



MONITORING REPORT

CARBON OFFSET UNIT (CoU) PROJECT



Title: 4 MW Bundled Solar Projects, Motikundal, Botad, Gujarat, India

Version 2.0

Date: 11.03.2025

1st Monitored Period: 01/11/2020 to 31/12/2024 (04 years, 02 months)

1st Crediting Period: 01/11/2020 to 31/12/2024 (both dates inclusive)



Monitoring Report (MR) CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	4 MW Bundled Solar Projects, Motikundal, Botad, Gujarat, India
UCR Project Registration Number	467
Version	2.0
Completion date of the MR	11.03.2025
Monitoring period number and duration of this monitoring period	1 st Monitored Period: 01/11/2020 to 31/12/2024 (04 years, 02 months)
Project participants	Yojan Solutions (Aggregator) Contact Person: Dipti Raval Email: projects@yojan.in Hariom Solar Park (Project Owner) Address: Bhavnagar Rd, Zaver Nagar, Botad, Gujarat 364710
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 18 Standardized Baseline: UCR Protocol Emission Factor
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2020: 1566CoUs (1566 tCO ₂ eq)
	2021: 6331 CoUs (6331 tCO ₂ eq)
	2022: 6663 CoUs (6663 tCO ₂ eq)
	2023: 6445 CoUs (6445 tCO ₂ eq)
	2024: 5389CoUs (5389tCO ₂ eq)
Total:	26394 CoUs (26394 tCO₂eq)

Table of Contents

SECTION A. Description of project activity	4
A.1. Purpose and general description of project activity	4
A.2. Location of project activity	6
A.3. Parties and project participants	7
A.4. References to methodologies and standardized baselines	7
A.5. Crediting period of project activity	7
A.6. Contact information of responsible persons/entities	8
SECTION B. Implementation of project activity	8
B.1. Description of implemented registered project activity	8
B.2 Do no harm or Impact test of the project activity	9
B.3. Baseline Emissions	11
B.4. Debundling	11
SECTION C. Application of methodologies and standardized baselines	11
C.1. References to methodologies and standardized baselines	11
C.2. Applicability of methodologies and standardized baselines	11
C.3 Applicability of double counting emission reductions	14
C.4. Project boundary, sources and greenhouse gases (GHGs)	14
C.5. Establishment and description of baseline scenario (UCR Protocol)	15
C.6. Prior History	16
C.7. Monitoring period number and duration	16
C.8. Changes to start date of crediting period	17
C.9. Permanent changes from PCN monitoring plan, applied methodology or applied standardized baseline	17
C.10. Monitoring plan	17

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

a) Purpose of the project activity and the measures taken for GHG emission reductions

The **4MW Bundled Solar Project** by **Hariom Solar Projects** in **Motikundal, Gujarat, India**, is designed to generate renewable energy for captive consumption through a grid-connected ground-mounted solar photovoltaic (PV) system. With an installed capacity of **4.0089 MWh**, the project aims to reduce greenhouse gas (GHG) emissions by replacing conventional energy sources with solar power, thereby contributing to climate change mitigation efforts.

Purpose of the Project

The primary purpose of this project is to provide a sustainable energy solution for identified consumers through a wheeling agreement with the grid. This arrangement allows for the efficient delivery of solar-generated electricity while ensuring compliance with local regulations set forth by the **Gujarat Energy Development Agency (GEDA)**.

The project supports the broader goals of Gujarat's Solar Policy 2015, promoting renewable energy adoption and reducing reliance on fossil fuels.

Measures for GHG Emission Reductions

To achieve GHG emission reductions, the project implements several key measures:

- **Operational Capacity:** The project consists of multiple solar parks, including Gopinath, Surya, Shakti, and Hariom Solar Parks, all operational since **October 2, 2020**. Collectively, these parks contribute to a significant reduction in carbon emissions by generating clean energy.
- **Continuous Monitoring:** The project is registered under the **Universal Carbon Registry (UCR)**, which facilitates ongoing tracking of GHG emissions and ensures transparency in reporting reductions achieved through solar energy generation.
- **Compliance with Regulatory Frameworks:** The signing of the Power Purchase Agreement (PPA) and Connectivity Permission Procedure (CPP) ensures that the project adheres to regulatory standards while promoting environmental sustainability.

By utilizing solar power for electricity generation, this bundled project not only meets energy needs but also plays a crucial role in reducing GHG emissions associated with traditional energy sources.

b) Brief description of the installed technology and equipment>>

Power generated by the project activity directly replaces an equal amount of power which would have been generated at the regional Grid which is mainly dominated by fossil fuel-intensive thermal power plants. The project activity uses thin film solar photovoltaic technology to generate clean energy. The generation of power from rooftop 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. Thus, project activity leads to reduction in GHG emissions as it displaces grid power.

The technological details have been provided in Section B.1.a.

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

UCR Project ID or Date of Authorization: 467
 Start Date of Crediting Period: 01/11/2020
 Project Commissioned: 02/10/2020

PP name	Total Installed Capacity MWh	Commissioning Date
Gopinath Solar Park	0.86415	02/10/2020
Surya Solar Park	0.7392	
Shakti Solar Park	0.9504	
Hariom Solar Park	1.45515	

Monitoring Period: 01/11/2020 to 31/12/2024 (04 years, 02 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	01/11/2020
Carbon credits claimed up to	31/12/2024
Total ERs generated (tCO _{2eq})	26394 tCO _{2eq}
Leakage	0 tCO _{2eq}
Project Emission	0 tCO _{2eq}

e) Baseline Scenario>>

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”.

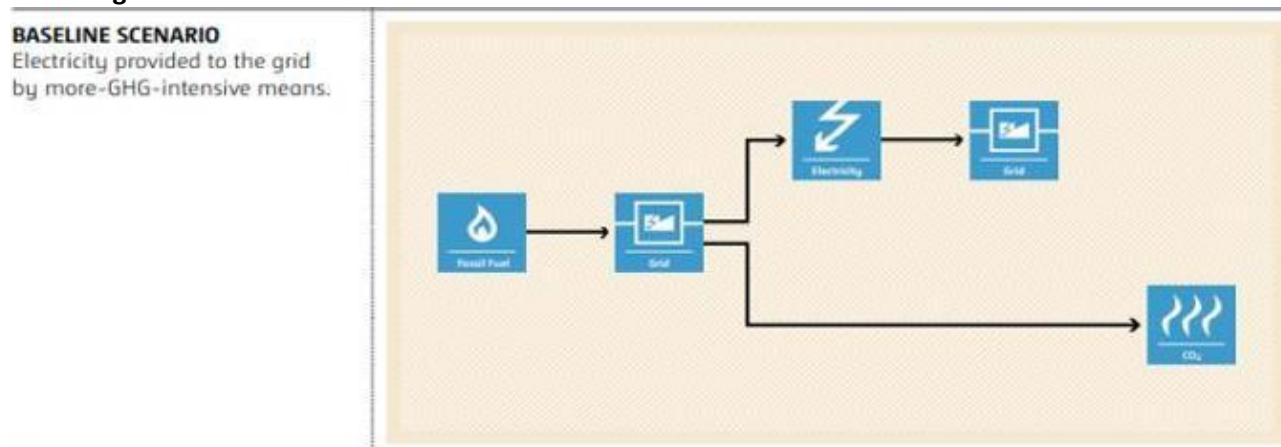


Figure 1 Baseline Scenario

A.2. Location of project activity

Country: India
District: Botad
Village: Motikundal
Taluka: Gadhada
State: Gujarat

PP name	Total Installed Capacity MWh	Latitude	Longitude
Gopinath Solar Park	0.86415	21°54'24"N	71°30'15"E
Surya Solar Park	0.7392		
Shakti Solar Park	0.9504		
Hariom Solar Park	1.45515		

The project site is in Motikundal village of Botad district, Gujarat, which is site is located at a distance of 52km from Botad city in Gujarat and well connected by National highway 47. From the proposed site existing the 66/11kV GETCO substation (ingrola approximately 0.35km distance from the site. The geographic co-ordinates of the project location have been given below.

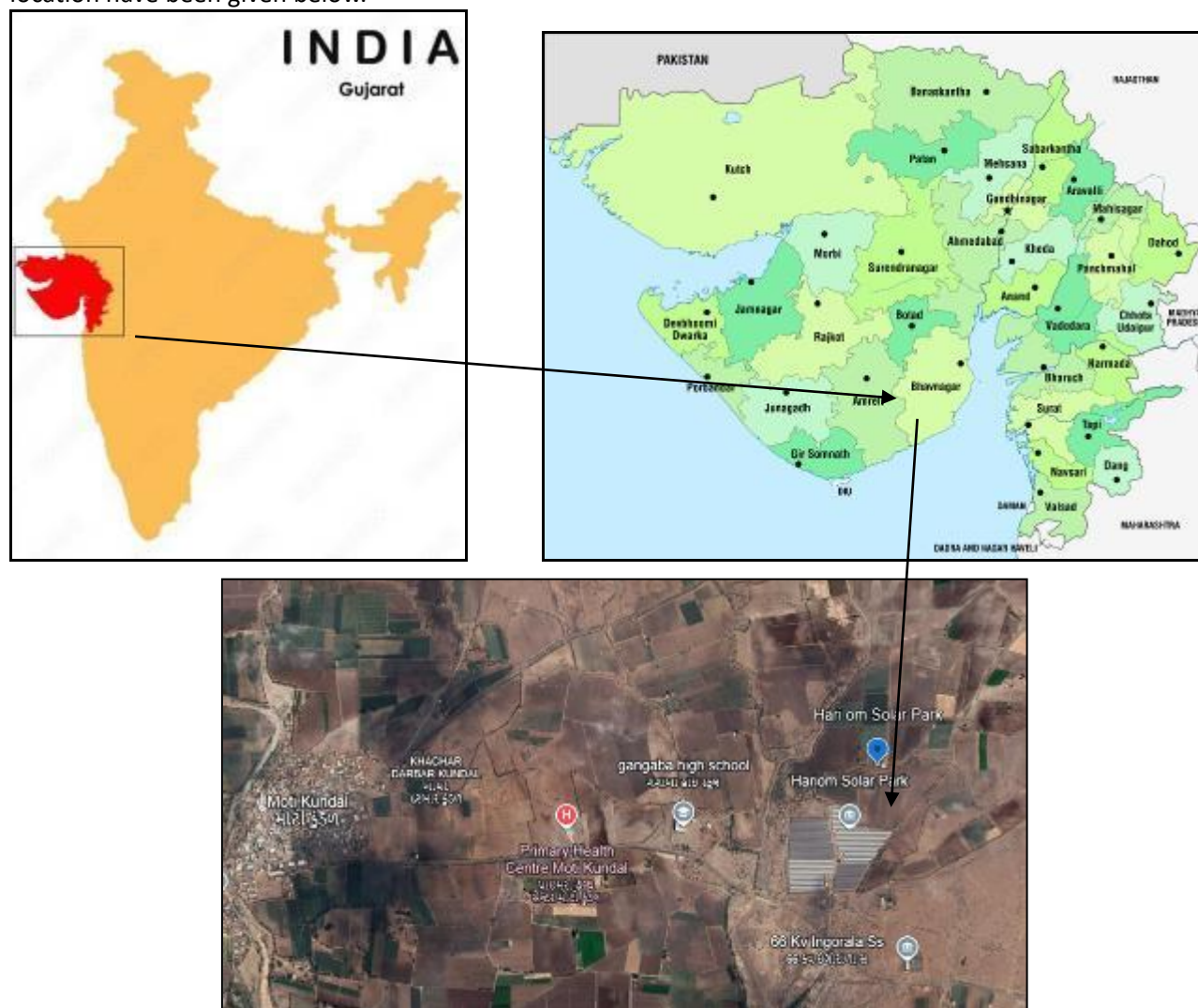


Figure-2- Location of the project activity (courtesy: Google images and www.mapofindia.com)

A.3. Parties and project participants

Party (Host)	Participants
INDIA	Yojan Solutions (Aggregator) UCR ID: 577644419 UCR Contact: Naimishraval@yojan.in Contact Person: Dipti Raval Email: projects@yojan.in Hariom Solar Park (Project Owner) Address: Bhavnagar Rd, Zaver Nagar, Botad, Gujarat 364710

A.4. References to methodologies and standardized baselines

The project activity is approved under the positive list of approved activities under the UCR CoU Standard

Sectoral Scope	01, Energy industries (Renewable/Non-renewable sources)
Type	I - Renewable Energy Projects
Scale	Small Scale
Category	AMS-I.D. (Title: "Grid connected renewable electricity generation", version 18)

Illustration of respective situations under which each of the methodology ("AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user") applies is included in Table 2 below.

Table 2. Applicability of AMS-I.D, AMS-I.F and AMS-I.A based on project types

	Project type	AMS-I.A	AMS-I.D	AMS-I.F
1	Project supplies electricity to a national/regional grid		√	
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			√
3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		√	
4	Project supplies electricity to a mini grid ⁵ system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			√
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	√		

A.5. Crediting period of project activity

Duration of crediting period: - 01/11/2020 to 31/12/2024 (both dates inclusive)

Length of the crediting period corresponding to this monitoring period: 04 years, 02 months.

A.6. Contact information of responsible persons/entities

Particular	Details
Name	Vedant Raval
Designation	Executive
Company	Yojan Solutions Pvt. Ltd.
Address	405, Kanha Capital Behind B.N. Chambers R C Dutt Road, Alkapuri Vadodara 390007 Gujarat, India
Email	info@yojan.in / projects@yojan.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 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 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 to ensure that an environmentally safe and sound technology has been implemented. A sites are based on net metering arrangement with DISCOMs.

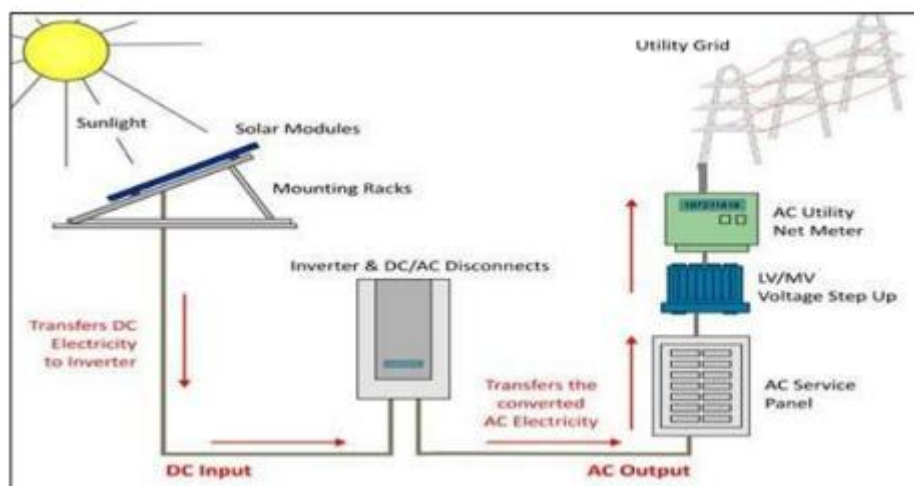
The technical details of the plants included under this project activity provided below:

General	
PV module technology	Mono Perc
Inverter technology	String inverters
Installed DC peak capacity (kWp)	1455.15
Tilt angle	20
PV module manufacturer	TRINA
Model	TSM-DE17M(II)
Wattage (Wp)	445
Inverter manufacturer / model	ABB
Inverter nominal AC output	800 Volt
Orientation of modules	Portrait

This project activity is a bundled project and include 4 members with overall bundled project capacity as 4.0089 MW. Details for individual members for their status of implementation and start date of operation are provided in Appendix-1 of this document.

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

The installed photovoltaic system uses **Mono Perc** technology for the solar panels, manufactured by **TRINA** with a model of **TSM-DE17M(II)**, each providing **445 Wp** of power. The system includes **String inverters** by **ABB** with a nominal AC output of **800 Volts**. The total installed DC peak capacity is **1455.15 kWp**, and the panels are tilted at a **20°** angle for optimal sunlight exposure. The modules are arranged in a **portrait orientation**, designed for efficient energy conversion and integration into the grid.



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

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

The Government of India has stipulated the following indicators for sustainable development in the interim approval guidelines for such projects which are contributing to GHG mitigations. The Ministry of Environment, Forests & Climate Change, has stipulated economic, social, environmental, 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:

Environmental well-being: The project utilizes solar energy for generating electricity which is a clean source of energy. The project activity will not generate any air pollution, wind pollution or solid waste to the environment which otherwise would have been generated through fossil fuels. Also, it will contribute to the reduction of GHG emissions. Thus, the project causes no negative impact on the surrounding environment contributing to environmental well-being.

Economic well-being: Being a renewable resource, using solar energy to generate electricity contributes to the conservation of precious natural resources. The project contributes to economic sustainability through the promotion of decentralization of economic power, leading to the diversification of the national energy supply, which is dominated by conventional fuel-based generating units.

Locally, improvement in infrastructure will provide new opportunities for industries and economic activities to be set up in the area. Apart from getting better employment opportunities, the local people will get better prices for their land, thereby resulting in overall economic development.

Technological well-being: The project activity leads to the promotion of PV power generation project into the region and will promote practice for small scale industries to reduce the dependence on carbon intensive grid supply to meet the captive consumption requirement of electrical energy and also increasing energy availability and improving quality of power under the service area. Hence, the project leads to technological well-being.

SDG Goals	Description
	• The project will generate affordable clean energy, increasing renewable electricity in the global mix. • Solar energy will be used to boost renewable power generation, reducing dependence on non-renewable sources.
	• The project will create additional employment opportunities for both skilled and unskilled workers, particularly benefiting unskilled individuals in remote areas. • Comprehensive training will be provided, covering safety, operational procedures, and skill development. • The initiative aims to achieve full and productive employment, ensuring decent work for all, including women, youth, and persons with disabilities. • It will uphold the principle of equal pay for equal work, promoting fairness and equity in the workplace.
	• This 4.0089 MW bundled solar meet the SDG 13 goal by saving fossil fuel and produce clean energy. • This project is expected to reduce CO2 emission 26394 tCO2 per year. • SDG 13 on clean energy is closely related and complementary. • In the Greenfield project, electricity delivered to the grid by the project would have otherwise been generated by the operation of grid connected power plants. Thereby the project activity reduces the dependence on fossil fuel-based generation units and as there are no associated emissions with this project it contributes to the reduction of greenhouse gases (GHG) emissions.

B.3. Baseline Emissions

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 bundled solar power plant to harness the green power from solar energy and supply the generated electricity to the grid. 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 "grid emission factor" refers to the CO₂ emission factor (tCO₂/MWh) associated with each unit of electricity supplied by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/MWh as a fairly conservative estimate for Indian projects that have not been previously verified under any GHG program for the vintage years **2013–2023**.

For the **2024** vintage year, a grid emission factor of 0.757 tCO₂/MWh has been considered. The combined margin emission factor calculated from the CEA database in India results in higher emissions than the default value.

Hence, the same emission factor has been used to calculate the emission reduction under a conservative approach.

B.4. Debundling

This project activity is not a de-bundled component of a larger project activity. Similarly, each of the bundle members is also not a de-bundled component of any 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

Category: AMS. I.D. (Title: “Grid connected renewable electricity generation”, version 18)

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 4.0089 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:

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., wind power project which sell its energy to the grid and falls under applicability criteria option 1 point (a). Thus, this project activity fulfil this criterion.
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). Involve a rehabilitation of (an) existing plant(s)/unit(s); or 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) 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 activity involves installation of Solar PV (SPV); hence, this criterion is not applicable.
4. If the new unit has both renewable and non-renewable 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 4.0089 MW solar power project, i.e., only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.
5. Combined heat and power (co-generation) systems are not eligible under this category	This is not relevant to the project activity as the project involves only solar power generating units.
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.	There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.
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 project activity is a new installation, it does not involve any retrofit measures nor any replacement and hence is not applicable for the 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 “AMS-I.C.: Thermal energy production with or without electricity” shall be explored.	This is not relevant to the project activity as the project involves only solar power generating units.
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 is involved, the project is only a solar power project and thus the criterion is not applicable to this project activity.

C.3 Applicability of double counting emission reductions

There is no double accounting of emission reductions in the project activity due to the following reasons:

- 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 for project developer.

C.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.

Sources		Gas	Included?	Justification/Explanation
Baseline	Grid Connected Electricity generation	CO2	Yes	Main emission source
		CH4	No	Minor emission source
		N2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Electric Power 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
		Other	No	No other emissions are emitted from the project

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

Net GHG Emission Reductions and Removals:

Thus,

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y = 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 the project activity in year y (MWh)

$EF_{grid,y}$ = UCR recommended emission factor of 0.9 tCO₂/MWh has been considered.

Project Emissions

As per Paragraph 39 of 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, $PE_y=0$.

Leakage

As per paragraph 42 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, $LE=0$

The actual emission reduction achieved during the first CoU period (i.e., period for this monitoring report) is calculated in detail in separate spreadsheet. The same is provided as attachment below for Reference. Overall emission reduction achieved by the proposed bundled project activity for this monitoring period (01/11/2020 to 31/10/2024) is demonstrated below (vintage wise breakup is given in Appendix 2):

$$BE_y = 30994.676 \text{ MWh} \times 0.9 \text{ tCO}_2/\text{MWh}$$

$$\approx 26,394 \text{ tCO}_2\text{e}$$

$$ER_y = BE_y - PE_y - LE_y$$

$$\approx 26394 - 0 - 0$$

$$\approx 26394 \text{ tCO}_2\text{e (i.e., 26394 CoUs)}$$

C.6. Prior History

The project activity is a 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 credits (i.e., COUs)

C.7. Monitoring period number and duration

Total Monitored Period: 01/11/2020 to 31/12/2024 (04 years, 02 months)

C.8. Changes to start date of crediting period

There is no change in the start date of crediting period, as prescribe under the UCR PCN. The project activity is being submitted at UCR for its first-issuance

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

Not applicable.

C.10. Monitoring plan

Data and Parameters available (ex-ante values):

Data/Parameter	UCR recommended emission factor
Data unit	tCO ₂ /MWh
Description	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. The UCR recommends an emission factor of 0.9 tCO ₂ /MWh for the 2020 - 2024 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.
Source of data	https://a23e347601d72166dcd616da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardAug2022updatedVer5_030822005728911983.pdf
Value(s) applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For the calculation of the Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version, Year 2023) results into higher emission factor. Hence for 2020-2023 vintage UCR default emission factor remains conservative.

Data/Parameter	UCR recommended emission factor
Data unit	tCO ₂ /MWh

Description	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 a grid emission factor of 0.757 tCO₂/MWh for the 2024 vintage year as a fairly conservative estimate for Indian projects not previously verified under any GHG program.
Source of data	https://cea.nic.in/wp-content/uploads/2021/03/User_Guide_Version_20.0.pdf
Value(s) applied	0.757
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of data	For the calculation of the Emission Factor of the grid

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

Data / Parameter:	EGPJ, facility, y
Data unit:	MWh
Description:	Total electricity produced by the project activity
Source of data:	Electricity Generation data through monitoring system
Measurement Procedures (if any):	Data Type: Measured Monitoring equipment: Energy Meters and inverter data are used for monitoring
Monitoring frequency:	Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized
	Annually Archiving Policy: Paper & Electronic Calibration frequency: 5 years (as per CEA provision)
	For example, the difference between the measured quantities of the grid export and the import will be considered as net export: EGPJ,y = EGExport - EGImport
QA/QC procedures:	Monthly
Purpose of data:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.
Any comment:	The Data/Parameter is required to calculate the baseline emission.
	Data will be archived electronically for a period of 36 months beyond the end of crediting period.

Appendix 1: Certificate of Commissioning

 **GEDA**
ગુજરાત ઊર્જા વિકાસ એજન્સી
GUJARAT ENERGY DEVELOPMENT AGENCY
A Government of Gujarat Organisation

BY RPAD

GEDA/SOL-26317/2020/10/OW/ 8957 Date: October 27, 2020

CERTIFICATE OF COMMISSIONING

This is to certify that **M/s. Gopinath Solar Park**, C/o Hariom Offset, Paliyad Road, Village- Botad, Ta- Botad, Dist.- Botad has installed and commissioned **864.15 kW (DC)** capacity Solar Power Plant at Survey no. 38 P5/1, 38 P5/2, Village- Moti Kundal, Ta- Gadhada, Dist.- Botad on 2/10/2020 along with the associated equipment as per following details.

GEDA Registration No.	GMSPVIND21012020-26317
Capacity of Solar Power Project	864.15 kW (DC)
SPV Modules- Type / Make	Mono PERC / Trina Solar
Nos. of Photovoltaic Modules / Rating	720 / 440 Wp, 1230 / 445 Wp
Inverters- Type / Make	String / ABB
Nos. of Inverter / Rating	04 / 175 kW
ABT Meter- Make / Serial no.	Secure / PG 5192 B
Name of Substation	66 kV GETCO Substation, Ingrola

The commissioning of the Ground Mounted Solar PV System has been carried out; the ABT meter has been installed.

For Gujarat Energy Development Agency

(S. B. PATIL)
Officer On Special Duty

To,
✓ **M/s. Gopinath Solar Park**
C/o Hariom Offset, Paliyad Road,
Village- Botad, Ta- Botad,
District- Botad- 364719

Cc to: (1) Chief Engineer (R & C),
Paschim Gujarat Vij Company Limited (PGVCL),
Off. Nana Mava Main Road, Laxminagar,
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)
GETCO, 332kV Gotri Sub Station Compound,
Opp. Kalpvruk building, Near T.B. Hospital, Gotri Road,
Vadodara - 390 021

Ph. : 079-232 57251-53
Fax : +91 79 232-47097, 57255
e-mail : director@geda.org.in
www.geda.gujarat.gov.in

 **GEDA**
ગુજરાત ઊર્જા વિકાસ એજન્સી
GUJARAT ENERGY DEVELOPMENT AGENCY
A Government of Gujarat Organisation

BY RPAD

GEDA/SOL-26319/2020/10/OW/ 8955 Date: October 27, 2020

CERTIFICATE OF COMMISSIONING

This is to certify that **M/s. Hariom Solar Park**, C/o Hariom Offset, Paliyad Road, Village- Botad, Ta- Botad, Dist.- Botad has installed and commissioned **1455.15 kW (DC)** capacity Solar Power Plant at Survey no. 37 P4/3, 38 P5/3, Village- Moti Kundal, Ta- Gadhada, Dist.- Botad on 2/10/2020 along with the associated equipment as per following details.

GEDA Registration No.	GMSPVIND21012020-26319
Capacity of Solar Power Project	1455.15 kW (DC)
SPV Modules- Type / Make	Mono PERC / Trina Solar
Nos. of Photovoltaic Modules / Rating	3270 / 445 Wp
Inverters- Type / Make	String / ABB
Nos. of Inverter / Rating	07 / 175 kW
ABT Meter- Make / Serial no.	Secure / PG 5191 B
Name of Substation	66 kV GETCO Substation, Ingrola

The commissioning of the Ground Mounted Solar PV System has been carried out; the ABT meter has been installed.

For Gujarat Energy Development Agency

(S. B. PATIL)
Officer On Special Duty

To,
✓ **M/s. Hariom Solar Park**
C/o Hariom Offset, Paliyad Road,
Village- Botad, Ta- Botad,
District- Botad- 364719

Cc to: (1) Chief Engineer (R & C),
Paschim Gujarat Vij Company Limited (PGVCL),
Off. Nana Mava Main Road, Laxminagar,
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)
GETCO, 332kV Gotri Sub Station Compound,
Opp. Kalpvruk building, Near T.B. Hospital, Gotri Road,
Vadodara - 390 021

Ph. : 079-232 57251-53
Fax : +91 79 232-47097, 57255
e-mail : director@geda.org.in
www.geda.gujarat.gov.in

 **GEDA**
ગુજરાત ઊર્જા વિકાસ એજન્સી
GUJARAT ENERGY DEVELOPMENT AGENCY
A Government of Gujarat Organisation

BY RPAO

GEDA/SOL-26316/2020/10/OW/ 8958 Date: October 27, 2020

CERTIFICATE OF COMMISSIONING

This is to certify that **M/s.Shakti Solar Park**, C/o Hariom Offset, Paliyad Road, Village- Botad, Ta- Botad, Dist.- Botad has installed and commissioned **950.4 kW (DC)** capacity Solar Power Plant at Survey no. 37 P4/2, 37 P4/3, Village- Moti Kundal, Ta- Gadhadda, Dist.- Botad on 2/10/2020 along with the associated equipment as per following details.

GEDA Registration No.	GMSPVIND21012020-26316
Capacity of Solar Power Project	950.4 kW (DC)
SPV Modules- Type / Make	Mono PERC / Trina Solar
Nos. of Photovoltaic Modules / Rating	2160 / 440 Wp
Inverters- Type / Make	String / ABB
Nos. of Inverter / Rating	05 / 175 kW
ABT Meter- Make / Serial no.	Secure / PG 5194 B
Name of Substation	66 kV GETCO Substation, Ingrola

The commissioning of the Ground Mounted Solar PV System has been carried out; the ABT meter has been installed.

For Gujarat Energy Development Agency
(S. B. PATIL)
Officer On Special Duty

To,
M/s. Shakti Solar Park
C/o Hariom Offset, Paliyad Road,
Village- Botad, Ta- Botad,
District- Botad- 364719

Cc to: (1) Chief Engineer (R & C),
Paschim Gujarat Vij Company Limited (PGVCL),
Off. Nana Mava Main Road, Laxminagar,
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)
GETCO, 332kV Gotri Sub Station Compound,
Opp. Kalpvruk building, Near T.B. Hospital, Gotri Road,
Vadodara - 390 021

સાહેબ મેવા, નાના મેવા રોડ ને બેઠવાને
4th Floor, Block No. 11-12, Udyogbhavan,
Sector-11, Gandhinagar-382017, India.
Ph : 079-232 57251-53
Fax : +91 79 232-47097, 57255
e-mail : director@geda.org.in
www.geda.gujarat.gov.in

 **GEDA**
ગુજરાત ઊર્જા વિકાસ એજન્સી
GUJARAT ENERGY DEVELOPMENT AGENCY
A Government of Gujarat Organisation

BY RPAO

GEDA/SOL-26318/2020/10/OW/ 8956 Date: October 27, 2020

CERTIFICATE OF COMMISSIONING

This is to certify that **M/s.Surya Solar Park**, C/o Hariom Offset, Paliyad Road, Village- Botad, Ta- Botad, Dist.- Botad has installed and commissioned **739.2 kW (DC)** capacity Solar Power Plant at Survey no. 37 P4/1, Village- Moti Kundal, Ta- Gadhadda, Dist.- Botad on 2/10/2020 along with the associated equipment as per following details.

GEDA Registration No.	GMSPVIND21012020-26318
Capacity of Solar Power Project	739.2 kW (DC)
SPV Modules- Type / Make	Mono PERC / Trina Solar
Nos. of Photovoltaic Modules / Rating	1680 / 440 Wp
Inverters- Type / Make	String / ABB
Nos. of Inverter / Rating	04 / 175 kW
ABT Meter- Make / Serial no.	Secure / PG 5193 B
Name of Substation	66 kV GETCO Substation, Ingrola

The commissioning of the Ground Mounted Solar PV System has been carried out; the ABT meter has been installed.

For Gujarat Energy Development Agency
(S. B. PATIL)
Officer On Special Duty

To,
M/s. Surya Solar Park
C/o Hariom Offset, Paliyad Road,
Village- Botad, Ta- Botad,
District- Botad- 364719

Cc to: (1) Chief Engineer (R & C),
Paschim Gujarat Vij Company Limited (PGVCL),
Off. Nana Mava Main Road, Laxminagar,
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)
GETCO, 332kV Gotri Sub Station Compound,
Opp. Kalpvruk building, Near T.B. Hospital, Gotri Road,
Vadodara - 390 021

સાહેબ મેવા, નાના મેવા રોડ ને બેઠવાને
4th Floor, Block No. 11-12, Udyogbhavan,
Sector-11, Gandhinagar-382017, India.
Ph : 079-232 57251-53
Fax : +91 79 232-47097, 57255
e-mail : director@geda.org.in
www.geda.gujarat.gov.in

Appendix 2: Vintage wise CoU claim:

Units in tCO2eq:

Total Co2 Emission year						
Year	2020	2021	2022	2023	2024	Total
Gopinath	376	1534	1506	1457	1257	6130
Hariom	584	2197	2435	2364	1955	9535
Shakti	338	1424	1466	1438	1186	5852
Surya	268	1176	1256	1186	991	4877
Total	1566	6331	6663	6445	5389	26394