PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 3MW Solar PV Power Plant by Eaama Estates Private Limited, Vizianagaram

Version 1.1

Date 12/09/2023

First CoU Issuance Period: 6 years, 9 months , 2 days

Date: 30/03/2016 to 31/12/2022

Project Concept Note (PCN)
CARBON OFFSET UNIT (CoU) PROJECT

BASIC INFORMATION	
Title of the project activity	3MW Solar PV Power Plant by Eaama Estates Private Limited
Scale of the project activity	Small scale
Completion date of the PCN	13/09/2023
Project participants	M/s Eaama Estates Private Limited
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D : "Grid connected renewable electricity generation", version 18.0.
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	5913 CoUs (5913 tCO_2eq)

SECTION A. Description of project activity

A.1. Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project 3MW Solar PV Power Plant by Eaama Estates Private Limited is located in Village Tentuvalasa, Tehsil Badangi, District Vizianagaram, State Andhra Pradesh, Country India.

The details of the registered project are as follows:

Purpose of the project activity:

The project activity is a renewable power generation activity at Eaama Estates, Vizianagaram. The project activity involves commissioning of 3MW Grid Connected Solar PV Power Plant. The solar plant was completed in single phase and put to use from 30/03/2016. The system has an estimated annual generation at 25% PLF is 6570 MWh which works out to 5913 tCO_2eq

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The purpose of the project activity is to utilize the solar energy source for clean electricity generation. The net generated electricity from the project activity will be exported to grid. The proposed project has been synchronized with the national grid.

The project activity has been designed with an estimated annual net electricity generation of about 6570 MWh which otherwise would have been imported from the grid. In the absence of the project activity an equivalent amount of electricity would have been generated from the connected/new power plants in the integrated the Indian grid system, which is predominantly based on fossil fuels. On the contrary the operation of solar modules is emission free throughout the lifetime of the project activity. The project activity doesn't involve any GHG emission sources.

The project activity involves "Solar PV system" as the technology. The system is designed for a capacity of 3 MW. The solar module is a packaged, connected assembly of solar cells which uses the incident photons from the sun light and converts it into electricity. The solar module generates DC power which is converted to AC power with the help of inverters. The output from the Inverters has been connected to 1 no ACDB, wherein the electricity generated will be recorded using Multi-Function Meters (MFM) and then connected to national grid.

The generated power will be supplied/exported to the national grid through a net meter installed by the Electricity Distribution company i.e. APTRANSCO

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

There was no harm identified from the project and hence no mitigations measures are applicable.

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

There are social, environmental, economic and technological benefits which contribute to sustainable development.

- **Social benefits:**
- The project would help adding more employment opportunities as compared to regular employees, such as during the construction and operation phases of the solar plant.
- Also, the project activity directly contributes to the development of renewable infrastructure in the region which will motivate other fellow industries in the region to adopt solar technology for green power.

- **Environmental benefits:**
- The project activity will generate solar based power with zero emissions. The power generation facility, which helps to reduce GHG emissions and specific pollutants like SOx, NOx, and SPM associated with the conventional thermal power generation facilities.
- Also, being a renewable resource, use of solar energy to generate electricity contributes to resource conservation.
- It reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion.
- Thus, the project causes no negative impact on the surrounding environment and thus contributing to environmental well-being.

- **Economic benefits:**
- The project is a clean technology investment decided based on carbon revenue support, which signifies flows of clean energy investments into the host country.
- The project activity requires temporary and permanent, skilled and semi-skilled manpower at the solar project location; this will create additional employment opportunities in the region.
- The generated electricity will be utilized for captive consumption, thereby reducing the demand from the grid.

A.3. Location of project activity >>

Country: India
District: Vizianagaram
Village: Tentuvalasa
Tehsil: Badangi
State: Andhra Pradesh
Code: 535578

The project location is situated in village Tentuvalasa of Vizianagaram district in the state of Andhra Pradesh. The nearest railway station to the project site is at Donkinavalasa. The project location can be approached by road with a distance of 1.7 Kms from Donkinavalasa. Nearest Airport is Vishakapatnam Airport

The geographic co-ordinate of the project locations is 18.4726° N and 83.3478° E.

A.4. Technologies/measures >>

The project activity involves “Solar PV system” as the technology. The system is designed with a capacity of 3MW. The solar modules are mounted on the module mounting structures. The solar module is a packaged, connected assembly of solar cells which uses the incident photons from the sun light and converts it into electricity. The solar module generates DC power which is converted to AC power with the help of inverters. The system was supplied and commissioned by M/s Renesola Jiangsu Limited and has Poly Crystalline type (315 Wp) modules. The installed system has net metering facility to transfer the excess units to grid.

Technical specifications of the key components that are used for baseline calculations or methodology selection limits as follows:

<table>
<tr><th>Specification Value</th><th>Value</th></tr>
<tr><td>Nominal Power</td><td>3 MW</td></tr>
<tr><td>Solar Modules</td><td>Make: Renesola Jiangsu Limited
Technology: Poly Crystalline
Rating: 315 Wp
No. of modules: 10480</td></tr>
<tr><td>Inverters</td><td>Type: String inverters
Make: ABB
<table>
<tr><th>Rating</th><th>Qty</th></tr>
<tr><td>1000 kW</td><td>3 no’s</td></tr>
</table>
</td></tr>
<tr><td>Energy Meters</td><td>Energy meter-1: Main Meter
Sr. No. APX00590
Make: Secure Meters Limited
Model: Premier 300
Class: 0.2s
Meter Calibration Date: 19/04/2022
Calibration validity: 26/03/2024

Energy meter-2: Check meter
Sr. No. APX00591
Make: Secure Meters Limited
Model: Premier 300
Class: 0.2s
Meter Calibration Date: 19/04/2022
Calibration validity: 26/03/2024

Energy meter-3: Standby meter
Sr. No. APX00592
Make: Secure Meters Limited
Model: Premier 300
Class: 0.2s
Meter Calibration Date: 19/04/2022
Calibration validity: 26/03/2024</td></tr>
</table>

A.5. Parties and project participants >>

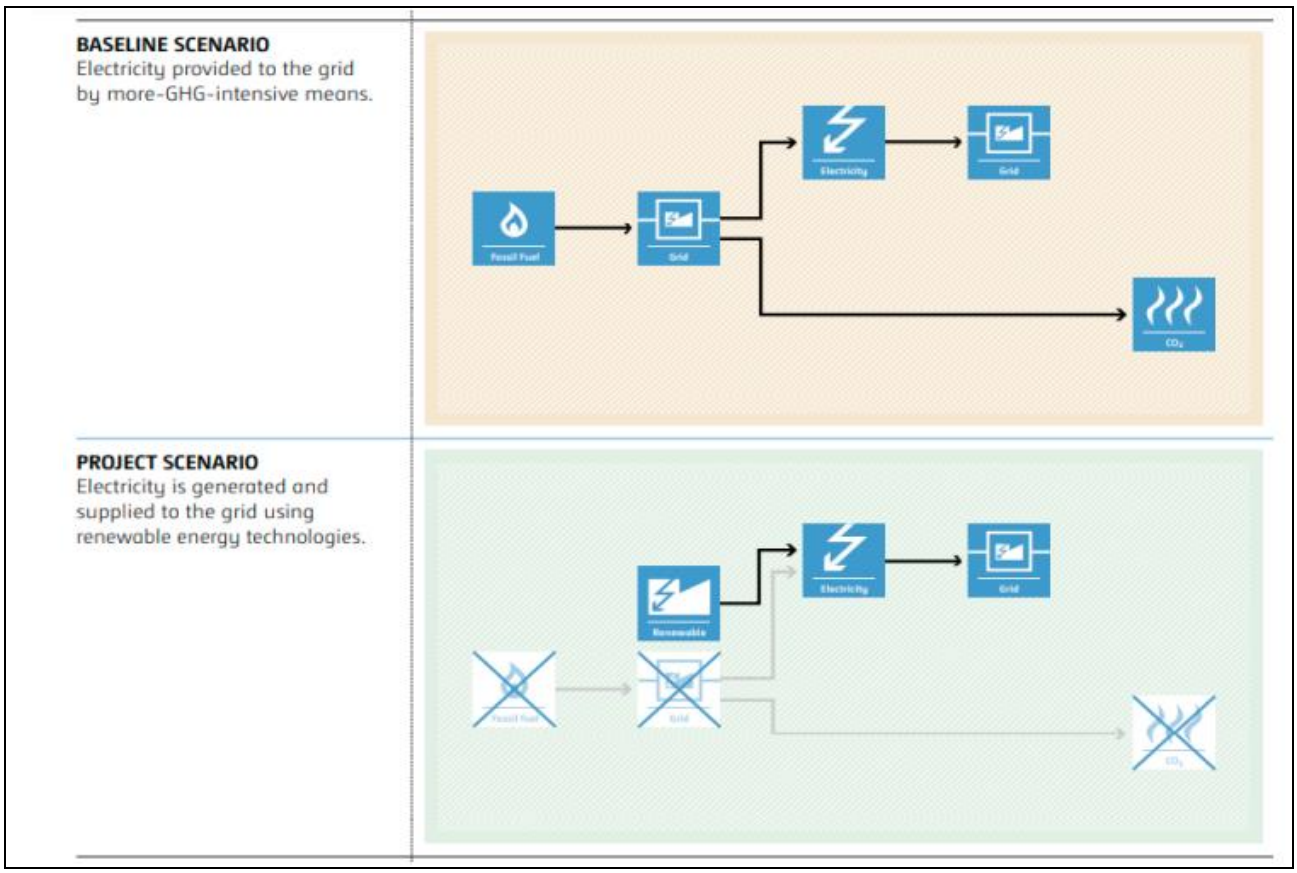
Party (Host)	Participants
India	M/s Eaama estates Private Limited, Tentuvalasa Village, Badangi Mandal, Vizianagaram District, Andhra Pradesh, India. 535578

A.6. Baseline Emissions>>

The baseline scenario identified at the PCN stage of the project activity is:

- Grid

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), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants. Hence baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.



A.7. Debundling>>

This Grid Connected Solar Plant at Vizianagaram District, Andhra Pradesh project is not a debundled component of a larger project activity.

SECTION B. Application of methodologies and standardized baselines

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

SECTORAL SCOPE – 01, Energy industries (Renewable/Non-renewable sources)

TYPE I - Renewable Energy Projects

CATEGORY- Grid-connected electricity generation from renewable sources

The applied CDM methodologies - AMS. I.D. (Title: "Grid connected renewable electricity generation", version 18.0)

The project activity has installed capacity of 3MW which is less than 15MW. Hence, it will qualify for a small-scale project activity under Type-1 of the small-scale methodology.

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

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as Wheeling.	The project activity is a Renewable Energy Project i.e. Solar PV project falls under applicability criteria option 1 (a) "The energy generated will be exported to the grid. Hence the project activity meets the given applicability criterion as well as satisfies the applicability illustration mentioned in Appendix of AMS-ID Table 1 – Scope of AMS-I.D version 18.
2. This methodology is applicable to project activities that: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m2. (c) (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2	The project is a Solar PV (SPV) ground mounted Installation, hence this criterion is not applicable.

4. If the new unit has both renewable and nonrenewable components (e.g., a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The proposed project is 3 MW SPV i.e., only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.
5. Combined heat and power (co-generation) systems are not eligible under this category	The project is SPV project and thus the criterion is not applicable to this project activity.
6. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct1 from the existing units.	The proposed project is a greenfield 3 MW SPV i.e., only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.
7. In the case of retrofit, rehabilitation or replacement, to qualify as a small-scale project, the total output of the retrofitted, rehabilitated or replacement power plant/unit shall not exceed the limit of 15 MW.	The proposed project is a greenfield 3 MW SPV i.e., only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.
8. In the case of landfill gas, waste gas, wastewater treatment and agro-industries projects, recovered methane emissions are eligible under a relevant Type III category. If the recovered methane is used for electricity generation for supply to a grid then the baseline for the electricity component shall be in accordance with procedure prescribed under this methodology. If the recovered methane is used for heat generation or cogeneration other applicable Type-I methodologies such as"AMSI. C.: Thermal energy production with or without electricity" shall be explored.	The proposed project is a greenfield 3 MW SPV i.e., only component is renewable power project below 15MW, thus the criterion is not applicable to this project activity.
9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	No biomass involved, the project is only a SPV project and thus the criterion is not applicable to this project activity.

B.3. Applicability of double counting emission reductions >>

This project activity is not registered with any other GHG program for carbon credits prior to this monitoring period. Hence this project will not cause any double accounting of carbon credits. Further

- Project is uniquely identifiable based on its location coordinates,
- Project has dedicated commissioning certificate and connection point,
- Project is associated with energy meters which are dedicated to the consumption point of the user and grid

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

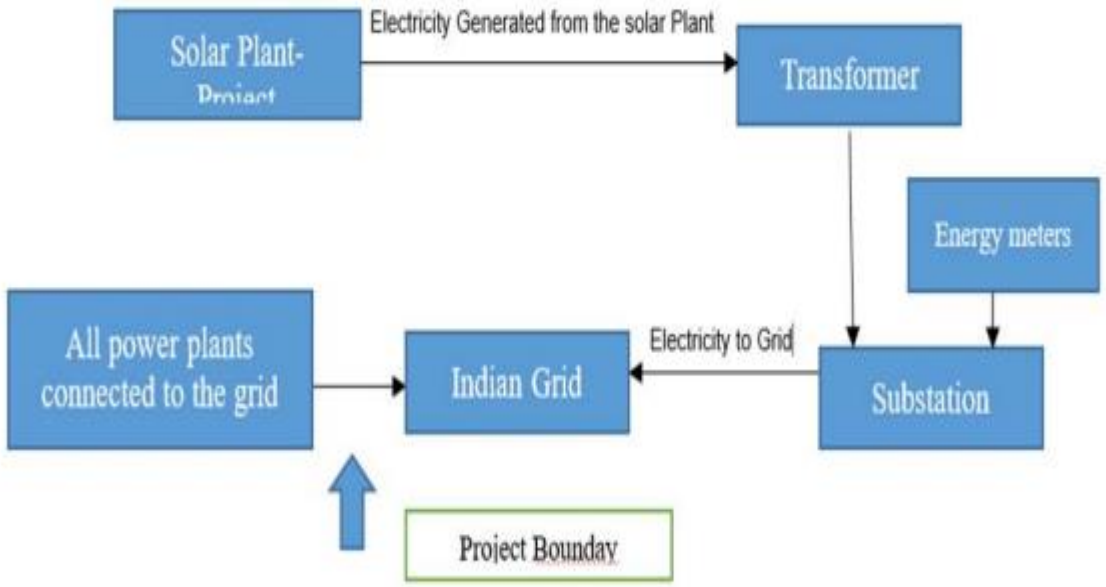
As per applicable methodology AMS-I.D. Version 18, "The spatial extent of the project boundary include the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to."

Thus, the project boundary includes the solar PV system and the Indian grid system.

The Project is executed at Tentuvalasa, Badangi, Vizianagaram, Andhra Pradesh, India. The project focuses on installation of 3 MW solar power plant which is exported to the grid. The energy generated from the system is exported to the grid by net metering system. The project helps to reduce the GHG's by reducing consumption of energy from the grid.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO_2	Yes	Main emission source
		CH_4	No	Main emission source
		N_2O	No	Main emission source
Project Activity	Greenfield Solar PV Project Activity	CO_2	No	No CO_2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH_4
		N_2O	No	Project activity does not emit N_2O

Project boundary diagram:



B.5. Establishment and description of baseline scenario >>

This section provides details of emission displacement rates/coefficients/factors established by the applicable methodology selected for the project.

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18, 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 PV plant to harness the green power from solar energy and to use for captive purpose via grid interface through wheeling arrangement. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. The 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 CO_2 emission factor (tCO_2/MWh) which will be associated with each unit of electricity provided by an electricity system. An emission factor of 0.9 tCO_2/MWh for the 2014- 2020 years, recommended by the UCR as a fairly conservative estimate for Indian projects not previously verified under any GHG program is used for baseline emission calculation. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into same emission factor. Hence, the same grid emission factor of 0.9 tCO2/MWh has been considered for the entire monitoring period, as a conservative measure

Net GHG Emission Reductions and Removals

Thus, ERy = BEy – PEy – Ley

Where:

- ERy = Emission reductions in year y (tCO_2/y)
- BEy = Baseline Emissions in year y (tCO_2/y)
- PEy = Project emissions in year y (tCO_2/y)
- LEy = Leakage emissions in year y (tCO_2/y)

Baseline Emissions

Baseline emissions include only CO_2 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:

$BEy = EGPJ,y \times EFgrid,y$

- BEy = Baseline emissions in year y (t CO_2)
- $EGPJ,y$ = Quantity of net electricity generation that is produced and fed into the grid or used for captive as a result of the implementation of the CDM project activity in year y (MWh)
- $EFgrid,y$ = UCR recommended emission factor of 0.9 tCO_2/MWh has been considered

(Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per AMS-I.D. version-18, only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a solar power project, project emission for renewable energy plant is nil.

Thus, PEy =0.

Leakage
As per paragraph 22 of AMS-I.D. version-18, 'If the energy generating equipment is transferred from another activity, leakage is to be considered.' In the project activity, there is no transfer of energy generating equipment and therefore the leakage from the project activity is considered as zero.

Hence, LEy= 0

The actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification. However, for the purpose of an ex-ante estimation, following calculation has been submitted:

Estimated annual baseline emission reductions (BEy)

= 6570 MWh *0.9 tCO_2/MWh
An Emission factor of 0.9 has been selected as per UCR standard

= 5913 CoUs /year (i.e., 5913 tCO_2eq/year)

B.6. Prior History>>

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits for the said crediting period.

B.7. Changes to start date of crediting period >>

Not Applicable

B.8. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline >>

Not applicable.

B.9. Monitoring period number and duration>>

First Issuance Period: 6 years, 09 months, 02 days – 30/03/2016 to 31/12/2022

B.8. Monitoring plan>>

Data/Parameter	$EFgrid,y$
Data unit	tCO_2 /MWh
Description	Combined margin emission factor for Indian grid connected power generation in year y
Source of data Value(s) applied	The UCR Standard 0.9
Measurement methods and procedures	As per recommendation by The UCR Standard for the

	2014- 2020 years for Indian projects not previously verified under any GHG program.
Monitoring frequency	Yearly
Purpose of data	Calculation of baseline emission

Data and Parameters to be monitored (ex-post monitoring values):

Data / Parameter:	$EG_{PJ, y}$
Data unit:	MWh
Description:	Quantity of net electricity generated for captive consumption and the excess/unutilized energy will be supplied by the project power plant to the grid in year y.
Source of data:	Energy meter-1: Main Meter Sr. No. APX00590 Make: Secure Meters Limited Model: Premier 300 Class: 0.2s Meter Calibration Date: 19/04/2022 Calibration validity: 18/04/2023 Energy meter-2: Check meter Sr. No. APX00591 Make: Secure Meters Limited Model: Premier 300 Class: 0.2s Meter Calibration Date: 19/04/2022 Calibration validity: 18/04/2023 Energy meter-3: Standby meter Sr. No. APX00592 Make: Secure Meters Limited Model: Premier 300 Class: 0.2s Meter Calibration Date: 19/04/2022 Calibration validity: 18/04/2023
Measurement methods and procedures (if any):	Monitoring equipment: Energy Meters are used for monitoring Archiving Policy: Paper & Electronic Calibration frequency: Once in every year (as per provision of CEA). Difference of staring reading of current month and ending reading of previous month will be considered for arriving at the gross generation from the project activity. The sum of energy generation from the 3 meters will be considered for computation gross generation from the project activity. Cross Checking:

	Quantity of net electricity supplied to the grid will be cross checked from SCADA generation report.
Measurement Frequency:	Monthly
QA/QC procedures:	If the energy meter fails in recording the generation, we will not claim any COUs for that period.
Any comment:	-