PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 0.27 MW Captive Solar Power Project ZIPL, Gujarat, India.

Version 1.0

Date of PCN: 09/02/2024

First CoU Issuance Period: 04 years, 09 months

Date: 01/03/2019 to 31/12/2023

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

BASIC INFORMATION	
Title of the project activity	0.27 MW Captive Solar Power Project ZIPL, Gujarat, India.
Scale of the project activity	Small Scale
Completion date of the PCN	09/02/2024
Project participants	Project Proponent: Zydus Infrastructure Pvt. Ltd. (ZIPL), Ahmedabad, Gujarat.
Host Party	India
Applied methodologies and standardized baselines	Type I (Renewable Energy Projects) UNFCCC Methodology Category AMS-I.F. Small-scale Methodology, Renewable electricity generation for captive use and mini-grid" Ver 05 UCR Protocol Standard Baseline Emission Factor
Sectoral scopes	01 Energy industries (Renewable / Non-renewable Sources)
Estimated amount of total GHG emission reductions per year	340 CoUs/yr (340 tCO_{2eq}/yr)

SECTION A. Description of project activity

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

The project **0.27 MW Captive Solar Power Project ZIPL**, Gujarat, India is located in Village Matoda, Taluka Sanand, District Ahmedabad, State Gujarat, Country India.

The details of the registered project are as follows:

This is a single project activity of total installed capacity 0.27 MW, which is a ground mounted captive solar power generation activity for captive use by M/s Zydus Infrastructure Pvt. Ltd. (ZIPL, Project Proponent or PP). Zydus Cadila, group of companies, is a fully integrated global healthcare and pharmaceutical provider, which has set up a Pharmaceutical Special Economy Zone (SEZ) called "Pharmez", about 25 kilometers from Ahmedabad, Gujarat. The Zydus group has undertaken focused efforts towards solar energy, water and wastewater recycling and reuse across all of its operations in India.

The PP has the full ownership of the project activity. This project is an operational activity with continuous reduction of GHGs, currently being applied under "Universal Carbon Registry" (UCR), which rewards solar programs with carbon credits as an incentive for positive climate action in the Global South, as opposed to carbon finance in other international voluntary carbon programs.

It is now widely acknowledged that global efforts must accelerate clean technology adoption by 2030 to avert irreversible climate catastrophe. Carbon incentive policies, exemplified by programs like the UCR CoU, will play a pivotal role in achieving this goal. India has set ambitious targets: 450 GW of renewable energy capacity and 500 GW of non-fossil fuel capacity by 2030. With 110 GW already operational (as of 2021-22), the country must add 340 GW of new renewable energy capacity over the next eight years (equivalent to an average of 42.5 GW annually). This substantial expansion is crucial for addressing climate change and providing hope to the world. To achieve this, India's solar capacity needs to increase fivefold, reaching 280 GW from the current 54 GW. This translates to an average annual addition of 29 GW of new solar capacity until the end of this decade – a pace significantly faster than the nation's previous record of 15 GW renewable energy (including 14 GW of solar and 1 GW of wind) added in fiscal year 2021-22.

Purpose of the project activity:
The objective of the proposed project is to produce electricity through a sustainable and renewable energy source: solar radiation. Specifically, the project involves setting up and operating a 0.27 MW solar power plant in Sanand Taluka, located in the state of Gujarat:

Village	Taluka	Type	Total installed capacity KW	Commissioning date
Matoda	Sanand	ground mounted - Captive	270	20.01.2019

Based on the ex-ante estimate, this project is expected to produce approximately 340 MWh of renewable electricity annually, assuming an average PLF (Plant Load Factor) of 14.39%. The project employs Polycrystalline solar photovoltaic technology to generate environmentally friendly energy.

Solar photovoltaic power generation is inherently clean, as it does not involve the combustion of fossil fuels or the emission of greenhouse gases (GHGs). A photovoltaic module comprises interconnected photovoltaic cells encased in an environmentally protective laminate. These modules serve as the fundamental building blocks of a complete PV (photovoltaic) generating unit. When multiple PV panels are mounted on a frame, they form what is known as a PV Array. By displacing fossil fuel-based electricity generation in the regional grid, this project contributes to reducing GHG emissions.

The technological details have been provided in Section A.4.

The anticipated annual average emission reductions resulting from the project activity are estimated to be **340 tCO_2e/yr**. The actual emission reduction achieved during the initial CoU (crediting period) will be submitted as part of the first monitoring and verification process. As the project generates electricity using solar energy, a clean and renewable source, it has no adverse impact on the environment and actively contributes to climate change mitigation efforts.

Project's Contribution to Sustainable Development

This project represents a greenfield initiative, with grid power serving as the baseline scenario. India's electricity grid has historically relied heavily on fossil fuel-based plants. While renewable energy generation is gradually increasing its share of clean and green power, the grid's emission factor remains relatively high, defining it as a distinct baseline.

Unfortunately, a significant number of solar mini grids across India are no longer operational. These decentralized solar systems, including ground panels, electric water pumps, streetlights, and local distribution networks, were initially hailed as a solution to electrify underserved areas and facilitate the country's transition away from fossil fuels. However, the challenge lies in maintaining these solar installations, a task that has proven more complex than anticipated. As a result, many solar panels and batteries lie abandoned (source).

To address this issue, the UCR CoU program can play a crucial role in mitigating the operational

and maintenance costs associated with such projects.

The Government of India has outlined specific indicators for sustainable development in the interim approval guidelines for projects contributing to greenhouse gas (GHG) mitigation. These indicators encompass economic, social, environmental, and technological well-being. It is envisioned that this project will actively contribute to sustainable development through the following means:

Social well-being:

During the construction phase of the project, significant employment opportunities were generated for the local workforce. These opportunities not only supported the project's development but also had a positive impact on the community. Importantly, even after the project's implementation, it has continued to provide sustained employment for the local population. This ongoing support contributes to poverty alleviation in the surrounding area, ensuring that economic benefits extend throughout the project's lifetime.

Economic well-being:

The project represents a strategic investment in clean technology, effectively mitigating CO_2 emissions from the grid. As a result, it qualifies for carbon incentives in the form of CoUs (Certified Emission Reduction Units), signifying an influx of clean energy investments into the host country. The project's operations necessitate both temporary and permanent skilled and semi-skilled manpower at the project site, thereby creating additional employment opportunities within the region.

By replacing grid-based electricity, the project ensures that surplus power is available for nearby areas. This direct and indirect benefit contributes to local economic growth and enhances overall quality of life. Furthermore, the success of such projects can catalyze new industrial ventures and economic activities in the area. As the world strives to limit global warming to a 1.5-degree Celsius increase by 2030, these initiatives also offer carbon incentives for capacity upgrades or expansions.

Beyond improved employment prospects, local communities stand to gain better land prices, fostering comprehensive economic development.

Technological well-being:

The successful operation of this project promotes solar-based power generation and serves as an encouragement for other entrepreneurs to engage in similar ventures. As interest in solar energy projects grows, it will drive research and development efforts by technology providers, leading to the creation of more efficient and advanced machinery in the future. By showcasing the success of solar projects in the region, this initiative motivates additional investors to participate in solar power projects. Consequently, the project contributes to technological well-being.

Environmental well-being:

The proposed project aims to generate electricity using a zero-emission solar-based power generation facility. By harnessing solar energy, the project avoids greenhouse gas (GHG) emissions and specific pollutants like SOx, NOx, and SPM associated with conventional thermal power

plants. Solar power is a clean and renewable energy source, contributing to resource conservation. It reduces reliance on fossil fuels and helps preserve natural resources that are at risk of depletion. Importantly, the project has minimal impact on land, water, air, and soil, ensuring a positive environmental footprint.

Through solar photovoltaic (PV) technology, the project displaces an equivalent amount of power from the regional grid. This displacement directly contributes to reducing GHG emissions associated with electricity generation in India's regional grids. As the world strives to prevent permanent climate disaster by ramping up clean technologies by 2030, carbon incentive policies like the UCR CoU program play a crucial role.

With regards to ESG credentials:

At present, the project has not undergone a formal assessment of its Environmental, Social, and Governance (ESG) credentials. Nevertheless, the project inherently supports several indicators that are in line with ESG principles. Here are a few examples:

Under Environment:

Environmental criteria encompass various aspects of a company's practices, including energy consumption, waste management, pollution control, natural resource preservation, and treatment of animals. In the case of the PP project, the energy usage pattern has shifted toward renewable sources, contributing to both greenhouse gas (GHG) emission reduction and the conservation of depleting energy resources associated with the project's baseline.

Additionally, environmental criteria can be further assessed based on any risks the company may encounter and how it manages those risks. Notably, since the project relies on solar power generation, environmental concerns related to non-renewable energy sources and the risk of escalating power costs are now mitigated. As a result, the project significantly contributes to ESG credentials.

Under Social:

Social criteria encompass various aspects related to a company's interactions and impact on society. These include business relationships, the quality of employment, and working conditions that prioritize employee health and safety. Additionally, social criteria consider the interests of other stakeholders.

In the context of this project, the project proponent (PP) has established robust policies to ensure fair employment practices, stringent health and safety measures, and the creation of local jobs. Furthermore, the organization's corporate social responsibility (CSR) initiatives directly benefit local stakeholders, contributing to social sustainability.

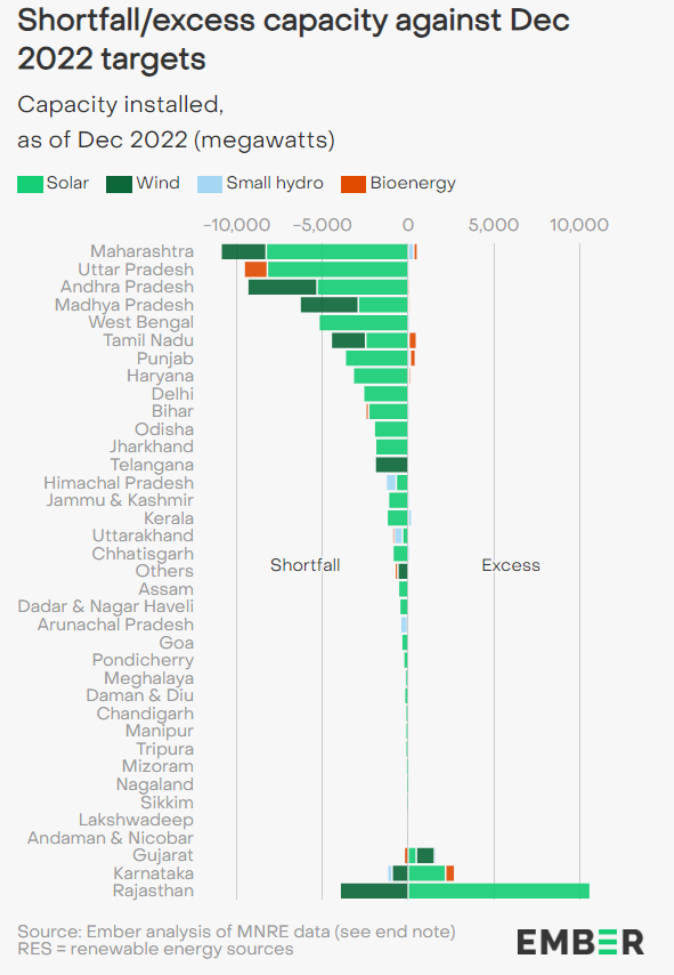
Overall, the project significantly enhances its ESG (Environmental, Social, and Governance) credentials through these positive social contributions.

Under Governance:

Governance criteria pertain to an organization's overall operational practices and accounting procedures. In the context of this project, the project proponent (PP) adheres to sound governance principles, emphasizing transparency, accountability, and compliance with local and national regulations. These practices are well-documented in the company's annual report.

Furthermore, the project itself is a solar power initiative owned and managed by the proponent. It has obtained all necessary NOCs (No Objection Certificates) and approvals. The electricity generated by the project undergoes accurate monitoring, recording, and verification within the existing management framework of the company. As a result, both the project and the proponent demonstrate strong credentials in terms of ESG (Environmental, Social, and Governance).

Despite the challenges faced by many Indian states due to coal shortages, a significant portion of them has yet to meet even half of their renewable energy targets for December 2022. Given this context, the flow of UCR (Certified Emission Reduction) carbon incentives can catalyze the establishment of similar large-scale projects. These efforts are crucial in averting the climate crisis predicted by the IPCC by 2030.



Gujarat State installed capacity of captive solar power plants in industries having demand of 1 MW & above (2022) is 131.8 MW (source). Wind and solar made up 92% of India's power generation

capacity additions in 2022.

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

- 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. Additionally, there are social, environmental, economic and technological benefits which contribute to sustainable development. The key details have been discussed in the previous section. Provides employment to local communities through construction and maintenance of units.

United Nations Sustainable Development Goals:

The project activity generates electrical power using solar energy which is generated from photovoltaic cells, there by displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations.

Thus, the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions. Positive contribution of the project to the following Sustainable Development Goals:

- SDG13: Climate Action
- SDG 7: Affordable and Clean Energy
- SDG 8: Decent Work and Economic Growth

Development Goals	Targeted SDG	Target Indicator (SDG Indicator)
 SDG 13: Climate Action	13.2: Integrate climate change measures into national policies, strategies and planning Target: tCO_2 avoided for the Monitored Period 01	13.2.1: Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)

SDG 7: Affordable and Clean Energy	7.2: By 2030, increase substantially the share of renewable energy in the global energy mix Target: MWh renewable power supplied for the Monitored Period 01	7.2.1: Renewable energy share in the total final energy consumption
SDG 8: Decent Work and Economic Growth	8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value Target: Training, O&M staff	8.5.1: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities

A.3. Location of project activity >>

Country	: India.
District	: Ahmedabad
Village	: Matoda
Taluka	: Sanand
State	: Gujarat
Pincode	: 382213
Latitude	: 22°52'51.6"N & 22°52'55.8"N
Longitude	: 72°24'24.5"E & 72°24'28.5"E

A.4. Technologies/measures

The project utilizes clean renewable solar energy for electricity generation, employing a technology widely recognized for its environmental friendliness. Unlike conventional power plants, Solar photovoltaic operations produce no greenhouse gases (GHGs) or other harmful emissions.

A Photovoltaic module comprises interconnected photovoltaic cells sealed within an environmentally protective laminate, forming the essential components of the complete PV generating unit. When multiple PV panels are mounted on a frame, they form a PV Array. The project has adopted reliable and proven technology to ensure the implementation of environmentally safe practices, ultimately contributing to greenhouse gas reduction.

Each power production unit will in general constitute the following equipment:

- Solar Photovoltaic modules
- Inverters
- Transformers
- Circuit breakers
- Mounting structures
- Cables and hardware.
- Junction box and distribution boxes.
- Earthing kit.
- Control room equipment.
- System for control and monitoring.
- Evacuation system

The technology utilized in the project poses no environmental threat when compared to fossil fuel-fired power plants. It is a proven and reliable technology, ensuring safety and effectiveness in its application. Importantly, the project does not involve the transfer of technology from any Annex 1 country, nor does it receive public funding from Official Development Assistance (ODA) or Annex I countries.

Parameter	Description
Total number of Photovoltaic Modules	842
Rating of Photovoltaic Module	0.320 KWP- Kilo watt peak / 320 WP- watt peak
Technology	Poly Crystalline Silicon
Solar Panel Maker	Seraphim
Meter Maker	Secure
Commissioning Date	20.01.2019
Inverter Make	Solis
Total no. of inverters	6

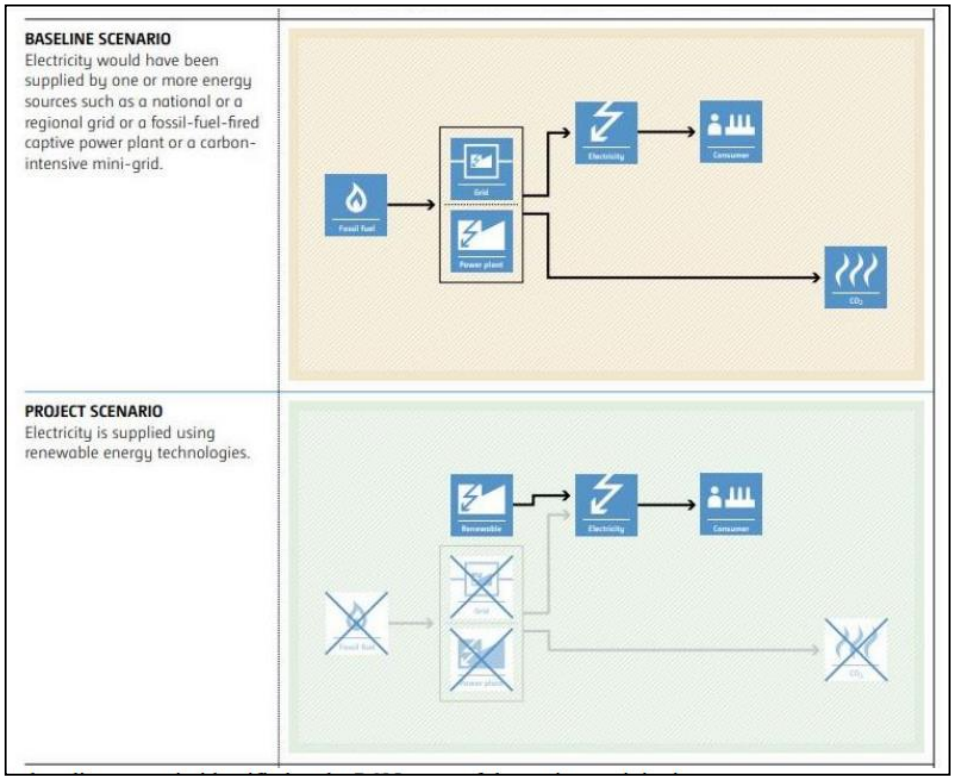
A.5. Parties and project participants >>

Party (Host)	Participants
India	**Project Proponent:** PHARMEZ Special Economic Zone, Zydus Infrastructure Pvt. Ltd., Village: Matoda, Taluka: Sanand, District: Ahmedabad, Gujarat.

A.6. Baseline Emissions>>

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

- *The product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.*



A.7. Debundling>>

This project activity is not a debundled component of a larger carbon or GHG registered 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.F. – Renewable electricity generation for captive use and mini-grid, ver 05***

This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit, i.e. in the absence of the project activity, the users would have been supplied electricity from:

(a) A national or a regional grid (grid hereafter)

Methodology key elements

Typical project(s)	Production of electricity using renewable energy technologies such as photovoltaic, hydro, tidal / wave, wind, geothermal and renewable biomass that supply electricity to user(s).
Type of GHG emissions mitigation action	Renewable energy: Displacement of electricity that would be provided to the user(s) by more-GH-intensive means.

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

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) 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 captive use solar photovoltaic power generation with capacity 0.27 MW which is less than 15MW.
The project activity involves installation of Solar PV (SPV). Hence, the activity is not a hydro power project or combined heat and power (co-generation) systems.
Project displaces grid electricity consumption (e.g. grid import).
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, etc
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.
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). Hence this methodology is applicable and fulfilled for the solar project activity.
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.
Project and leakage emissions from biomass are not applicable.

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

Renewable electricity units are meticulously monitored through digital means, utilizing distinct energy meters positioned within the project activity boundary. It's essential to note that the project activity will not participate in India's NDC carbon ecosystem/market and has not been enlisted under any other GHG mechanism for carbon offsets/credits previously.

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

The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system and encompasses the physical, geographical site of the solar power plant and the energy metering equipment.

	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.

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)

Project Emissions (PE_y) for the following categories of project activities, including relevant definitions, shall be considered following the procedure described in the ACM0002:

- Emissions related to the operation of geothermal power plants (e.g. non-condensable gases, electricity/fossil fuel consumption);
- Emissions from water reservoirs of hydro power plants.
- For the other types of renewable energy projects, $PE_y = 0$

Hence $PE_y = 0$

LE_y = Leakage emissions in year y (tCO_2/y)

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

The baseline scenario identified at the PCN (ver 1.0) stage of the project activity is:

- *The product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.*

Total Capacity: 0.27 MWh

Commissioning Date of first installation: 20/01/2019

Estimated Emission Reductions: $BE_y = EG_{BL,yl} \times EF_{CO2, GRID, y}$

BE_y = Emission reductions in a year y.

where:

$EG_{BL,y}$ = Quantity of net electricity supplied to the grid as a result of the implementation of the UCR project activity in year y (MWh)

$EF_{Grid,CO2,y}$ = CO_2 emission factor of the grid in year y (t CO_2/MWh) as determined by the UCR Standard.

Estimated Annual baseline emission reductions (BEy) = 340 CoUs /year (340 tCO_2eq/yr)

B.6. Prior History>>

The project activity is a ground mounted small-scale solar project and this project was never applied under any other GHG mechanism prior to this registration with UCR. Also, the capacity or the total project as a whole has not been applied for any other environmental crediting or certification mechanism. Hence project will not cause double accounting of carbon offset units or credits (i.e., CoUs).

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

There are no changes to the start date of the 1st crediting period.

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

This is PCN version 1.0 and hence there are no changes applicable.

B.9. Monitoring period number and duration>>

Monitored Period : 01
1st Monitoring Period Date : 01/03/2019 to 31/12/2023
1st Monitoring Duration : 04 years 09 months

B.8. Monitoring plan>>

Key Data Monitored: Quantity of net electricity generated per year.

1. **Monitoring Plan Objective and Organization**

PP, as the project implementer, oversees and monitors the electricity generated by the project activity. Data pertaining to this is electronically archived and has been stored since 01/03/ 2019.

To uphold reliability and transparency in the data, PP has instituted Quality Assurance and Quality Control (QA&QC) measures. These measures are designed to efficiently manage and oversee data reading, recording, auditing, as well as the archiving of data and associated documents. Data is monitored on a daily basis and submitted to PP accordingly.

PP has also implemented QA&QC measures to calibrate and ensure the accuracy of metering devices, as well as the safety aspects of project operation. Metering devices are calibrated and inspected regularly and in accordance with specifications and requirements outlined by the state electricity board, thereby ensuring accuracy in readings.

Data/Parameter	EG_y
Data unit	MWh
Description	Quantity of net electricity displaced in year y
Source of data Value(s) applied	Main Meter Unit Readings, Direct measurement.
Measurement methods and procedures	Daily: Direct measurement using electricity meters
Monitoring frequency	Continuously, aggregated at least annually Calibration Frequency: 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 will be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements. The calibration of meters, including the frequency of calibration, should be done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters should be in accordance with the stipulation of the meter supplier or national requirements. If these standards are not available, and meter supplier does not specify, calibrate the meters every 3 years and use the meters with at least 0.5 accuracy class (e.g. a meter with 0.2 accuracy class is more accurate and thus it is accepted). In case of missing data due to meter failure or other reasons for a certain period of time, the following options to estimate electricity consumption may be applied: (a) A conservative value based on rated capacity and full operational hours (8760 hours).
Purpose of data	Calculation of baseline emissions

Data / Parameter:	$EF_{, CO2, GRID, y}$
Data unit:	tCO_2 /MWh
Description:	Fixed 2019-2022 -Ex-Ante
Source of data:	UCR Standard Protocol As per Standard

Measurement procedures (if any):	Fixed
Monitoring frequency:	NA
Purpose of data:	To estimate baseline emissions
Any comment:	-