MONITORING REPORT

CARBON OFFSET UNIT (CoU) PROJECT

Title: 10 MW Solar Grid Power Project Amaravathi Textiles, Nellore, Andhra Pradesh

UCR PROJECT ID: 144

Version 1.0

Date 08/05/2022

First CoU Issuance Period: 21/06/2015-31/12/2021

Monitoring Period: 21/06/2015 to 31/12/2021

Crediting Period: 6 years 6 months

MONITORING REPORT (MR)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	10 MW Solar Grid Power Project Amaravathi Textiles, Nellore, Andhra Pradesh
UCR Project ID	144
Scale of the project activity	Small Scale
Completion date of the PCN	08/05/2022
Project participants	Amaravathi Textiles Private Limited (Project Proponent) Energy Advisory Services Pvt Ltd (Aggregator)
Host Party	India
Applied methodologies and standardized baselines	Type I (Renewable Energy Projects) UNFCCC Methodology Category AMS I.D.: "Grid connected renewable electricity generation" Ver 18 UCR Protocol Standard Baseline EF
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of total GHG emission reductions for the crediting period per year	**2015: 4638 CoUs (4638 tCO2eq)** **2016: 15668 CoUs (15668 tCO2eq)** **2017: 14907 CoUs (14907 tCO2eq)** **2018: 15490 CoUs (15490 tCO2eq)** **2019: 14887 CoUs (14887 tCO2eq)** **2020: 13449 CoUs (13449 tCO2eq)** **2021: 13451 CoUs (13451 tCO2eq)** **Total: 92220** CoUs (**92220** tCO_{2eq}/yr)

SECTION A. Description of project activity

a). Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project activity (UCR ID#144) titled, **10 MW Solar Grid Power Project Amaravathi Textiles, Nellore, Andhra Pradesh,** is located in Village: Nellore Palem, Mandal: Atmakur, District: Nellore, State: Andhra Pradesh, Country: India.

This is a single project activity of capacity 10 MW, which is a ground mounted grid connected solar power generation project supplying renewable power to the Transmission Corporation of Andhra Pradesh Limited (APTRANSCO) in the District of Nellore, in the state of Andhra Pradesh, in India. The purpose of this plant installation and power generation is for grid supply.

In pre-project scenario the State utility was importing the required electricity from the Southern grid to meet its requirement of electrical energy. Currently, the Southern grid is connected to large numbers of fossil fuel-based power plants. Hence, project activity is displacing the gross electricity generation from the Southern grid, which otherwise would have been imported from the Southern grid. The project activity doesn't involve any GHG emission sources. The annual and the total CO2e emission reduction by the project activity over the defined monitoring period is as per Annexure I. Thus, project activity leads to reduce the GHG emissions as it displaces power from fossil fuel-based electricity generation in the regional grid.

b). Purpose of the project activity:

The purpose of the proposed project activity is to generate electricity using a clean and renewable source of energy i.e., solar radiation. As per the ex-post estimate, this project generates approximately 16268 MWh of electricity per annum considering an average PLF of 17%. The project activity uses Poly Crystalline solar photovoltaic technology to generate clean energy.

The generation of power from solar photovoltaic is a clean technology as there is no fossil fuel fired or no GHG gases are emitted during the process. Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array.

The average life time of the Photovoltaic Panel is around 20 years as per the equipment supplier specification. Solar radiation is converted directly into electricity by solar cells (photovoltaic cells). In such cells, a small electric voltage is generated when light strikes the junction between a metal and a semiconductor (such as silicon) or the junction between two different semiconductors. Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array

The estimated annual average CO2e emission reductions by the project activity is 14642 tCO2e. Since the project activity generates electricity through solar energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

c). Relevant dates for the project activity (e.g., construction, commissioning, continued operation periods, etc.)>>

The project activity of 10 MWh (i.e.,10000 kWh) is the installation and operation of a solar power plant in Nellore district in the state of Andhra Pradesh are per the details listed below:

Village	District	Type	Total installed capacity kW	Commissioning date
Nellore Palem	Nellore	Ground mounted	10000	31/03/2015

UCR Project ID : 144
Commissioning Date: 31/03/2015
Start Date of Crediting Period: 21/06/2015
Crediting Period: 6 years 6 months

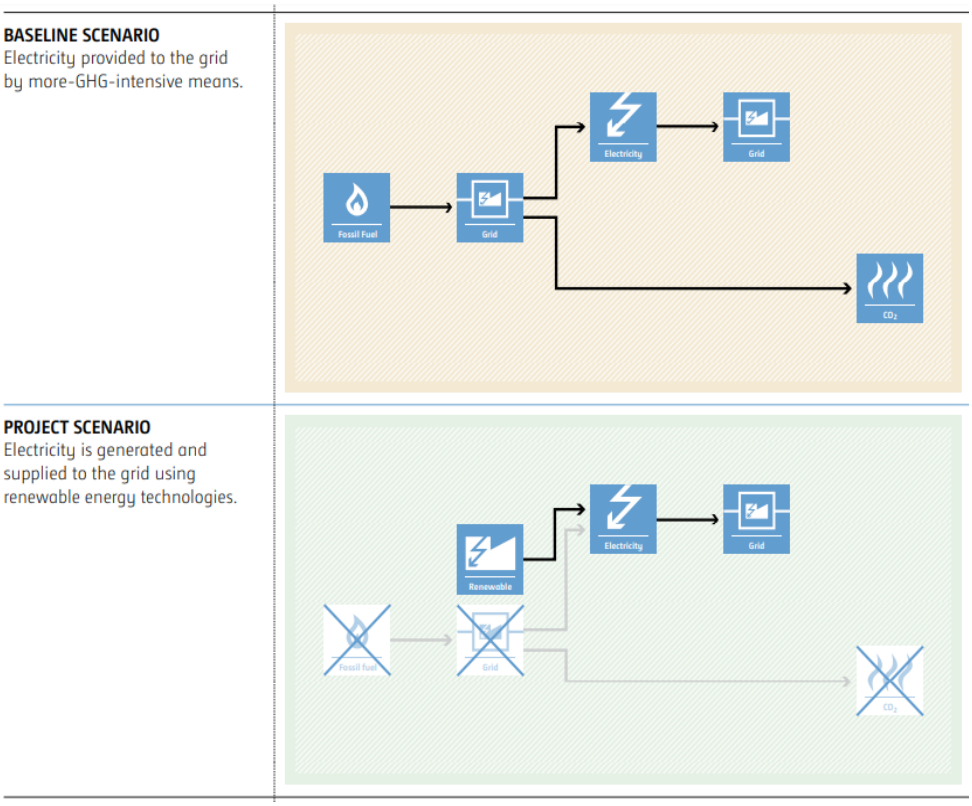
d). Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>

The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	21/06/2015
CoUs claimed up to	31/12/2021
Total ERs generated in this crediting period (tCO2eq)	92220 tCO2eq
Leakage	0
Project Emisions	0

e). Baseline Scenario>>As per the approved consolidated methodology AMS-I.D. Version 18.0

As per the UNFCCC Methodology, tf the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: "*The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise, been generated by the operation of gridconnected power plants and by the addition of new generation sources into the grid.*"

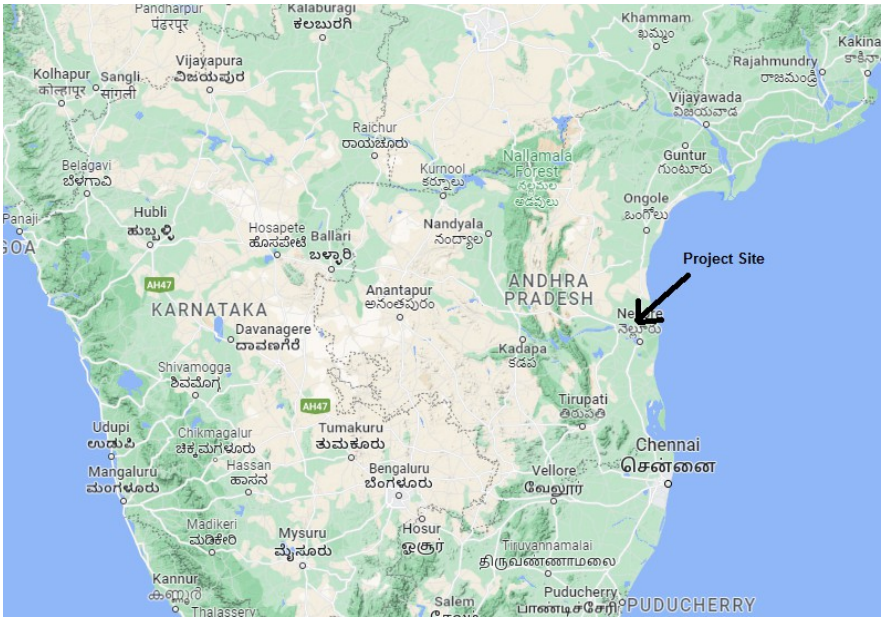


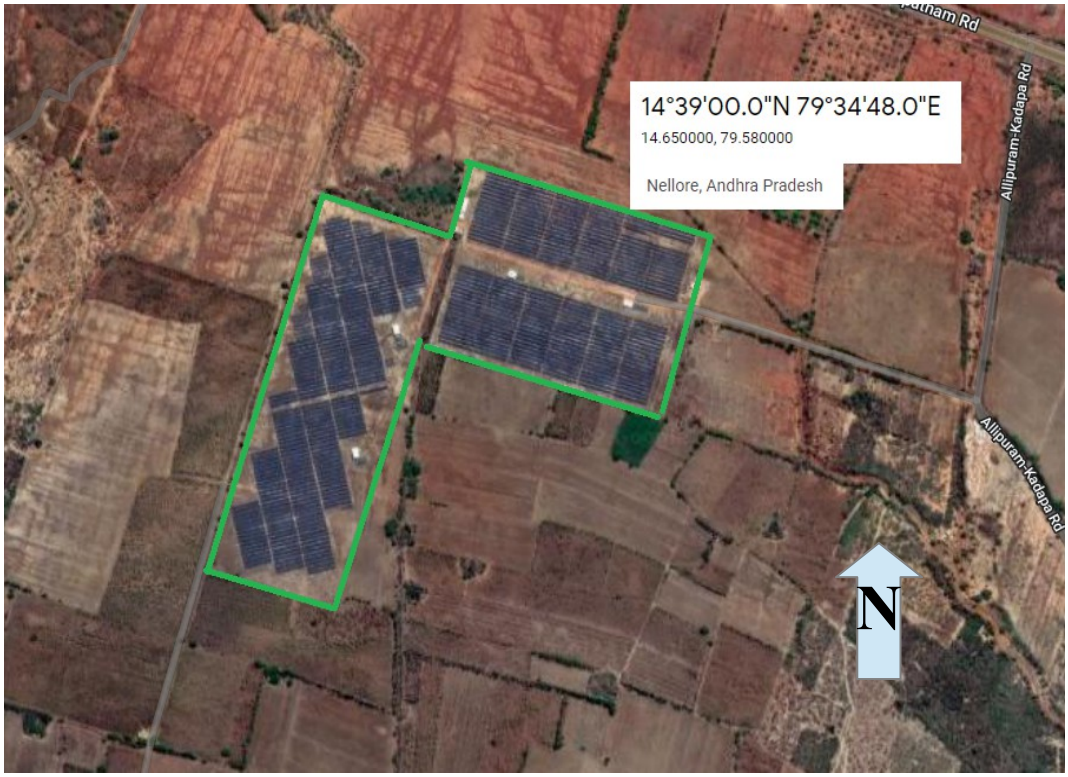
A.2. Location of project activity>>

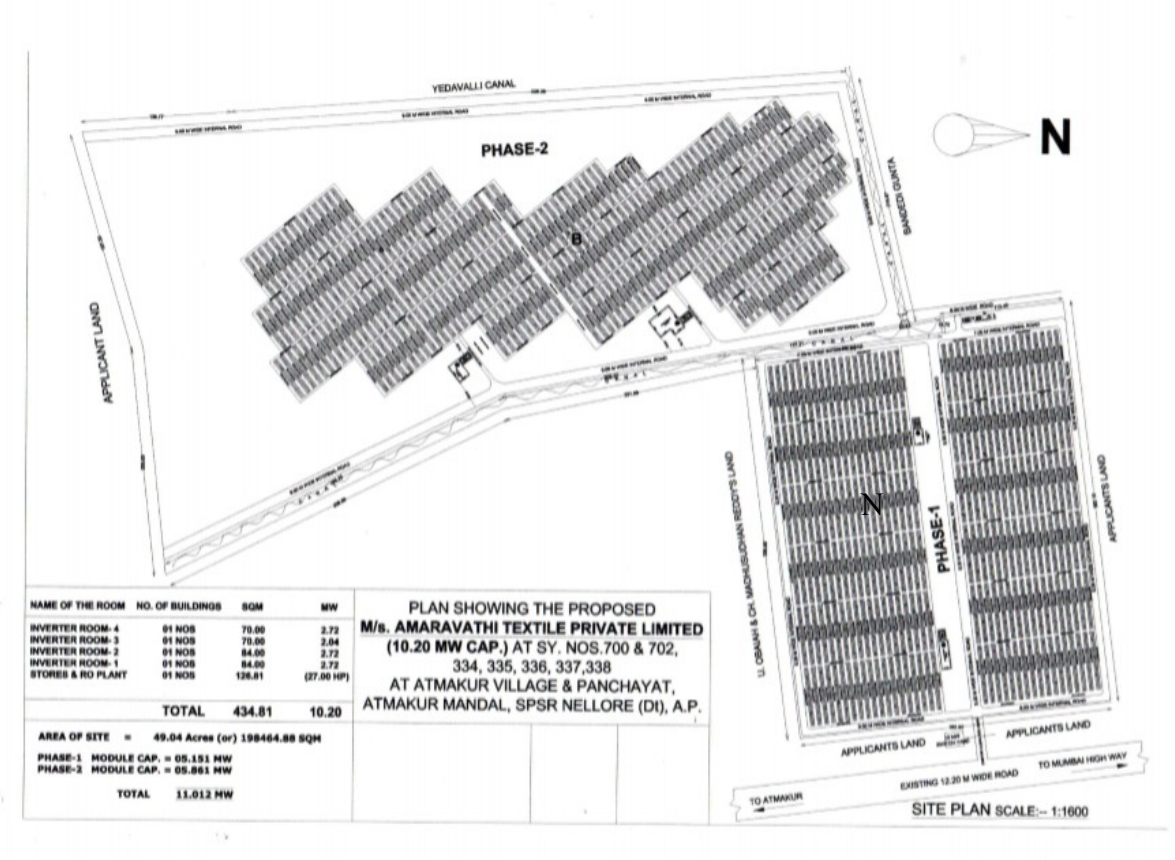
Country : India
Village : Atmakur
District : Nellore

The project site is in village Atmakur of Nellore district, Andhra Pradesh. The geographic co-ordinates of the project location have been given below.

Latitude : 14°39'00"N Longitude : 79° 34' 48.0"E
The representative location map is included below:







NAME OF THE ROOM	NO. OF BUILDINGS	SQM	MW
INVERTER ROOM-4	01 NOS	70.00	2.72
INVERTER ROOM-3	01 NOS	70.00	2.04
INVERTER ROOM-2	01 NOS	84.00	2.72
INVERTER ROOM-1	01 NOS	84.00	2.72
STORES & RO PLANT	01 NOS	126.81	(27.00 HP)
	TOTAL	434.81	10.20

A.3. Parties and project participants >>

Party (Host)	Participants
India	**PP**: Amaravathi Textiles Private Limited Factory : NH-16, (Old NH5), Martur – 523 301 Martur Mandal, Prakasam District. A.P **Aggregator:** Energy Advisory Services Pvt Limited, Bangalore, Karnataka, India

A.4. References to methodologies and standardized baselines >>

SECTORAL SCOPE - 01 Energy industries (Renewable/Non-Renewable Sources)
TYPE - Renewable Energy Projects
CATEGORY - AMS-I. D: "Grid connected renewable electricity generation", Version 18.0

A.5. Crediting period of project activity >>

Start Date of Crediting Period: 21/06/2015
Length of the crediting period corresponding to this monitoring period: 06 years 6 months i.e., 21/06/2015 to 31/12/2021 (Both the dates are inclusive).

A.6. Contact information of responsible persons/entities >>

Name :Energy Advisory Services Pvt Limited, Bangalore, Karnataka, India
E-Mail : manoj@easpl.co.in and cleanergy@easpl.co.in

SECTION B. Implementation of project activity

B.1. Description of implemented registered project activity >>

a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

The project consists of two Photo Voltaic Plants with capacities of 5 MW each (total 10MW). The first plant of 5 MW was was commissioned on 31/03/2015 and the second 5 MW was commissioned on 28/11/2015 by the PP within the same project boundary.

Particulars	Name	Distance from Project Site(km)
Nearest Tehsil/Block HQ	Atmakur	3.9
Nearest Road Head	SH 57	14
Nearest Railway Station	Nellore	47
Nearest Airport	Tirupathi	122
Nearest Grid/Substation	Atmakur	3.9

b) For the description of the installed technology, technical process and equipment, include diagrams, where appropriate>>

Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array. The project activity has used the reliable and proven technology from supplier to ensure that an environmentally safe and sound technology is only being implemented in the proposed project activity leading to the GHG reduction. The technical arrangement of the project activity is as provided below:

The project activity is using clean renewable solar energy to produce electricity. The applied technology is considered to be one of the most environment friendly technologies available as the operation of the Solar photovoltaic does not emit any GHGs or any other harmful gases unlike the operation of conventional power plants.

Photovoltaic module consists of a number of photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array. The project activity has used the reliable and proven technology to ensure that an environmentally safe and sound technology is only being implemented in the proposed project activity leading to the GHG reduction.
Each power production unit will in general constitute the following equipment:

1. Solar Photovoltaic modules
2. Inverters
3. Transformers
4. Circuit breakers
5. Mounting structures
6. Cables and hardware.
7. Junction box and distribution boxes.

8. Earthing kit.
9. Control room equipment.
10. System for control and monitoring.
11. Evacuation system

The technology used does not pose any threat to the environment in comparison to the fossil fuel-fired power plants. The technology to be applied in the project activity is proven technology and can hence be considered safe and sound technology. The project does not involve any transfer of technology from any Annex 1 country. There is no Public funding (ODA and/ or Annex I countries) for the project activity.

Parameter	Description	
Total number of Photovoltaic Modules	18750	22330
Rating of Photovoltaic Module	310 Wp	255 Wp
Technology	Poly Crystalline Silicon	
Meter make	Secure (P) 300	
Main meter number	APX00412	
Check Meter number	APX00413	

B.2 Do no harm or Impact test of the project activity>>

The Indian economy is highly dependent on "Coal" as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

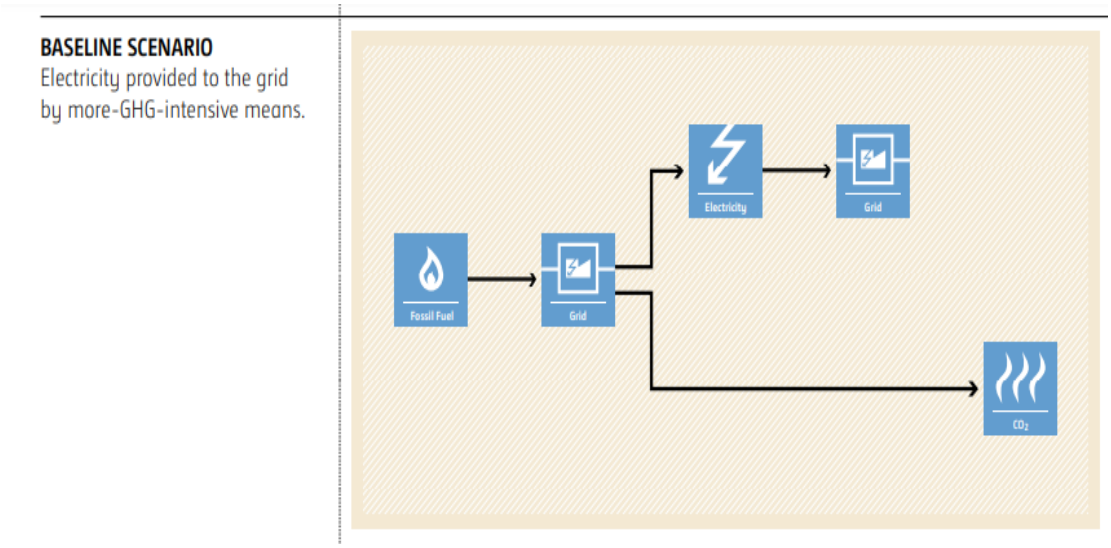
Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. The renewable power generation is gradually contributing to the share of clean & green power in the grid; however, grid emission factor is still on higher side which defines grid as distinct baseline.

The Government of India has stipulated following indicators for sustainable development in the interim approval guide lines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. It has been envisaged that the project shall contribute to sustainable development using the following ways: Rational: As per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (07/03/2016), it has been declared that solar project activity falls under the "White category". White Category projects/industries do not require any Environmental Clearance such as 'Consent to Operate' from PCB as such project does not lead to any negative environmental impacts.

Additionally, as per Indian Regulation, Environmental and Social Impact Assessment is not required for small-scale Solar Projects.

B.3. Baseline Emissions>>

In the absence of the project activity, the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system (Southern Grid)), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants.



Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from the Indian grid. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace fossil fuel-based power plants and help fight against the impacts of climate change. The Project Proponent hopes that UCR carbon incentives under the CoU program from 2015-2021 vintage years accumulated as a result of carbon credits generated will help repay the loans, scale up the project capacity and help in the continued maintenance of this project activity.

B.4. Debundling>>

This project activity is not a de-bundled component of a larger project activity.

SECTION-C: Application of methodologies and standardized baselines

C.1. References to methodologies and standardized baselines >>

Sectoral Scope: 01 Energy industries (Renewable/Non-Renewable Sources)

TYPE I – Renewable Energy Projects

Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", Version 18.0

C.2. Applicability of methodologies and standardized baselines >>

This project activity involves generation of grid connected electricity from the construction and operation of a new solar power-based power project. The project activity has installed capacity of 10 MW which will qualify for a small-scale project activity under Type-I of the Small-Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 18 and applicability of methodology is discussed below:

This project is included within the UCR Standard Positive List of technologies and are within the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of: (a) The grid-connected renewable electricity generation technologies of installed capacity up to 15 MW, (b) Solar technologies (photovoltaic and solar thermal electricity generation);
Project activity involves installation of grid-connected solar photovoltaic power generation with capacity 10MW which is less than 15MW.
The project activity involves installation of Solar PV (SPV). Hence, the activity is not a Hydro power project.
The project activity was commissioned in two phases. In the first phase 5MW was installed and within the same year of Phase 1 commissioning another 5MW was added, hence the total capacity of the project activity is 10MW and below the 15 MW threshold.
The project activity is a new installation, it does not involve any retrofit measures nor any replacement.
Landfill gas, waste gas, wastewater treatment and agro-industries projects are not relevant to the project activity. No biomass is involved, the project is only a solar power project.
The technology/measure allowed under the grid connected Solar PV based generation systems displace equivalent quantity of electricity from the regional grid in India. The testing/certifications; all the equipment of the solar project activity will be complying with applicable national/ international standards. The above details may be verified from one or more of the following documents: • Technology Specification provided by the technology supplier • Purchase order copies • EPC contracts • Power purchase agreement • Project commissioning certificates
The project activity is a voluntary coordinated action
As per the Ministry of Environment and Forest (MoEF), Govt. of India Office Memorandum dated 13/05/2011, it had received specific clarification regarding the applicability of EIA Notification, 2006 in respect of Solar Photo Voltaic (PV) Power plants. It was further clarified in the above memorandum that both Solar PV power projects are not covered under the ambit of EIA Notification, 2006 and no environment clearance is required for such projects under provisions thereof.
The project activity comprises of a renewable energy generation through installation of solar photovoltaic modules and

will displace electricity from the regional grid by supplying to the grid itself. Hence this methodology is applicable and fulfilled.
The project activity involves installation of new power plants at listed sites where there was no renewable energy power plant operating prior to implementation of project.

C.3 Applicability of double counting emission reductions >>

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., CoUs). Undertaking will be provided to the UCR verifier.

C.4. Project boundary, sources and greenhouse gases (GHGs)>>

As per applicable methodology AMS-I.D. Version 18.0, "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system." Thus, the project boundary includes the Solar Photovoltaic Plant and the Indian grid system.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid-connected electricity	**CO_2**	**Included**	**Major source of emission**
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative
Project Activity	Greenfield solar power project	CO_2	Excluded	Excluded for simplification. This is conservative
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

C.5. Establishment and description of baseline scenario (UCR Protocol) >>

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18.0, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following: "The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid". The project activity involves setting up of a new Solar Photovoltaic Plant to harness the green power from Solar energy and sell it to the grid. In the absence of the project activity, the equivalent amount of power would have been generated by the operation of grid-connected fossil fuel-based power plants and by the addition of new fossil fuel-based generation sources into the grid. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO2 emission factor (tCO2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO2/MWh for the 2015-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into same emission factors as

that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

Net GHG Emission Reductions and Removals

Thus, ERy = BEy – PEy – LEy

Where:

ERy = Emission reductions in year y (tCO2/y)

BE_y = Baseline Emissions in year y (t CO2/y)

PE_y = Project emissions in year y (tCO2/y)

LE_y = Leakage emissions in year y (tCO2/y)

Baseline Emissions

Baseline emissions include only CO2 emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows: $BE_y = EG_{PJ,y} \times EF_{grid,y}$

Where:

BE_y = Baseline emissions in year y (t CO2)

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

$EF_{grid,y}$ = UCR recommended emission factor of 0.9 tCO2/MWh has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per paragraph 39 of AMS-I.D. (Version 18.0), for most renewable energy project activities emission is zero.

Hence, $PE_y = 0$

Leakage Emissions

As per paragraph 42 of AMS-I.D. version-18, all projects other than Biomass projects have zero leakage.

Hence, $LE_y = 0$

Total Emission Reduction (ER) by the project activity for the current monitoring period is calculated as below:

Year	2015	2016	2017	2018	2019	2020	2021
BE_y (tCO2e)	4368	15668	14907	15490	14887	13449	13451
Total ER_y (tCO2e)	92220						

C.6. Prior History>>

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs).

C.7. Monitoring period number and duration>>

First Monitoring Period : 06 years 06 months, 21/06/2015 to 31/12/2021 (inclusive of both dates)

C.8. Changes to start date of crediting period >>

Crediting period start date has been changed to the first meter reading date which is 21/06/2015.

C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

There are no permanent changes from registered PCN monitoring plan and applied methodology

C.10. Monitoring plan>>

The project activity essentially involves generation of electricity from Solar Radiation, the employed SPV can only convert Solar energy into electrical energy and cannot use any other input fuel for electricity generation, thus no special ways and means are required to monitor leakage from the project activity. The recording of the electricity fed to the state utility grid is carried out jointly at the incoming feeder of the state power utility.

Details of Metering CTs & PTs			Details of Billing Energy Meters			
	CTs	PTs		Main Meter	Check Meter	Stand by Meter
Class	0.2 S	0.2 S	Make	Secure(P)300	Secure(P)300	Secure(P)300
Burden	25		Sl.No ./ Year	APX00412	APX00413	APX00379
			Type	E3M024	E3M024	E3M024
	Available	Adopted	Meter CT Ratio	200/1A	200/1A	200/1A
CT Ratio	200/1A	200/1A	Meter PT	33KV/110V	33KV/110V	33KV/110V
PT Ratio	33KV/110V	33KV/110V	MF for KWH	1000	1000	1000

Data / Parameter:	***EGy***
Data unit:	MWh
Description:	Quantity of net electricity supplied by the Project Activity to the grid in year y
Source of data:	JMR. Statement of net export of power to the grid issued Monthly by State Electricity Board or any other competent authority as applicable.
Measurement procedures (if any):	To be specified by State Electricity Board
Monitoring frequency:	The net energy exported to the grid is measured every month using calibrated energy meter by the State Electricity Board authorities in the presence of the project implementer or its representatives. The meter/s shall be jointly inspected, and sealed by authorised representatives of the company and the state utility. Measuring procedure: Will be measured by an export-import energy meter. The net electricity exported by the project plant would either be directly sourced as a measured parameter or be calculated by deducting the amount of imported electricity from the total amount of exported electricity. Accuracy class of energy meter:As per Power Purchase Agreement (PPA) or relevant National standards amended/modified from time to time. Calibration Frequency: As per the Central Electricity Authority the testing and calibration frequency should be minimum once in five years. However, the calibration will be done following the relevant applicable National Guidelines updated from time to time during the operation of the project activity. Entity responsible: Aggregator
QA/QC procedures:	Monitoring frequency: Continuous Measurement frequency: Hourly Recording frequency: Monthly The electricity meter/s record both export and import of electricity from the solar Power plant and the readings with regard to net electricity generated will be used for calculation of emission reductions. The net electricity supplied to the grid will be cross checked with the monthly invoices. The meter/s would be checked for accuracy and the meters will be calibrated as per the procedures of State Electricity Board as per the national or international standards. Measurement results shall be cross checked with records for sold electricity (i.e. invoice).
Purpose of Data	-Calculation of baseline emissions

Data/Parameter	$EF_{, CO2, GRID, y}$
Data unit	tCO2 /MWh
Description	Fixed
Value of data applied	0.9 UCR Standard Protocol As per Standard
Measurement methods and procedures	A "grid emission factor" refers to a CO2 emission factor (tCO2/MWh) which will be associated with unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO2/MWh for the 2014 - 2020 years as a

	fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Monitoring frequency	NA
Purpose of data	To estimate baseline emissions
Additional Comment	The combined margin emission factor as per CEA database (current Version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

ANNEXURE 1 (Emission Reduction Calculation)

Year	2015	2016	2017	2018	2019	2020	2021
Total (kwh)	4853600	17409500	16563339	17211300	16541400	14943700	14946500
EG y (MWh)	4853.6	17409.5	16563.339	17211.3	16541.4	14943.7	14946.5
BE y (tCO2e)	**4368**	**15668**	**14907**	**15490**	**14887**	**13449**	**13451**
Total ER	92220						