

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

Key Project Information

0 - Description of project

0 - Implementation of project

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KEY PROJECT INFORMATION

Key Project Information

GS ID (s) of Project (s)	GS7078
Title of the project (s) covered by monitoring report	216 MWac Adani Green Energy (Tamil Nadu) Solar Power Project
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	06
Version number of the monitoring report	03
Completion date of the monitoring report	21/07/2025
Date of project design certification	09/11/2020
Date of Last Annual Report	31/12/2024
Monitoring period number	02
Duration of this monitoring period	01/01/2021 to 08/11/2023 (Both dates included)
Project Representative	Adani Green Energy (Tamil Nadu) Limited
Host Country	India
Activity Requirements applied	☐ Community Services Activities ☒ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	ACM0002: Grid-connected electricity generation from renewable sources - Version 20
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
SDG 7: Affordable and Clean Energy	MWh of renewable energy generated	1,054,382	MWh

SDG 8: Decent Work and Economic Growth	Trainings Employees Income (INR)	21 26 24,682,572	Training Employee INR
SDG 13: Climate Action	Emission Reduction	993,122	VERs

Table 2 – Product Vintages

		Amount Achieved		
Start Dates	End Dates	SDG 7: Affordable and Clean Energy MWh	SDG 8: Decent Work and Economic Growth	SDG 13: Climate Action VERs
01/01/2021	31/12/2021	335,167 MWh	5 Trainings 26 Employees INR 8,190,192	315,694 GSVERs
01/01/2022	31/12/2022	390,522 MWh	14 Trainings 26 Employees INR 8,225,184	367,832 GSVERs
01/01/2023	08/11/2023	328,693 MWh	2 Trainings 26 Employees INR 8,267,196	309,596 GSVERs

SECTION A. DESCRIPTION OF PROJECT

A.1. 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 (Tamil Nadu) Limited (AGETL) is the promoter of the proposed project activity. The project activity involves installation of 216 MW_{AC} (corresponding to 259.20 MWp) solar power project. The project is installed in the same project boundary at Village: Sangapadai & Pudukottai, Tehsil: Kamuthi, District: Ramanthpuram, 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 substation located at Kamuthi for consumption in the Indian Electricity Grid. The project has replaced anthropogenic emissions of greenhouse gases (GHG's) to be 993,122 tCO₂e, thereon displacing average 1,054,382 MWh 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 because of erroneous inclusion of CPAs.

Table 3 – Details and chronology of the project:

Capacity in MW	216 AC
State	Tamil Nadu
Grid	TANGEDCO
Purchase order date (project start date)	13/06/2015
PPA	04/07/2015
Commissioning date	11/03/2016

Project Boundary- Project boundary has ascertained using ACM0002, version 20.0. The spatial extent of the project boundary includes the project power plant/unit and all power plants/ units connected physically to the electricity system that the CDM project power plant is connected to.

Hence the project boundary includes the solar project activity, substation, grid and all power plants connected to the grid. The project activity evacuates power to the Indian grid.

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 7: Tool to calculate the emission factor for an electricity system" (Version 7.0)¹.

Baseline Scenario

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

Sustainable Development

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

- **Social well being**

The project activity provides job opportunity to local people during erection, commissioning and maintenance of the solar 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. This directly and indirectly positively effects the economy of villages and nearby area.

- **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

¹ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

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. Location of project

Host Party: India

State: Tamil Nadu

District: Ramanthpuram

Tehsil: Kamuthi

Village: Sangapadai & Pudukottai

Table 4 – Physical/Geographical location:

Project Developer	Latitude	Longitude	Commissioning date
Adani Green Energy (Tamil Nadu) Limited	9° 20' 36.32 "N	78° 23' 17.54 "E	11/03/2016





216 MWac Adani Green Energy (Tamil Nadu) Solar Power Project

A.3. Reference of applied 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)

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

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

A.4. Crediting period of project

Table 5 – Details of Crediting Period

Type	Renewable
CDM crediting period	04/08/2020 to 03/08/2027 ²

² <https://cdm.unfccc.int/Projects/DB/Appendix1595926960.08/view>

Design certification Date	09/11/2020
Transition date (GSCER to GSVER)	28/04/2022 ³
GS crediting period	09/11/2018 ⁴ to 08/11/2023
Length of Crediting Period	5 years Which will be renewed twice totaling to 15 years (5+5+5)
Current Monitoring Period	01/01/2021 to 08/11/2023 (Both dates included)

project will/has not issue both a CER/other compliance unit under Paris Agreement and GS VER for the same vintage.

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

The project activity aims to harness solar energy through installation of PV with total installed capacity of 216 MWac. The solar PV power plant has solar PV modules, inverters, transformers and other protection system and supporting components. The first Purchase Order is considered as the start date for the Project i.e. 13/06/2015 and the Project is commissioned on 11/03/2016.

Technical Specifications: -

Table 6 – Solar PV modules:

Module Supplier	Module Model	Capacity (p)	Number	Total Capacity (MWp)
Canadian	Poly C-Si	310	53,280	16.5168
Canadian	Poly C-Si	315	226,560	71.3664
Canadian	Poly C-Si	320	28,160	9.0112
GCL	Poly C-Si	310	640	0.1984
GCL	Poly C-Si	315	58400	18.396

³ This is a provided in the public domain. The link for the same is provided - [Gold Standard Assurance](#)

⁴ 10.2.1 of GHG Emissions Reduction & Sequestration Product Requirements v.2.1

"The start date of Crediting Period is the date of start of operation (start of planting for A/R Projects) or a maximum of two years (three years for A/R & AGR) prior to the date of Project Design Certification, whichever occurs later."

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

Table 7 – 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

Table 8 – Transformer:

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

Table 9 – 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 the project activity, the applicability of methodology, additionally of project activity and scale of project activity. Moreover, 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 is replaced or changes made in the project will be transparently reflected in the monitoring report.

B.1.1 Forward Action Requests

Following FAR was raised during last performance review-

1. An annual report shall be submitted for each monitoring year by end of next calendar year for which verification is not completed. The first non-compliance with this requirement is deviated and approved on 27 June 2022. Further Failure to provide Annual Reports as required shall result in the de- certification of the Project.

PD Response: Annual report is submitted for each monitoring year by end of next calendar year for which verification is not completed and same are publicly available on- <https://assurance-platform.goldstandard.org/project-documents/GS7078>

2. The pre-CDM period can be included in GS CP and GSVERs may be issued directly and GS VER CP1 is 9/11/2018 to 8/11/2023. To maintain Gold Standard Certified Project status beyond five years, a Project must undergo Design Certification Renewal no later than the last date of current certification cycle.

PD Response: The Project has completed the Design Certification Renewal before the expiration of the previous crediting period. The documents for the same are publicly available on- <https://assurance-platform.goldstandard.org/project-documents/GS7078>

3. Verification VVB shall check all registries that could hold CERs/VERs/RECs from the project activity and confirm there is not any other issuance except GS VER from this project activity.

PD Response: The Project was initially registered under CDM with Project 10583: 216 MWac Adani Green Energy (Tamil Nadu) Solar Power Project⁵, however, no carbon credits were claimed under the CDM. The Project was later registered under GS for the crediting period of 09/11/2018 to 08/11/2023, out of which the first monitoring report period was 09/11/2018 to 31/12/2020. The Project Developer wants to clarify that the project is not registered under any other GHG/non-GHG mechanism and the PD has also provided the declaration for no double-counting for the same.

4. The project is in Tamilnadu and feedback form is not in local vernacular language i.e. Tamil. PP must be aware that in rural area of Tamilnadu, people are not very well acquainted with Hindi. Verification VVB shall confirm the grievance mechanism is in place and method for continuing feedback is proper for this project activity.

PD Response: The PD wants to clarify that the complaints provided in the grievance register consists of both English and the local languages as per the stakeholder convenience. The grievance register is provided to the VVB for their verification.

B.2. Post-Design Certification changes

Not Applicable

B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

Not Applicable

B.2.2. Corrections

Not Applicable

B.2.3. Changes to start date of crediting period

⁵ <https://cdm.unfccc.int/Projects/DB/Appendix1595926960.08/view>

Not Applicable

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

Not Applicable

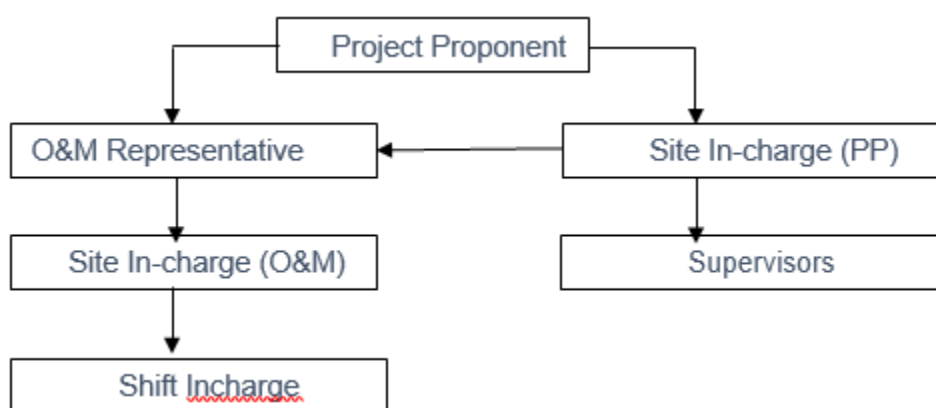
B.2.5. Changes to project design of approved project

Not Applicable

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

The monitoring plan is developed in accordance with the modalities and procedures for project activities and for grid-connected solar power project/ unit being in Tamil Nadu, India. The monitoring plan, implemented by the project developer 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 developer. There were no major breakdowns occurred in the current monitoring period. Although, no such events have happened during the reported monitoring period, which can alter the applicability of the applied methodology. The details for the breakdown are provided in Appendix 1.



Responsibilities of Site In charge (PD):

Overall functioning and maintenance of the project activity, the Site In charge shall coordinate with the O&M operator as well as the site supervisors.

Responsibilities of O&M Representative:

Co-ordination between Site in charge of the O&M operator as well as the project developer and further report to PD 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.

QA/QC procedures:

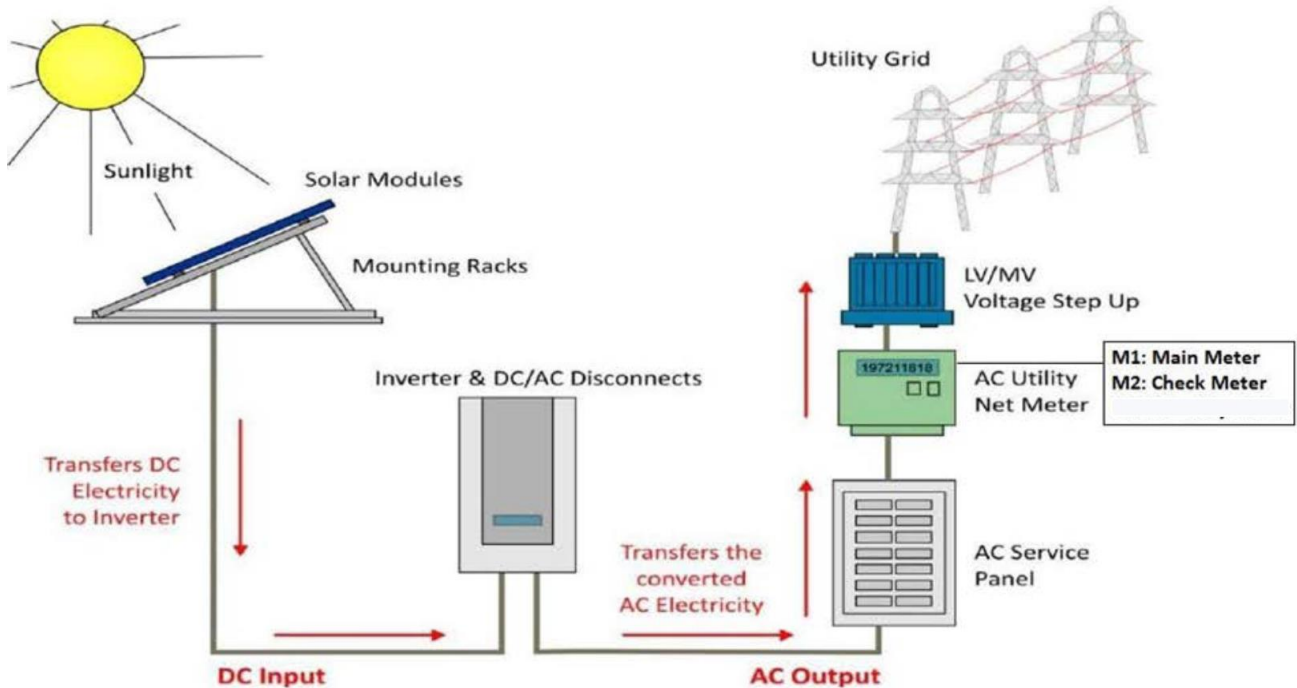
The energy meters at the feeders are maintained and owned by Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO). Neither the project developer nor the site personnel have any control over it. The records Are cross-checked with the records of sold electricity TANGEDCO. The meters are calibrated by TANGEDCO at-least once in five years.

Data Measurement

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

The export and import energy are 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 PD or representative of PD. The meter reading will be taken jointly and signed by the representatives of the TANGEDCO 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 PD or PD representative is available during meter reading, the calculations of net electricity supplied to grid is completely under purview of TANGEDCO officer and PD do not have any control on it. Also, accuracy class of meters and calibration frequency is

under purview of TANGEDCO officer and PD do not have any control on it. PD get the monthly generation 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 are collected under the supervision of the authorized representatives of PD. 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 meter installed at Substation, where all the faulty meters are required to be repaired or replaced simultaneously, the export & import readings from Main, Check 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 (GS team) are 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 D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

Relevant SDG Indicator 13: Take urgent action to combat climate change and its impacts

Table 10

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 ⁶ .
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 "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	This parameter is fixed ex-ante for the entire crediting period.

Table 11

Data/parameter	$EF_{BM, y}$
Unit	tCO2e/MWh
Description	Build Margin Emission Factor of INDIAN Grid
Source of data	Calculated from CEA database, Version 15, December 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.

⁶ [CDM - CO2 Baseline Database - Central Electricity Authority](#)

Additional comment	This parameter is fixed ex-ante for the entire crediting period.
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Table 12

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, December 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	-

D.2 Data and parameters monitored

Relevant SDG Indicator 7.2: By 2030, increase substantially the share of renewable energy in the global energy mix

Table 13

Data / Parameter	$EG_{PJ, y}$
Unit	MWh
Description	Quantity of net electricity generation that is produced and fed into the grid
Measured/calculated/	Method: The Net electricity supplied to the grid by the project activity is calculated as a difference of electricity exported to the

default	grid, electricity imported from the grid obtained from Monthly Meter reading reports provided by SEB as per below equation: $EG_{\text{facility},y}= EG_{\text{Export}} - EG_{\text{Import}}$																																				
Source of data	Generation statement provided by TANGEDCO every month.																																				
Value(s) of monitoring parameter	1,054,382 MWh																																				
Monitoring equipment	Projects activity comprises of installation of 6 Energy meters installed at the at project site, 3 Energy meters (1 main meter 1 check meter and 1 standby meter) under control of PD and 3 Energy meters (1 main meter, 1 check meter and 1 standby meter) sealed and under control of TANGEDCO used for joint metering installed at interconnection point of the Grid at project site. <table><tr><th colspan="4">Meter & Calibration Details:</th></tr><tr><th>Detail s</th><th>Main Meter</th><th>Check Meter</th><th>Standby Meter</th></tr><tr><td>Meter Numb er</td><td>TNW01990</td><td>TNW01991</td><td>TNE81533</td></tr><tr><td>Make</td><td>Secure</td><td>Secure</td><td>Secure</td></tr><tr><td>Accur acy</td><td>0.2s</td><td>0.2s</td><td>0.2s</td></tr><tr><td>Last Calibr ation</td><td>27/08/2018</td><td>27/08/2018</td><td>19/02/2016</td></tr><tr><td>Due date</td><td>26/08/2023</td><td>26/08/2023</td><td>18/02/2021</td></tr><tr><td>Recen t calibra tion</td><td>28/12/2022</td><td>28/12/2022</td><td>28/12/2022</td></tr><tr><td>Calibr ation freque ncy</td><td colspan="3">Once in 5 years as per CEA guidelines</td></tr></table> Cross Checking: Quantity of net electricity supplied to the grid will be cross-checked from the Invoices/ Monthly Bill raised by the Project Developer to Ramnad Electricity Distribution Circle, TANGEDCO.	Meter & Calibration Details:				Detail s	Main Meter	Check Meter	Standby Meter	Meter Numb er	TNW01990	TNW01991	TNE81533	Make	Secure	Secure	Secure	Accur acy	0.2s	0.2s	0.2s	Last Calibr ation	27/08/2018	27/08/2018	19/02/2016	Due date	26/08/2023	26/08/2023	18/02/2021	Recen t calibra tion	28/12/2022	28/12/2022	28/12/2022	Calibr ation freque ncy	Once in 5 years as per CEA guidelines		
Meter & Calibration Details:																																					
Detail s	Main Meter	Check Meter	Standby Meter																																		
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Accur acy	0.2s	0.2s	0.2s																																		
Last Calibr ation	27/08/2018	27/08/2018	19/02/2016																																		
Due date	26/08/2023	26/08/2023	18/02/2021																																		
Recen t calibra tion	28/12/2022	28/12/2022	28/12/2022																																		
Calibr ation freque ncy	Once in 5 years as per CEA guidelines																																				

Measuring/reading / recording frequency:	Monthly
Calculation method (if applicable)	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 guidelines⁷ 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 as per below equation: $EG_{PJ,y} = EG_{Export} - EG_{Import}$ Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) do the calculation and the PD 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 tri-vector meters of accuracy class 0.2s. The electricity exported will be measured continuously using Main & Check meters.
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.

⁷ As per CEA data base the frequency of meter calibration is once in five years.
https://cea.nic.in/old/reports/regulation/CEA_metering_regulation_amendment_2019.pdf

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 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.

Table 14

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 is made on day-to-day basis with the minimum wage requirement within the state for each year⁸. Annual records of income paid to all the employees would be available.
Measured/calculated/	Measured

⁸ Detailed calculation is provided to VVB for assessment

default																																	
Source of data	Training Records (HSE & HR) & Employee feedback forms Salary Slip of the project employees.																																
Value(s) of monitoring parameter	Number of training vintage-wise: <table><tr><th>Year</th><th>Number of Training</th></tr><tr><td>2021</td><td>5</td></tr><tr><td>2022</td><td>14</td></tr><tr><td>2023</td><td>2</td></tr><tr><td>Total</td><td>21</td></tr></table> The detailed training record for this monitoring period is provided in the Appendix 2. Vintage-wise salary in INR: <table><tr><th>Year</th><th>Income generation (Amount In INR)</th></tr><tr><td>2021</td><td>8,190,192</td></tr><tr><td>2022</td><td>8,225,184</td></tr><tr><td>2023</td><td>8,267,196</td></tr></table> The total number of O&M staffs employed for the operation & maintenance of the project activity are around 26. <table><tr><th>Year</th><th>Number of employees</th></tr><tr><td>2021</td><td>26</td></tr><tr><td>2022</td><td>26</td></tr><tr><td>2023</td><td>26</td></tr></table> Number of Skilled, semi-skilled and unskilled bifurcation- <table><tr><th>Skilled</th><th>Semi-skilled</th><th>Unskilled</th></tr><tr><td>17</td><td>1</td><td>8</td></tr></table> The above number of jobs are permanent and full-time in nature. Additional short-term services create temporary jobs. Females are not employed at the site for this monitoring period as the site is located at a remote location. As per Minimum Wages Act, 1948, the workers in the project plant are required to be paid minimum wages as per	Year	Number of Training	2021	5	2022	14	2023	2	Total	21	Year	Income generation (Amount In INR)	2021	8,190,192	2022	8,225,184	2023	8,267,196	Year	Number of employees	2021	26	2022	26	2023	26	Skilled	Semi-skilled	Unskilled	17	1	8
Year	Number of Training																																
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2022	26																																
2023	26																																
Skilled	Semi-skilled	Unskilled																															
17	1	8																															

	government regulations ⁹¹⁰¹¹ , on the basis of Zone C which is applicable for the project location.
Monitoring equipment	• Training Attendance sheets and records. • Employment Records • Salary slip of the employees
Measuring/reading/recording frequency:	Annually
Calculation method (if applicable)	The number of persons employed would be mentioned in the plant register, which can be crossed checked with daily attendance register. Salary slip can be checked for earnings of female and male employees
QA/QC procedures	Continuation of regular trainings/workshops for employees and O&M staffs
Purpose of data	-
Additional comment	

Relevant SDG Indicator 13: Take urgent action to combat climate change and its impacts

Table 15

Data / Parameter	Air Quality
Unit	tCO ₂ e
Description	Reduction in CO ₂ emission reduction due to implementation of project activity
Measured/calculated/default	Calculated
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

⁹ [Minimum Wages in Tamil Nadu April 2021 » HR | Compliance | Labour Law](#)

¹⁰ [Minimum Wages in Tamil Nadu April 2022 » HR | Compliance | Labour Law](#)

¹¹ [Minimum Wages in Tamil Nadu Revised April 2023 » HR | Compliance | Labour Law](#)

	Power Sector" version 17.0, published by the Central Electricity Authority, Ministry of Power, Government of India.
Value(s) of monitored parameter	993,122
Monitoring equipment	Not Applicable, as it is a calculated parameter
Measuring/reading / recording frequency:	Calibration and Testing of Meters will be done by the accredited agency as per norms. Once in 5 years as per CEA guidelines.
Calculation method (if applicable)	Calculated from "CO ₂ Baseline Database for Indian Power Sector" and Energy Generation
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	The data will be archived for crediting period+2 years

D.3. Comparison of monitored parameters with last monitoring period

Not Applicable for non- Community Service Activities.

D.4. Implementation of sampling plan

No sampling process is involved, hence not applicable. The details of sampling any of carried out during the course of verification will be included.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

SDG 7 The monitoring parameter for the SDG 7 is Quantity of net electricity supplied to the grid during the year y. Since baseline and pre-project scenario are same, in the

baseline condition no renewable electricity will be supplied to grid from the project location. Hence, the baseline value is zero.

Table 16

Vintage	Baseline Value
	Quantity of net electricity supplied to the grid (MWh)
01/01/2021 to 31/12/2021	0
01/01/2022 to 31/12/2022	0
01/01/2023 to 08/11/2023	0

SDG 8: -

The monitoring parameter for the SDG 8 are Number of trainings provided to employees & O&M staff, Income generation & Number of O&M staffs involved in the project. Since baseline and pre-project scenario are same, in the baseline condition these values are zero.

Table 17

Vintage	Baseline Value		
	Number of trainings (Nos)	Income generation (Lakh INR)	Number of employees (Nos)
01/01/2021 to 31/12/2021	0	0	0
01/01/2022 to 31/12/2022	0	0	0
01/01/2023 to 08/11/2023	0	0	0

SDG 13: Climate Action

In the baseline, there were no Social Development activities taking place; whereas baseline Emissions for electricity supplied by project activity, BE_y is calculated as:

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

Where,

BE _y	Baseline emissions in year y (tCO ₂ /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 project activity in year y (MWh/yr).
EF _{grid,CM,y}	Combined margin CO ₂ 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" (tCO ₂ /MWh).

$$EG_{PJ,y} = 1,054,382 \text{ MWh}$$

$$EF_{CO_2, grid, y} = EF_{grid, CM, y, y} = 0.9419 \text{ tCO}_2\text{e/MWh}$$

Hence,

$$\begin{aligned} BE_y &= 1,054,382 \text{ MWh} * 0.9419 \text{ tCO}_2\text{e/MWh} \\ &= 993,122 \text{ tCO}_2\text{e} \text{ (Round down values)} \end{aligned}$$

Thus, the estimated baseline situation of each SDG outcome is summarised as follows;

Table 18

Item	Baseline value
SDG 7: Affordable and Clean Energy	No Activities in the baseline
SDG 8: Decent Work and Economic Growth	No Activities in the baseline
SDG 13: Climate Action	Emission of 993,122 tCO ₂ e

E.2. Calculation of project value or estimation of project situation of each SDG Impact

>>

SDG 7:

The monitoring parameter for the SDG 7 is Quantity of net electricity supplied to the grid during the year y. In the project situation, the project supplied 1,054,382 MWh electricity during the monitoring period. This can be crosschecked from JMR & Invoices.

During Monitoring period - 01/01/2021 to 08/11/2023

Quantity of net electricity supplied to the grid (MWh) = 1,054,382 MWh

Table 19

Monitoring period	Project Value
	Quantity of net electricity supplied to the grid (MWh)
01/01/2021 to 31/12/2021	335,167
01/01/2022 to 31/12/2022	390,522
01/01/2023 to 08/11/2023	328,693
Total	1,054,382

SDG 8:

The monitoring parameter for the SDG 8 are Number of trainings provided to employees & O&M staff, Cost spent for O&M & Number of O&M staffs involved in the project. During the project scenario, the following is achieved:

During Monitoring period - 01/01/2021 to 08/11/2023

Quality of Employment – 21 trainings

Quantitative employment and income generation - 26 employees & INR 24,682,572

These can be crosschecked from the training records & employment records.

Table 20

Monitoring period	Project Value		
	Number of trainings (Nos)	Income generation (INR)	Number of employees (Nos)
01/01/2021 to 31/12/2021	5	INR 8,190,192	26
01/01/2022 to 31/12/2022	14	INR 8,225,184	26
01/01/2023 to 08/11/2023	2	INR 8,267,196	26
Total	21	INR 24,682,572	26

SDG 13:

As per the approved consolidated Methodology ACM0002 (Version 20.0):

The monitoring parameter for the SDG 13 is Quantity of emission reduction during the year y. In the project situation, the project reduced 993,122 tCO₂e during the current monitoring period. This parameter is calculated.

During Monitoring period - (01/01/2021 to 08/11/2023)

Quantity of emission reduction – 993,122 tCO₂e

Table 21

Monitoring period	Project Value		
	Net generation (MWh)	Grid Emission Factor (tCO ₂ /MWh)	Emission Reduction (tCO ₂)
01/01/2021 to 31/12/2021	335,167	0.9419	315,694
01/01/2022 to 31/12/2022	390,522	0.9419	367,832
01/01/2023 to 08/11/2023	328,693	0.9419	309,596
Total	1,054,382	0.9419	993,122

As per para 31 of section 5.4 of the approved consolidated Methodology ACM0002 (Version 20.0):

“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 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/year)

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

$PE_{GP, y}$ - Project emissions from the operation of dry, flash steam or binary geothermal power plants in year y (t CO₂e/ year)

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

" As the project activity is the installation of a new grid-connected Solar power plant/unit and does not involve any project emissions from fossil fuel, operation of dry, flash steam or binary geothermal power plants, and from water reservoirs of hydro power plants. Therefore $PE_{FF, y}$, $PE_{GP, y}$, $PE_{HP, y}$ is equal to zero and thus, $PE_y = 0$ tCO₂e.

Table 22

Monitoring period	Project Emission (tCO ₂ e)
01/01/2021 to 08/11/2023 (Inclusive of both the dates)	0

E.3. Calculation of leakage

>>

No leakage emissions are applicable.

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
7	MWh of renewable energy generated	0	1,054,382	1,054,382
8	Decent Work and Economic Growth	0	26Employees 21 Training INR 24,682,572	26 employees 21 Training INR 24,682,572
13	Emission Reduction	993,122	0	993,122

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ¹² achieved during this monitoring period
7	353,123 MWh/Year (365 days) 1,008,094 MWh for the Monitoring period (1042 days)	1,054,382 MWh
8	1 training/year 20 employees Minimum wage Rs 350/Day	21 training 26 employees INR 24,682,572
13	332,606 tCO ₂ /Year (365 days) 949,522 tCO ₂ for the monitoring period (1042 days)	993,122 tCO ₂

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

>>

SDG -13

It is to be noted here that as per the PDD the estimated emission reduction to be achieved from the project activity for the current monitoring period is

$$= 332,606 * 1042 \text{ (days)} / 365$$

$$= 949,522 \text{ tCO}_2\text{e}$$

Whereas actual emission reductions achieved during this monitoring period is 993,122 tCO₂e, which is approximately 5% Higher than the estimated emission reductions.

SDG -07

It is to be noted here that as per the PDD the estimated electricity generation to be achieved from the project activity for the current monitoring period is

$$= 353,123 * 1042 \text{ (days)} / 365$$

$$= 1,008,094 \text{ MWh}$$

¹² Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

The actual electricity generation for the current monitoring period achieved is 1,054,382 MWh which is approximately 5% Higher than the estimated value. This is due to higher PLF achieved due to increased solar radiation and is thus nature dependent and not in control of PD. Other parameters for increase in emission reduction in the current monitoring period are due to efficient equipment and frequent module cleaning. Therefore, as the generation increases so does the emission reduction.

Breakdown details for current monitoring period are provided in Appendix 1: Breakdown Details which have no major impact on actual net electricity generation.

SDG -08

As per the registered PDD 1 training per year and at least 20 employees should be employed. For this monitoring period there were 21 trainings and 26 employees.

Table 23 - The below comparison of SDG 7, SDG 8 and SDG 13 for the monitoring period of 01/01/2021 to 08/11/2023 is as per follows:

SDG	Parameter	Annual Average Estimation as per PDD	Estimation for the monitoring period as per PDD	Actual Achieved during the monitoring period	Difference
7	Renewable electricity generation (MWh)	353,123	1,008,094	1,054,382	5%
8	Number of Trainings Conducted	1	NA	21	NA
	Income generation (INR)	NA	NA	24,682,572	NA
	Number of Employment	20	20	26	30%
13	Emission Reduction (tCO ₂ e)	332,606	949,522	993,122	5%

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

>>

The actual achieved emission reduction for this monitoring period is 5% higher than estimated value in the PDD. This is due to higher PLF achieved due to increased solar radiation and is thus nature dependent and not in control of PD. Other parameters for

increase in emission reduction in the current monitoring period are due to efficient equipment and frequent module cleaning. This is within the sensitivity range which does not breach even with the increase of 10% in line with the registered PDD.

SECTION F. SAFEGUARDS REPORTING

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No safeguarding principles were added to the monitoring plan in the registered PDD. Therefore, the relative success and failures, or improvements to proposed mitigation measures is not applicable.

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

>>

As a part of continuous feedback from stakeholders, the grievances register is being placed at the project site office where all the complaints are being written down and the register is being checked by the site in-charge on regular basis and is being continuously monitored and addressed on regular basis and maintained in a register at site office. During the monitoring period, minor grievances were raised—such as the removal of jungle trees along public pathways, requests for electrical lighting in the village temple, issues with ceiling fan operation, streetlight replacements etc. These concerns have all been addressed and resolved. The copies have been provided to the VVB.

The grievances if any are recorded as per the table below:

S. No.	Date of Complaint	Topic	Date of resolution	Remark from PD
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G.2. Report on any stakeholder mitigations that were agreed to be monitored.

>>

No grievances received in the previous monitoring period, thus no follow up required.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

>>

Not legal contest or dispute that has arisen with the project during the monitoring period.

Appendix 1: Plant Breakdown Details

Date	Error Description	Action Taken	Duration (Hrs.)
Apr-2021	16amps aux fuse failure, U2 ph, W2ph	Fault String Rectified & Started	25:32
May-2021	IGBT SAT Trip, Inverter Fuse Failure	W1 ph, U2 PHASE	28:21
June-2021	IGBT SAT Trip not resetting, IGBT SAT trip	v2 phase gate drive card replace, Gate-drive card Replaced	15:58
July-2021	V1 ph, v2 ph	Gate Driver Card Replaced & Started, v2 ph Stack Replaced & Started	20:07
Aug-2021	W2 ph, Inverter Fuse Failure	Gate Driver Card Replaced & Started, Pulse distribution card & FRC cable replaced	12:49
Sept-2021	V2 ph, U1 ph	gate drive card replaced, Gate Driver Card Replaced & Started	15:12
Oct-2021	IGBT SAT TRIP V1 PH, V2 ph StackBlast	Gate Driver card replaced, IGBT Stack replaced and INV started	49:14
Nov-2021	Inverter Fuse Failure, IGBT SAT Trip	GATE DRIVE CARD replaced and running @ half load, Reset & started	125:03
Dec-2021	IGBT SAT TRIP, W2 ph	Reset & started	62:54
Jan-2022	DC CB Off Failure, Fan Power Failure, V1ph	Feedback Card Replaced & Started, Reset & started	262:37
Feb-2022	DC CB Off Failure, V2ph	Reset & started	97:05
March-2022	Charging Resistors Failure, IGBT SAT TRIP	Fault String Rectified & Started, Reset & Started	108:25
Apr-2022	DC Output Detection, IGBT SAT Trip	DC Switch Replaced & Started, W2ph Stack Replaced & Started	53:47
May-2022	Temperature Abnormal, AC Over Current	Reset & started	37:57
June-2022	Led not Fleckering,	Reset & started	76:57

	AC Over Current		
July-2022	Keypad Card Communication Fail, DC CB On Failure	F-3 stack failure, spare not available arrangement in progress, V1ph Gate Driver Card Replaced & Started	95:38
Aug-2022	DC CB Off Failure, U1ph Stack Blast	Replaced & started	225:59
Sept-2022	IGBT stack blast, AC Over Current Unavailability Of IGBT Stack Spare	Reset & Inv Started, DC CT feedback wire replaced, DC Coil replaced	305:49
Oct-2022	DC CB On Failure, main contactor fault	Replaced & started	29:23
Nov-2022	U1 PH stack blasted, AC Over Current	Reset & started	27:06
Dec-2022	IGBT Stack blasted (6 no), AC Over Current	Current Sharing Checked & Inv Started	61:26
Jan-2023	AC Over Current, IGBT SAT Trip	Reset & started	49:02
Feb-2023	DC CB On Failure, AC Over Current	Breaker Manually Closed & Inv Started, Reset and started	59:38
March-2023	Led Not showing, DC Output Detection	Wph ACCT Connector issue, connection removed, tighten and then started	35:27

Appendix 2: Training Records

S. No.	Number of Training	Number of participants	Date of training
1	EHS Induction Training	08	01/02/2021
2	EHS Induction Training	01	08/01/2021
3	Safety Induction Training	05	03/05/2021
4	Permit to work	13	21/05/2021
5	Work at height	14	22/05/2021
6	Animal/Insect bite Safety Awareness	09	12/10/2022
7	Awareness of Incident Reporting & Investigation	07	17/10/2022
8	Electric safety awareness	14	12/10/2022
9	Fire safety Training Awareness	10	10/10/2022
10	Lockout/Target Awareness Training	12	19/06/2022
11	Safety Induction Training	03	29/06/2022
12	OHS Traffic Awareness Training	06	28/06/2022
13	Safety Induction Training	03	16/10/2022
14	Safety Induction Training	03	18/10/2022
15	Safety Induction Training	01	24/10/2022
16	Safety Induction Training	01	27/10/2022
17	Safety Induction Training	06	28/10/2022
18	Safety Induction Training	03	29/10/2022
19	Safety Induction Training	01	31/10/2022
20	Hazardous chemical at workplace & safety awareness	11	11/05/2023
21	Safety operating procedure of Gas cylinder	18	19/05/2023