PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Grid Connected Rooftop Solar Plant at Berger Paints, Hindupur

Version 1.0

Date 01/12/2021

First CoU Issuance Period: 1 years, 10 months

Date: 08/02/2020 to 30/11/2021

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

BASIC INFORMATION	
Title of the project activity	Grid Connected Rooftop Solar Plant at Berger Paints, Hindupur
Scale of the project activity	Small Scale
Completion date of the PCN	08/02/2021
Project participants	Berger Paints India Limited
Host Party	INDIA
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D : "Grid connected renewable electricity generation", version 18.0 Online Grid connected roof top solar system with Mono Crystalline PERC type modules.
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	CoUs (1869 tCO2eq) Considered from date of completion of the project

SECTION A. Description of project activity

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

The project, Grid Connected Rooftop Solar Plant is located in Village Thumkunta, Hindupur taluk, Ananthapur District, 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 Berger Paints, Hindupur a leading paint manufacturer. The project activity involves commissioning of 992.7 Kwp Grid Connected Rooftop Solar Plant. The solar plant was completed in single phase and put to use on 8th February 2020. The system has an estimated annual generation of 1433 MWH which works out to 1339 tCO2eq,

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 used in the manufacturing facility for its captive consumption. The proposed project has been synchronized with the regional grid.

The project activity has been designed with an estimated annual net electricity generation of about 1433 MWH for captive consumption 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.

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

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

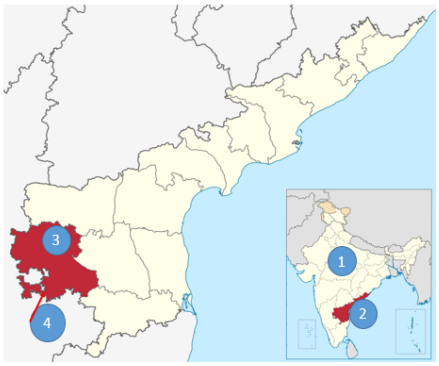
Rational: as per 'Central Pollution Control Board (Ministry of Environment & Forests, Govt. of India)', final document on revised classification of Industrial Sectors under Red, Orange, Green and White Categories (29/02/2016), it has been declared that solar project activity falls under the "White category". 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.

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 rooftop 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 power using zero emissions solar based power generation facility at the rooftop 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 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: Ananthapur
Village: Thumkunta
Tehsil: Hindupur
State: Andhrapradesh
Pin Code: 515211



1. COUNTRY:- INDIA
2. STATE:- ANDHRA PRADESH
3. DISTRICT:- ANATHAPUR
4. TEHSIL:- HINDUPUR

A.4. Technologies/measures >>

The project activity involves “Solar PV system” as the technology. The system is designed at a capacity of 992.7 Kwp. 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 Tata power solar and has Mono Crystalline PERC type (370 Wp) modules. The installed system has net metering facility to transfer the excess units to grid.

Description	Qty
Nominal Power	997.7 Kwp
No of Modules	2683 Nos.
Module make/Type	Mono Crystalline PERC type (370 Wp) modules
Rated voltage	45.6 V
Rated current	8.39 Amp
Mounting structure	Fixed structure
Inverter type	String Inverter

A.5. Parties and project participants >>

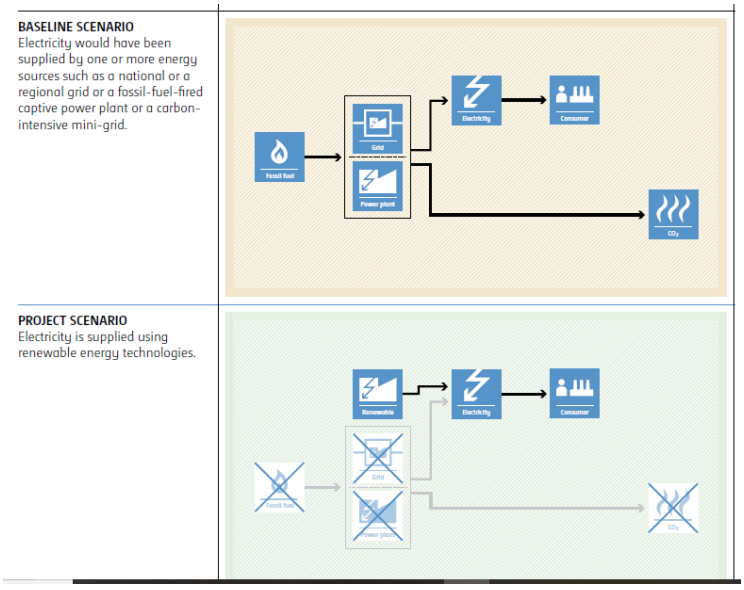
Party (Host)	Participants
INDIA	Berger Paints India Ltd, Plot.No.262, APIIC Growth Center, Thumakunta Village, Hindupur, Andhra Pradesh-515211.

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 Rooftop Solar Plant at Berger Paints, Hindupur 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- AMS. I.D. (Title: "Grid connected renewable electricity generation", version 18.0)

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

The Project helps to generate electricity for captive use by using solar energy. The projects focuses on generating 1433 MWH annually which is used for manufacturing purpose. The generated electricity replaces the equivalent value of MWH from the baseline scenario. Additionally, the project focusses of supplying excess electricity to the grid.

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 (SPV) for captive consumption which falls under applicability criteria option 1 (b) i.e., "Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as Wheeling". 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	The project is a Solar PV (SPV) rooftop Installation, hence this criteria is not applicable.

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	
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 992.7 Kwp 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 992.7 Kwp 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 992.7 Kwp 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 992.7 Kwp 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.	Not 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 >>

The electricity generated is used at the point of generation, Berger Paints, Hindupur & it is solely recorded & utilized for the purpose of the manufacturing unit located at this location. Moreover the amount of electricity generated/supplied is being monitored by the net metering system installed by the utility service provider with a unique customer number for the service connection.

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 includes 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 Hindupur Andhra Pradesh, India. The project focuses on installation of 992 Kwp roof top solar power plant which is meant for capacitive use. The excess energy generated from the system is sent 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	CO2	Yes	Main emission source
		CH4	No	Main emission source
		N2O	No	Main emission source
Project Activity	Greenfield Solar PV Project Activity	CO2	No	No CO2 emissions are emitted from the project
		CH4	No	Project activity does not emit CH4
		N2O	No	Project activity does not emit N2O

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 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.

The combined margin ($EF_{grid,CM,y}$) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) (having weightage 75%) and build margin (BM) (having weightage 25%). Calculations for this combined margin must be based on data from an official source (where available) and made publically available.

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

Parameter	Value	Nomenclature	Source
$EF_{grid,CM,y}$	**0.93463** tCO2/MWh	Combined margin CO_2 emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO2 Emission Database, Version 14[2] published by Central Electricity Authority (CEA), Government of India.
$EF_{grid,OM,y}$	0.95677 tCO2/MWh	Operating margin CO_2 emission factor for the project electricity system in year y	Calculated as the last 3 year (2014-15, 2015-16 & 2016-17,) generation-weighted average, sourced from Baseline CO2 Emission Database, version 14, published by Central Electricity Authority (CEA), Government of India.
$EF_{grid,BM,y}$	0.86821 tCO2/MWh	Build margin CO_2 emission factor for the project electricity system in year y	Baseline CO_2 Emission Database, Version 14, published by Central Electricity Authority (CEA), Government of India.

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y – PE_y – Le_y$

Where:

- ER_y = Emission reductions in year y (tCO_2/y)
- BE_y = Baseline Emissions in year y ($t\ CO_2/y$)
- PE_y = Project emissions in year y (tCO_2/y)
- LE_y = 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:

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

- BEy = Baseline emissions in year y (t CO2)
- $EGPJ,y$ = Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)

- $EFgrid,y$ = Combined margin CO2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (t CO2/MWh)

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)

= 1433 MWh *0.9
An Emission factor of 0.9 has been selected as per UCR standard

= 1,289 CoUs /year (i.e. 1,289 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 >>

There is no change in the start date of crediting period.

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: 1 years, 10 months – 08/02/2020 to 30/11/2021

B.8. Monitoring plan>>

Data and Parameters available at validation (ex-ante values):

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2 /MWh
Description	Combined margin emission factor for Indian grid connected power generation in year y calculated using the latest version of "Tool to calculate the emission factor for an electricity system version 07"
Source of data	CO_2 baseline database (Version 16.0) published by CEA on March 2021, which is the most recent and updated datasets.(https://cea.nic.in/wpcontent/ uploads/baseline/2021/06/User_Guide_ver_16_2021-1.pdf)
Value(s) applied	0.93463
Measurement methods and procedures	This value is calculated using OM and BM values as per the methodological tool to calculate the emission factor for an electricity system and using data base of CEA.
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For the calculation of Emission Factor of the grid

Data / Parameter:	$EF_{grid,OM,y}$
Data unit:	tCO_2 /MWh
Description:	Simple operating margin emission factor for Indian grid
Source of data:	CO_2 baseline database (Version 16.0) published by CEA on March 2021, which is the most updated datasets.
Value(s) applied	0.95677
Measurement methods and procedures	This value is calculated by taking weighted average of Simple Operating Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system"
Monitoring frequency:	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid

Data / Parameter:	$EF_{grid,BM,y}$
Data unit:	tCO_2 /MWh
Description:	Simple build margin emission factor for Indian grid
Source of data:	CO_2 baseline database (Version 16.0) published by CEA on March 2021, which is the most updated datasets.
Value(s) applied	0.86821
Measurement methods and procedures	This value is calculated by taking weighted average of Simple Operating Margin of recent three years for Indian grid as per the "Tool to calculate the emission factor for an electricity system"
Monitoring frequency:	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid

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

Data / Parameter:	$EG_{PJ,y}$
Data unit:	MWh

Description:	Quantity of net electricity supplied by the project plant/unit for the purpose of captive usage via wheeling through the grid in year y
Source of data:	Energy Meter records and/or monthly generation statement
Value(s) applied	1433 (Annualized average value has been considered here for ex-ante estimation purposes)
Measurement methods and procedures	Monitoring equipment: Energy Meters are used for monitoring Archiving Policy: Paper & Electronic Calibration frequency: Once in 5 years (as per provision of CEA). The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid (if any); $EG_{PJ,y} = EG_{Export} - EG_{Import}$ If the source of data directly provides the net units, then export and import values are not required as input parameters. The directly available value of net export quantity can be used. Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the monthly bills or invoices.
Measurement Frequency:	Monthly
Purpose of Data	The Data/Parameter is required to calculate the baseline emission.
QA/QC procedures applied:	Not required.