA/QC procedures	Calibration of all the meters will be undertaken once every five years and faulty meters will be duly replaced immediately. The meters will be of accuracy class 0.2s.
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	- Quantitative employment, - Quality of employment - Income generation
Unit	- Number (Trainings) - Number (employees) - INR (salary)
Description	- Number of Trainings provided to employees & O&M staff - Number of project employees with Number of male/female, permanent/temporary, age and person with disabilities. - Salary given to the employees of the project. The income to all the unskilled workers are made on day to day basis with the minimum being Rs. 350 per day. Annual records of income paid to all the employees would be available.
Source of data	Training Records (HSE & HR) & Employee feedback forms Salary Slip of the project employees.
Value(s) applied	Minimum of 1 training would be carried out annually. At least 10 people are expected to be employed at site during crediting period The income to all the unskilled workers are made on day to day basis with the minimum being Rs. 350 per day. Annual records of income paid to all the employees would be available. .
Measurement methods and procedures	- Training Attendance sheets and records. - Employment Records - Salary slip of the employees
Monitoring frequency	Annually
QA/QC procedures	The number of persons employed would be mentioned in the plant register, which can be cross checked with daily attendance register. Salary slip can be checked for earnings of female and male employees
Purpose of data	Continuation of regular trainings/workshops for employees & O&M staffs
Additional comment	-

Relevant SDG Indicator	SDG 13.2.1 : Climate Action
Data / Parameter	Air quality
Unit	tCO ₂
Description	Reduction in CO ₂ 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 "CO ₂ Baseline Database for Indian Power Sector" version 15.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) applied	332,606 tCO ₂ emission reductions estimated per annum
Measurement methods and procedures	Calculated from CEA database and Energy Generation

Monitoring frequency	Calibration and Testing of Meters will be done by the accredited agency as per norms. Once in 5 years as per CEA guidelines ⁹
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	-

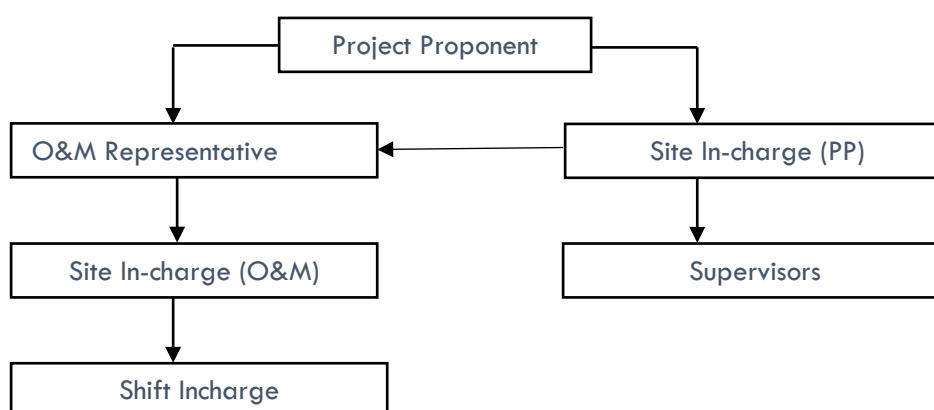
B.7.2. Sampling plan

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 Tamil Nadu, 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.

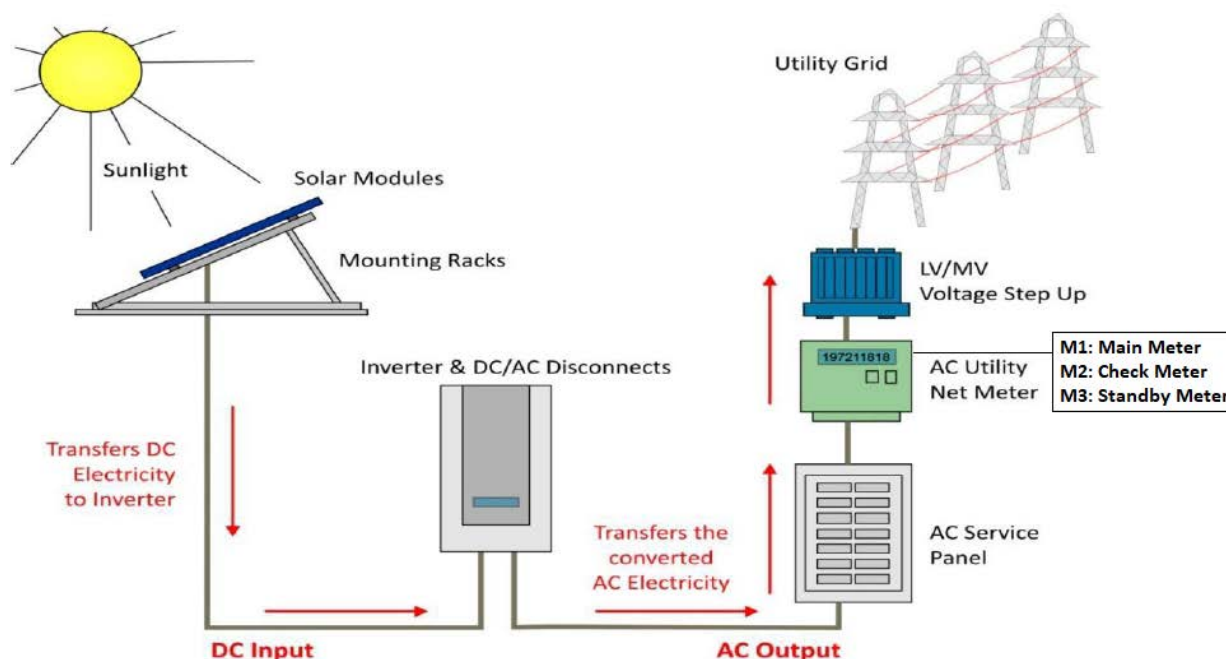
Responsibilities of Shift In-charge: Responsibility for day to day data collection and maintains day to day monitored data.

Data Measurement

Projects activity comprises of installation of 6 Energy meters installed at the at project site, 3 Energy meters (1 main meter and 1 check meter, 1 standby meter) under control of PP and 3 Energy meters (1 main meter, 1 check meter, 1 standby meter) sealed and under control of TANGEDCO used for joint metering installed at interconnection point of the Grid at project site.

⁹ http://www.aegcl.co.in/Metering_Regulations_Of_CEA_17_03_2006.pdf, page 12

The export and import energy will be measured continuously using above mentioned Main & Check meters. Export & Import readings of Main & Check meters installed at the project site shall be taken on monthly basis by authorized officer of TANGEDCO in the presence of PP or representative of PP. The meter reading will be taken jointly and signed by the representatives of the TANGEDCO and project investors. Based on the readings provided by TANGEDCO, 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 TANGEDCO officer and PP do not have any control on it. Also accuracy class of meters and calibration frequency is under purview of TANGEDCO officer and PP do not have any control on it. PP get the monthly generation report from where net electricity supplied to grid is obtained and used for emission reduction calculations.



It is to be noted that though the PP or their representatives are available during meter reading, the calculations of net electricity supplied to grid is completely under purview of TANGEDCO and PP does not have any control on it. Also accuracy class of meters and calibration frequency is under purview of TANGEDCO/Discom officer and PP does not have any control on it. PP gets 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 are 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-Jun-2015 as per the date of signed earliest purchase order for Balance of System (BOS) by Adani Green Energy (Tamilnadu) Limited.

C.1.2. Expected operational lifetime of project

25 years 00 Months

C.2. Crediting period of project

C.2.1. Start date of crediting period

01/11/2020 or two years prior to the date of Project Design Certification, whichever is later.

C.2.2. Total length of crediting period

5 years (Renewable twice).

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)
SOCIAL & ECONOMIC SAFEGUARDING PRINCIPLES				
1. Human Rights	a. The Project Proponent 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.	No	a. The Project is not in conflict with the economic livelihood or other issue of the local community. Thus, the Project does not cause any human rights abuse and respects internationally proclaimed human rights issue. b. Project activities are not expected to cause any human rights abuse. As a	Not Required

	b. The Project shall not discriminate with regards to participation and inclusion.		member of United Nations ¹⁰ and part of UN Agreement on Human Rights ¹¹ , it is ensured by law in India that no action can be taken against human rights.	
2. Gender Equality & Women's Rights	1. The Project shall complete the following gender assessment questions in order to inform Requirements, below: a. Is there a possibility that the Project might reduce or put at risk women's access to or control of resources, entitlements and benefits? b. 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)? c. 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)? d. 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)? e. 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	1. The project does not decrease women's access to or control of resources. a) 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. b) No, the Project does not create any adverse effect on the local community. c) No, the Project does not consider the gender roles while engaging them and thereby provide equal rights to men and women¹². Local community meetings are scheduled considering participation by both Men and Women. d) The project does not discriminate the local community on basis of gender or caste or religion and therefore equally serve to all.¹³ e) No, the Project design neither increase women's workload nor prevent them from engaging in other activities.	Not Required

¹⁰ <https://labour.gov.in/lcandilasdivision/india-ilo>

¹¹ <https://www.ilo.org/newdelhi/lang-en/index.htm>

¹² <https://labour.gov.in/sites/default/files/Equal%20Remuneration%20Rules,%201976.pdf>

¹³ https://labour.gov.in/sites/default/files/equal_remuneration_act_1976.pdf

	f. 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? g. 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? h. Is there a likelihood that the proposed Project would expose women and girls to further risks or hazards? 2. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women. a. Sexual harassment and/or any forms of violence against women - address the multiple risks of gender -based violence, including sexual exploitation or human trafficking. b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls. c. Restriction of women's rights or access to resources (natural or economic). d. 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. 3. Projects shall apply the principles of non discrimination, equal treatment, and equal pay for equal work, specifically:	f) There is no room for discrimination against women in this Project¹⁴. g) The Project will not limit women's ability regarding natural resources. The project is solely utilizing solar power and therefore does not impact natural resources of the region. h) No, the Project will not expose women and girls to further risks or hazards. 2. The project does not create any direct or indirect impacts on gender equality and/or the situation of women: a. The project proponent has a grievance cell which would investigate complaints. b. Project participation by women or girls is merely voluntary basis and there is no compulsion on them. The project proponent has a grievance cell which would investigate complaints. c. The Project will not restrict women's rights or access regarding natural resources. d. Marital status is completely irrelevant to the Project. The project proponent does not discriminate on gender, caste, religion etc. 3. The project has applied the principles of non-discrimination and equal treatment, pay & work as follows:	
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	a. 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. b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status. c. Ensure that these conditions do not limit the access of women or men, as the case may be, to Project participation and benefits. 4. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks.		a. Yes, the Project has equal opportunity for women and men to contribute both in volunteer and working positions. b. The project proponent has a specified HR policy that considers participation by both men and women. c. There is no limit on the access to Project participation and benefits from either of these conditions. 4. AGETL does not involve in any form of discrimination in any kind. India also ratified relevant ILO core conventions on equality, namely Equal Remuneration Convention (Convention No 100) and Discrimination (Employment and Occupation) Convention (Convention No 111) in 1997¹⁵.	
3. Community Health, Safety & Working Conditions	a. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community.	No	a. 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 Rights¹⁶.	Workplace Health & Safety trainings will be conducted regularly during the project operation.
4. Cultural Heritage, Indigenous Peoples, Displacement and Resettlement	a. 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)? b. Does the Project require or cause the physical or economic relocation of peoples		a. As per the EIA report, there are no protected archeological and cultural heritage sites are reported within the project footprint". Law on Cultural heritage is protected against alteration, damage or removal by the "law on cultural heritage¹⁷". b. The project does not involve any settlement areas. Thus, this project does not cause the physical or economic relocation of peoples. The project	Not required

¹⁵ https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---sro-new_delhi/documents/publication/wcms_650119.pdf

¹⁶ <https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx>

¹⁷ <https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf>

	(temporary or permanent, full or partial)? c. Does the Project require any change to land tenure arrangements and/or other rights? d. For Projects involving land-use tenure, are there any uncertainties with regards land tenure, access rights, usage rights or land ownership? e. Are indigenous peoples present in or within the area of influence of the Project and/or is the Project located on land/territory claimed by indigenous peoples?		activity does not involve any alteration of existing roads as well as it does not add additional traffic. Since the site located isolated area, the traffic volume is negligible. Hence, there is no additional burden to the existing traffic. c. The Solar panels are all developed on Private land purchased for project and all of them belongs to AGETL as per EIA report. No forest land will be used for the project. d. 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 as per EIA report. e. No cultural heritage/ indigenous people are replaced by the project.	
1. Corruption	a. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects.	No	AGETL does not involve and is not complicit in any kind of corruption. India has ratified UN convention against Corruption in 2011 ¹⁸ .	Not required
2. Economic Impacts	a. The project does not employ and is not complicit in any form of child labor. b. The project provides workers with a safe and healthy work environment and is not complicit in exposing workers to unsafe or unhealthy work environments.	No	a. AGETL and their subcontractors complying with all relevant national laws regarding child labor. AGETL will not employ children in any shape or form for their works. India has ratified ILO "C138 – Minimum Age Conventions" and "C182 – Worst Forms of Child Labour Convention"¹⁹. b. The project owner is committed to the safe and healthy working conditions all phases of the project. All employees will attend trainings health & safety. This issue is protected by Labor code²⁰ and UN Agreement on Human Rights²¹. c. AGETL and appointed contractors will not involve in any form of forced or compulsory labour. India has ratified	Not Required

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

¹⁹ https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691

²⁰ <https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx>

²¹ <https://www.ohchr.org/EN/Countries/AsiaRegion/Pages/INIndex.aspx>

	c. The project does not involve and is not complicit in any form of forced or compulsory labor.		ILO "C029 – Forced Labour Convention" ²²	
ENVIRONMENTAL & ECOLOGICAL SAFEGUARDING PRINCIPLES				
1. Climate and Energy	a. Will the Project increase greenhouse gas emissions over the Baseline Scenario? b. Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	a. The project reduces Greenhouse Gas (GHG) emissions and fossil fuel usage compared to the baseline scenario. b. On the contrary the project generates renewable energy and supplies (except plant's auxiliary consumption) 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.	Not required
2. Water	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? 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. c. Is the Project's area of influence susceptible to excessive erosion and/or water body instability?	No	a. The project being a solar power project thus there is no impact of water resources. As per the EIA report, the plant area does not have large rivers and streams, only small gaps flow. In the dry season, there is almost no water, only water in the rainy season. b. No. As per EIA report, the risk of erosion is unlikely by the project. c. No. As per EIA report, the risk of erosion is unlikely by the project.	Not required
3. Environment, Ecology and Land Use	a. Does the Project involve the use of land and soil for production of crops or other products? b. 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	a. The project has been established at the desert land which was not used for production of crops and other products for a long time. b. The project is susceptible to decreased vulnerability to solar, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme conditions. c. As per the EIA report, the solar plant does not affect the herbal life.	Not Required

²² https://www.ilo.org/dyn/normlex/en/f?p=1000:11200:0::NO:11200:P11200_COUNTRY_ID:102691

	c. Could the Project be negatively impacted by the use of genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development)? d. Could the Project potentially result in the release of pollutants to the environment? e. Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials? f. Will the Project involve the application of pesticides and/or fertilisers? g. Will the Project involve the harvesting of forests? h. Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives? i. Will the Project involve animal husbandry? j. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites[11] identified? k. Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? l. Does the Project potentially impact other areas where endangered species may be present through transboundary affects?		d. The project takes a precautionary approach regarding environmental challenges and is not complicit in practices contrary to the precautionary principle. The environment is protected by several Laws and Regulations in India. The purpose of the “Law on Environmental Protection” is to protect the environment with principles of sustainable development and environment ²³. The project owner also follows necessary procedures for environmental safety at the project. e. All hazardous and non-hazardous wastes will be disposed as per the local regulations. The methods are categorized for all materials in the EIA report. f. Not applicable for solar power plants. g. No. the project area was deserted before project implementation. h. No. The project does not modify the quantity or nutritional quality of food available. i. No. Not applicable for solar project. j. EIA report states that the projected area of the Project is laterite and rocky soils, not located in sensitive ecological zones, biodiversity conservation areas, and there are no rare and valuable plant and animal species. k. No. There were no endangered species found in the project boundary as per EIA report. l. No. The project does not impact other areas where endangered species may be present.	
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²³ <file:///C:/Users/hp/Downloads/The-Environment-Protection-Act-1986.pdf>

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 which were displayed to the nearby areas. Further, stakeholders were invited individually to attend the stakeholders meeting. The meeting was held on 10/06/2015.

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.

Now Stakeholder's Feedback round was defined jointly 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. The stakeholders from all categories suggested by Gold standard were invited to the meeting dated 25/05/2019, the same has been documented as per the guidelines.

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 09th May 2019.

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/agetl-adani/> for 2 months i.e. from 09th May 2019 to 08th July 2019 before Validation is finalized to allow time for stakeholders to review and comment. They are 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.

The DOE has taken the feedback directly from the stakeholders. The list of attendees of the physical meeting has been provided to DOE for validation.

Munities of meeting of stakeholders' feedback round is mentioned in Annex-I.

Grievance Mechanism information is mentioned in Annex-II

They were happy about the project & the benefits they are getting by the project activity.

E.2. Summary of comments received

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:	Aminur Miah
Comment: What are the fuels used in the operation of the project activity or any boiler will be installed on-site?	
Response: The project activity does not use any fuel, instead it uses potential of solar energy to generate Electricity with the help of PV modules, and there is no installation of boilers on-site. Solar panels are used to generate electricity.	

Name of the stakeholder:	D. George
Concerns: Does the project activity have any negative impact on local climate conditions like air, land and soil quality, rain and agriculture scenario of the area?	
Reply from PP/ PP Representative: The project activity does not have any negative impact on local climate conditions like air, land and soil quality, rain and agriculture scenario of the area, as already told motive of this project activity is to reduce future anthropogenic emission caused by conventional power generating unit like thermal power plants. The project activity will result in improvement in climate conditions, improve quality of air, land, water, and agriculture scenario.	

Name of the stakeholder:	D. Senthil Kumar
Concerns: 3. Will the project help in improving the electricity supply to the villagers or the neighborhood areas?	
Reply from PP/ PP Representative: Project proponents informed him that as the project exports the electricity to local substation first, there is clear possibility that the local electricity supply situation will be better and local populace will get benefited as a result of it. However, they have also mentioned the preference of supply of electricity is not under the control of project. Since, the electricity is generated in the region, we sincerely hope that the local requirements of electricity are given due consideration by the DISCOM.	

Name of the stakeholder:	T. Prabhakaran
Concerns: What will be the operational lifetime of the project activity?	
Reply from PP/ PP Representative: The Operational lifetime of the Project activity is of 25 years.	

Name of the stakeholder:	M. Murugan
Concerns: Does the project provide employment opportunities to local populace?	
Reply from PP/ PP Representative: They were informed that except technical staff, preference will be given to local population in employment, who have desired skills and qualifications. Possibility of imparting training to the educated unemployed youth will also be considered.	

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

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 (AGETL) 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 Adani Green Energy (Tamil Nadu) Limited proposes to establish continuous input and grievance procedure. He called upon Mr. Sankaranarayanan N to further discuss about the project and CSR activity.

Mr. Sankaranarayanan N from (AGETL) informed about Adani group and various projects 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.
- CSR Activity: Adani group has initiated various CSR activities 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 information

Methods	Details	Reason for Selection
Continuous Input/Grievance Expression	Input/Grievance Register to be maintained at project site office. The format of receiving inputs/complaints is as per GS requirements and is attached as annex 1. The inputs/grievance received shall be processed in line with the procedure as described in Annex2.	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.
Process Book	The format of receiving inputs/complaints is as per GS requirements and is attached as annex 1. The inputs/grievance received shall be processed in line with the procedure as described in Annex2.	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.
Telephone access	Mr. Sankaranarayanan N, an employee of the company who is based at the project location is responsible and his mobile number +91 9099005305 shall be available for any stakeholder to comment. The comments mentioned shall be recorded in the grievance register and shall be processed in line with procedure described in Annex 2.	For those who are unable to travel to site or are not literate, they may contact the Project Implementer via telephone. Persons dialing this telephone number will have access to a Project representative who speaks both English and the local language, Hindi. The stakeholders may also contact the DOE appointed for the Validation,

		i.e. Mr. Ravikant Soni (+91-9818561801)
Internet/email access	Email address: 1. Mr. Alpesh Gedia: alpeshk.gedia@adani.com 2. Gold Standard: info@sustain-cert.com DOE: Mr. Ravikant Soni ravikant.soni@climensys.com The comments mentioned shall be recorded in the grievance register and shall be processed in line with procedure described in Annex 2.	Two email id of the project Implementer has been provided for continuous input / grievance for the convenience of stakeholders with internet access. Email address for the Gold Standard's has also been provided along with the details of the DOE (Auditor) for the project.
Nominated Independent Mediator	No Independent mediator is assigned. However, Mr. Sankaranarayanan N, an employee of company has been assigned as the point of contact for all the local issues. The comments mentioned shall be recorded in the grievance register and shall be processed in line with procedure described in Annex 2.	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. However a local employee shall be available in case stakeholders have any comments.

Appendix 1. Contact information of project participants

Organization name	Adani Green Energy (Tamilnadu) Limited.
Registration number with relevant authority	U40300GJ2015PLC082578
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	
Website	http://www.adani.com/
Contact person	Dhaval Trivedi
Title	Sr. Manager - Business Development
Salutation	Mr.
Last name	Trivedi
Middle name	
First name	Dhaval
Department	Solar
Mobile	+91 79 2555 7429
Direct fax	
Direct tel.	
Personal e-mail	dhaval.trivedi@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