



# PROJECT CONCEPT NOTE

## CARBON OFFSET UNIT (CoU) PROJECT



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

Version 3.0

Date: 11.03.2025

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

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



**PROJECT CONCEPT NOTE (PCN)  
CARBON OFFSET UNIT (COU) PROJECT**

BASIC INFORMATION	
Title of the project activity	4 MW Bundled Solar Projects, Motikundal, Botad, Gujarat, India
Scale of the project activity	Small Scale
Completion date of the PCN	11/03/2025
Project participants	Yojan Solutions (Aggregator)  Hariom Solar Park (Project Owner)
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 total GHG emission reductions	<b>26394 CoUs</b>

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## SECTION A.1 Description and Purpose of the Project Activity

### A.1.1 General Description of project activity

### A.1.2 Purpose and general description of Carbon offset Unit (CoU) project activity >>

The project titled **4 MW Bundled Solar Projects, Motikundal, Botad, Gujarat, India** is a bundled project located at, Village: Motikundal, Taluka: Gadhada, State: Gujarat, Country: India.

This bundled project activity is of installed capacity of 4.0089 MWh which is grid connected ground mounted solar PV power generation for captive usage by identified consumers via a wheeling agreement with the grid. The Power Purchase Agreement (PPA) and the Connectivity Permission Procedure (CPP) for consumer use for this project activity were duly signed with the Gujarat Energy Development Agency (GEDA), the regulatory body overseeing energy projects in Gujarat. These agreements were finalized on the commissioning date as mentioned below, ensuring regulatory compliance and facilitating the seamless integration of the solar power project into the state's energy infrastructure.

The promoter of the project activity is 'M/s Hariom Solar,' (herein after called as **Project Proponent or PP**). PP has 100% ownership of the project activity. This project activity is an operational activity with continuous reduction of GHG emissions, currently being applied under "Universal Carbon Registry" (UCR).

The commissioning date of this project activity is 02/10/2020.

Below are the details of the individual promoters of each sub projects. Here the start date of generation is considered as the commissioning date.

Type	PP name	Total Installed Capacity MWh	Village	Taluka	District	Commissioning Date
Ground mounted	Gopinath Solar Park	0.86415	Motikundal	Gadhada	Botad	02/10/2020
	Surya Solar Park	0.7392				
	Shakti Solar Park	0.9504				
	Hariom Solar Park	1.45515				

Gopinath solar park (HSP) has developed an 860 KWp capacity plant that supplies renewable power to ERACON Vitrified Pvt Ltd in Wankaner. M/S Hariom, Shakti, and Surya Solar Park have installed capacities of 1450 KWp, 950 KWp, and 740 KWp respectively, all located in Village: Motikundal, Taluka: Gadhada, District: Botad. These projects are part of Gujarat's Solar Policy 2015 and will sell electricity to third parties under open-access agreements.

The site location details of project activity of 4.0089 MW are as below:

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		



**1. Gopinath Solar Park (0.86415MW)**



**2. Surya Solar Park (0.7392MW)**



**3. Shakti Solar Park (0.9504MW)**



**4. Hariom Solar Park (1.45515MW)**



**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 PS/1, 38 PS/2, Village- Moti Kundal, Ta- Gadhadra, 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 Viji Company Limited (PGVCL),  
Off. Nana Mava Main Road, Laxminagar,  
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)  
GETCO, 452kV Gotri Sub Station Compound,  
Opp. Kalpurva building, Near T.B. Hospital, Gotri Road,  
Vadodara - 390 021

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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 PA/3, 38 PS/3, Village- Moti Kundal, Ta- Gadhadra, 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 Viji Company Limited (PGVCL),  
Off. Nana Mava Main Road, Laxminagar,  
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)  
GETCO, 452kV Gotri Sub Station Compound,  
Opp. Kalpurva building, Near T.B. Hospital, Gotri Road,  
Vadodara - 390 021

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BY RPAD  
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 PA/2, 37 PA/3, Village- Moti Kundal, Ta- Gadhadra, 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 Viji Company Limited (PGVCL),  
Off. Nana Mava Main Road, Laxminagar,  
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)  
GETCO, 452kV Gotri Sub Station Compound,  
Opp. Kalpurva building, Near T.B. Hospital, Gotri Road,  
Vadodara - 390 021

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BY RPAD  
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 PA/1, Village- Moti Kundal, Ta- Gadhadra, 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 Viji Company Limited (PGVCL),  
Off. Nana Mava Main Road, Laxminagar,  
Rajkot - 360 004

(2) Chief Engineer, State Load Dispatch Centre (SLDC)  
GETCO, 452kV Gotri Sub Station Compound,  
Opp. Kalpurva building, Near T.B. Hospital, Gotri Road,  
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### **A.1.2. Purpose of the project activity**

This solar power project activity has a twofold purpose. First, it aims to supply renewable energy to the grid, supporting energy sustainability and reducing reliance on fossil fuels. Second, it provides electricity directly to the premises of the project proponent (PP), ensuring a reliable and sustainable power supply for their operations. These objectives align with broader efforts to promote clean energy adoption while addressing the specific energy needs of the developers' facilities.

The proposed project will generate electricity using a clean and renewable energy source; solar radiation. Located in Gujarat, India, the bundled project activity involves the installation and operation of a 4.0089 MW bundled solar power plant, contributing to the region's energy sustainability.

As per the ex-ante estimate, this project will generate approximately **30579.415MWh** of electricity per annum considering an average PLF of 20%. The power generated is supplied to the grid. The project activity uses Monocrystalline solar photovoltaic technology to generate clean energy. The generation of power from solar photovoltaic is a clean technology as there is no fossil fuel fired or no GHG gases are emitted during the process. Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array. Thus, project activity leads to reduce the GHG emissions as it displaces power from fossil fuel-based electricity generation in the regional grid.

Thus, project activity leads to reduce the GHG emissions as it displaces power from fossil fuel-based electricity generation in the regional grid. The technological details have been provided in Section A.4. The estimated total CO<sub>2e</sub> emission reduction by the project activity in the 1<sup>st</sup> monitored period is expected to be **26,394 tCO<sub>2e</sub>** whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

### **A.1.3. Project's Contribution to Sustainable Development**

This project is a Greenfield activity where grid power is the baseline. The Indian grid system has been predominantly dependent on fossil fuel-powered plants. Renewable power generation is gradually contributing to the share of clean & green power in the grid; however, the grid emission factor is still on the higher side which defines the grid as a distinct baseline.

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:

#### **Social well-being:**

There have been good employment opportunities created for the local workforce during the project construction phase. The project after implementation has also continued to provide employment opportunities for the local populace in a sustained manner and the same would be continued over the project lifetime. The employment opportunities created will contribute towards alleviation of poverty in the surrounding area throughout the lifetime of the project activity.

#### **Economic well-being:**

The project is a clean technology investment decision 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 project location; this will create additional employment opportunities in the region. The electricity replaced in the grid will be available for the nearby area which directly and indirectly improves the economy and lifestyle of the area. In addition, the success of these kinds of projects 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:**


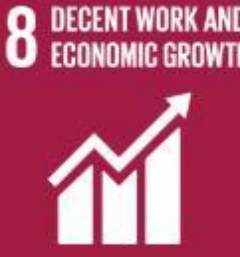

The successful operation of the project activity would lead to the promotion of solar-based power generation and would encourage other entrepreneurs to participate in similar projects. Increased interest in solar energy projects will further push R&D efforts by technology providers to develop more efficient and better machinery in the future. The project activity leads to the promotion and demonstrates the success of solar projects in the region which further motivates more investors to invest in solar power projects. Hence, the project activity leads to technological well-being.

#### **Environmental well-being:**

The project is a clean technology investment decision 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 project location; this will create additional employment opportunities in the region. The electricity replaced in the grid will be available for the nearby area which directly and indirectly improves the economy and lifestyle of the area. In addition, the success of these kinds of projects 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.



The project activity complies the following sustainability goals:

SDG Goals	Description
 <p><b>7</b> AFFORDABLE AND CLEAN ENERGY</p>	<ul style="list-style-type: none"> <li>• The project will generate affordable clean energy, increasing renewable electricity in the global mix.</li> <li>• Solar energy will be used to boost renewable power generation, reducing dependence on non-renewable sources.</li> </ul>
 <p><b>8</b> DECENT WORK AND ECONOMIC GROWTH</p>	<ul style="list-style-type: none"> <li>• The project will create additional employment opportunities for both skilled and unskilled workers, particularly benefiting unskilled individuals in remote areas.</li> <li>• Comprehensive training will be provided, covering safety, operational procedures, and skill development.</li> <li>• The initiative aims to achieve full and productive employment, ensuring decent work for all, including women, youth, and persons with disabilities.</li> <li>• It will uphold the principle of equal pay for equal work, promoting fairness and equity in the workplace.</li> </ul>
 <p><b>13</b> CLIMATE ACTION</p>	<ul style="list-style-type: none"> <li>• This 4.0089 MW bundled solar meet the SDG 13 goal by saving fossil fuel and produce clean energy.</li> <li>• This project is expected to reduce CO2 emission <b>26394 tCO2</b> per year.</li> <li>• SDG 13 on clean energy is closely related and complementary.</li> <li>• 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.</li> </ul>

### **A.1.2. ESG credentials**

At present specific ESG credentials have not been evaluated, however, the project essentially contributes to various indicators which can be considered under ESG credentials. Some of the examples are as follows:

- **Under Environment:**

Environmental criteria may include a company's energy use, waste, pollution, natural resource conservation, and treatment of animals, etc. For the project proponent, the energy use pattern is now based on renewable energy due to the project and it also contributes to GHG emission reduction and conservation of depleting energy sources associated with the project baseline. Also, the criteria can be further evaluated based on any environmental risks that the company might face and how those risks are being managed by the company. Here, as the power generation will be based on Solar power, the risk of environmental concerns associated with non-renewable power generation and risk related to increasing cost of power, etc. are now mitigated. Hence, the project contributes to ESG credentials.

- **Under Social:**

Social criteria reflect on the company's business relationships, qualitative employment, working conditions about its employees' health and safety, interests of other stakeholders etc. With respect to this project, the Project Proponent has robust policies in place to ensure equitable employment, health & safety measures, local jobs creation etc. Also, the organizational CSR activities directly support local stakeholders to ensure social sustainability. Thus, the project contributes to ESG credentials.

- **Under Governance:**

Governance criteria relate to the overall operational practices and accounting procedures of the organization. With respect to this project activity, the PP practices good governance practice with transparency, accountability, and adherence to local and national rules & regulations etc. This can be further referred to in the company's annual report. The electricity generated from the project can be accurately monitored, recorded and further verified under the existing management practice of the company. Thus, the project and the proponent ensure good credentials under ESG.

## **A.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.

**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 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.

### A.3. Location of project activity

Country: India

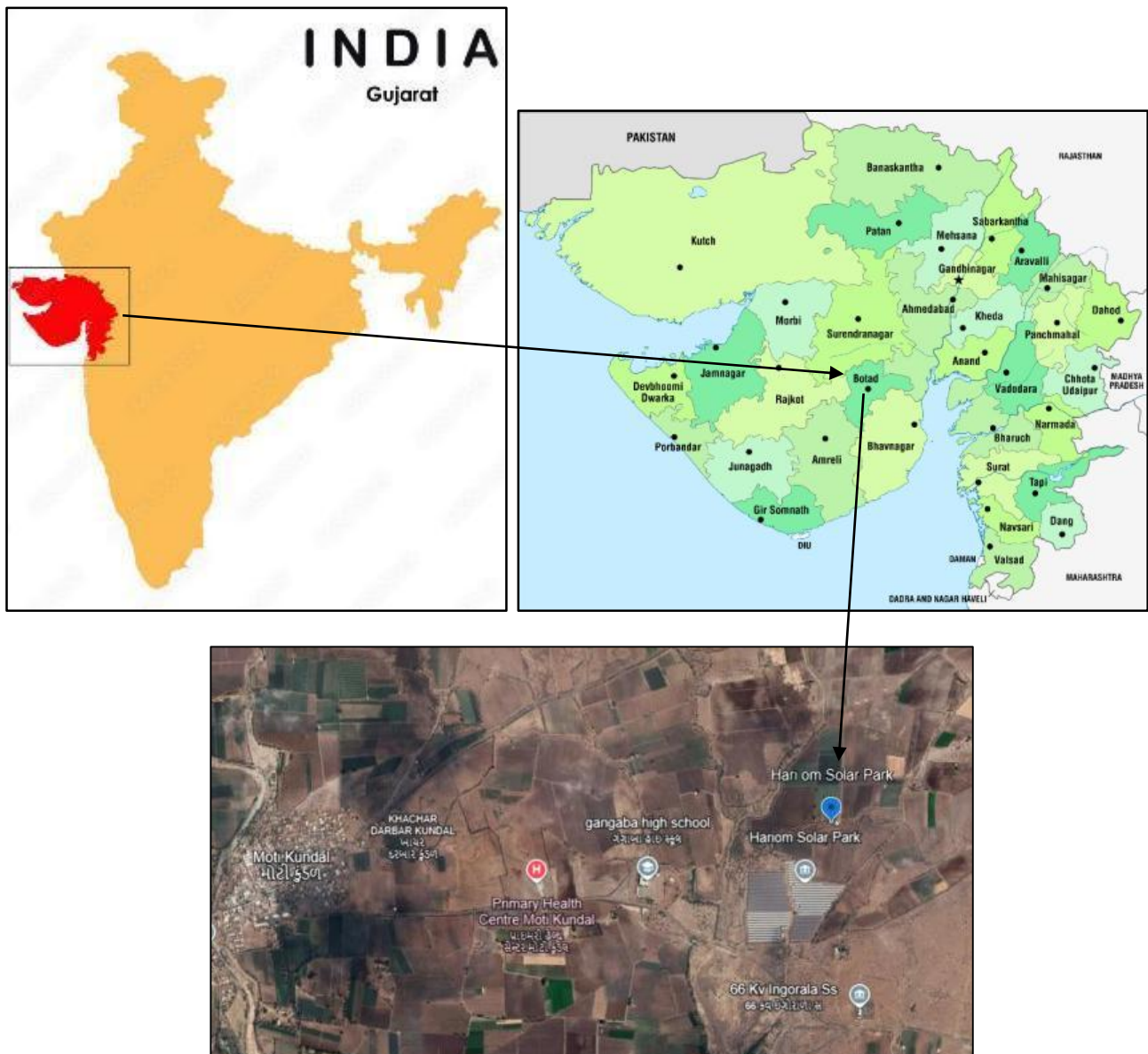
District: Botad

Village: Motikundal

Taluka: Gadhada

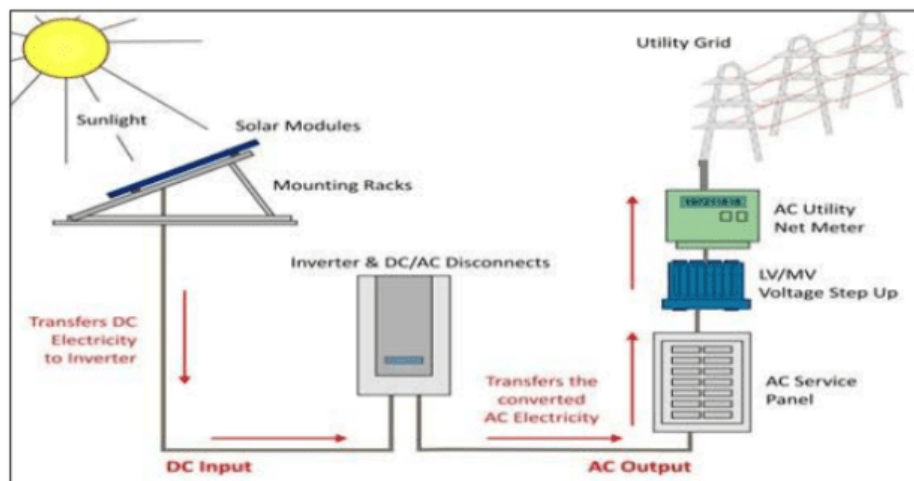
State: Gujarat

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.



#### A.4. Technologies/measures

The project activity is using clean renewable solar energy to produce electricity. The applied technology is 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.



**System Description:** Solar Photovoltaic power generator is the arrangement of all modules in series and parallel connections. In order to achieve a higher system voltage, modules are installed in a row arrangement, called a string. A higher system voltage has the advantage of lesser installation work, higher efficiency of the entire plant and usage of smaller cross section cables. The calculated numbers of strings are connected in parallel to a junction box.

These junction boxes are then connected to each string inverter. This Power Control Unit (PCU) will convert solar generated DC power in to conventional 3 phase AC power. PCU operate on MPPT (Maximum Power Point Tracking) mode to ensure maximum output from the solar generators at different ambient conditions. String inverters use system voltages to reach very high plant efficiency. Furthermore, installations can be expanded with the addition of more modules without problems. The conventional AC power from the inverter is fed through the LV (Low Voltage) panel to the main step-up transformer. From the transformer, power is fed to the HT (High Tension) power panel and required measuring & protection devices before connecting to the grid. The other salient features of the technology are:

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

## A.5. Parties and project participants

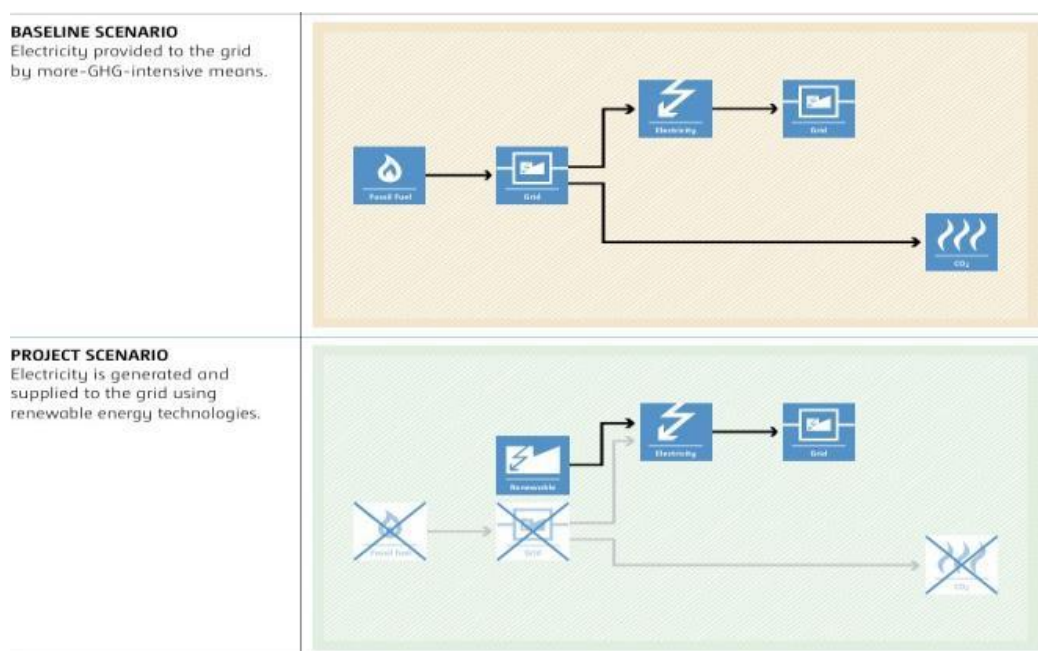
Party (Host)	Participants
INDIA	<p><b>Yojan Solutions (Aggregator)</b>  <b>UCR ID: 577644419</b>  <b>UCR Contact: Naimishraval@yojan.in</b>  Contact Person: Dipti Raval  Email: <a href="mailto:projects@yojan.in">projects@yojan.in</a></p> <p><b>Hariom Solar Park (Project Owner)</b>  Address: Bhavnagar Rd, Zaver Nagar, Botad, Gujarat 364710</p>

## 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. Schematic diagram showing the baseline scenario:

Schematic diagram showing the baseline scenario:





## A.7. Debundling

This project activity is not a debundled portion of a larger project activity.

## SECTION B. Application of methodologies and standardized baselines

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

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

<b>Sectoral Scope</b>	01, Energy industries (Renewable/Non-renewable sources)
<b>Type</b>	I - Renewable Energy Projects
<b>Scale</b>	Small Scale
<b>Category</b>	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**

	<b>Project type</b>	<b>AMS-I.A</b>	<b>AMS-I.D</b>	<b>AMS-I.F</b>
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 <sup>5</sup> 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	√		

**Applied conditions 1 and 3**

## B.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
<p>1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass:</p> <p>(a) Supplying electricity to a national or a regional grid; or</p> <p>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.</p>	<p>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.</p>
<p>This methodology is applicable to project activities that:</p> <p>(a) Install a Greenfield plant.</p> <p>(b) Involve a capacity addition in (an) existing plant(s)</p> <p>(c) Involve a retrofit of (an) existing plant(s).</p> <p>Involve a rehabilitation of (an) existing plant(s)/unit(s); or</p> <p>Involve a replacement of (an) existing plant(s).</p>	<p>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</p>

<p>3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:</p> <p>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or</p> <p>(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/m<sup>2</sup>.</p> <p>(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/m<sup>2</sup></p>	<p>The project activity involves installation of Solar PV (SPV); hence, this criterion is not applicable.</p>
<p>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.</p>	<p>The proposed project is 4MW solar power project, i.e., only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.</p>
<p>5. Combined heat and power (co-generation) systems are not eligible under this category</p>	<p>This is not relevant to the project activity as the project involves only solar power generating units.</p>
<p>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 distinct<sup>1</sup> from the existing units.</p>	<p>There is no other existing renewable energy power generation facility at the project site. Therefore, this criterion is not applicable.</p>
<p>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.</p>	<p>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.</p>

<p>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.</p>	<p>This is not relevant to the project activity as the project involves only solar power generating units.</p>
<p>9. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool “Project emissions from cultivation of biomass” shall apply.</p>	<p>No biomass is involved, the project is only a solar power project and thus the criterion is not applicable to this project activity.</p>

### **B.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.

### **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.

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

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

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

As per para 19 of the approved consolidated methodology AMS-I.D. Version 18, if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:

**“The baseline scenario is that the electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources into the grid”.**

The project activity involves setting up of a new grid connected solar power plant to harness the green power from solar energy and utilize the generated electricity as captive source for PP. 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 CO<sub>2</sub> emission factor (tCO<sub>2</sub>/MWh) associated with each unit of electricity supplied by an electricity system. The UCR recommends an emission factor of 0.9 tCO<sub>2</sub>/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 tCO<sub>2</sub>/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.

## **Net GHG Emission Reductions and Removals:**

Thus,

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER<sub>y</sub> = Emission reductions in year y (tCO<sub>2</sub>/y)

BE<sub>y</sub> = Baseline Emissions in year y (t CO<sub>2</sub>/y)

PE<sub>y</sub> = Project emissions in year y (tCO<sub>2</sub>/y)

LE<sub>y</sub> = Leakage emissions in year y (tCO<sub>2</sub>/y)

Baseline emissions include only CO<sub>2</sub> 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:

$$BE_y = EGPJ_y \times EF_{grid,y}$$

Where,

BE<sub>y</sub> = Baseline emissions in year y (t CO<sub>2</sub>)

EGPJ<sub>y</sub> = 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<sub>grid,y</sub> = UCR recommended emission factor of 0.9 tCO<sub>2</sub>/MWh has been considered.

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

### **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<sub>y</sub>=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 shall be submitted as a part of the first monitoring and verification. However, for the purpose of an ex-ante estimation, the following calculation has been submitted. Hence Net GHG emission reduction,  $\approx 26394 - 0 - 0 = \text{tCO}_2/\text{year}$  (i.e., 26394 CoUs/year).

**Total Energy Generated during crediting period:**

**1. GOPINATH SOLAR PARK:**

Gopinath Solar Park		
Year	MWh	tCO <sub>2</sub> /Year
20-21	420.675	376
21-22	1709.307	1534
22-23	1680.903	1506
23-24	1624.952	1457
24-25	1669.851	1257
<b>Total</b>	<b>7105.688</b>	<b>6130</b>

**2. HARIOM SOLAR PARK:**

Hariom Solar Park		
Year	MWh	tCO <sub>2</sub> /Year
20-21	650.401	584
21-22	2447.042	2197
22-23	2712.906	2435
23-24	2634.452	2364
24-25	2592.198	1955
<b>Total</b>	<b>11036.999</b>	<b>9535</b>

**3. SURYA SOLAR PARK:**

Surya Solar Park		
Year	MWh	tCO <sub>2</sub> /Year
2020	299.144	268
2021	1313.282	1176
2022	1400.704	1256
2023	1322.856	1186
2024	1319.678	991
<b>Total</b>	<b>5655.664</b>	<b>4877</b>

**4. SHAKTI SOLAR PARK:**

Shakti Solar Park		
Year	MWh	tCO <sub>2</sub> /Year
2020	378.016	338
2021	1588.776	1424
2022	1635.006	1466
2023	1603.781	1438
2024	1575.485	1186
<b>Total</b>	<b>6781.064</b>	<b>5852</b>

#### Total Energy Generated during crediting period 2020-2024:

Power Generation- MWh						
Year	2020-21	2021-22	2022-23	2023-24	2024-25	Total
Gopinath	420.675	1709.307	1680.903	1624.952	1669.851	7105.688
Hariom	650.401	2447.042	2712.906	2634.452	2592.198	11036.999
Shakti	378.016	1588.776	1635.006	1603.781	1575.485	6781.064
Surya	299.144	1313.282	1400.704	1322.856	1319.678	5655.664
Total	1748.236	7058.407	7429.519	7186.041	7157.212	30579.415

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) = 30579.415MWh/year \* 0.9 tCO<sub>2</sub>/MWh ≈ 26394 tCO<sub>2</sub>/year**

**Total emission reductions during the 1st crediting period: 26394 tCO<sub>2</sub>**

#### B.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)

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

The start date of crediting under UCR is considered as 02/10/2020 and no GHG emission reduction has been claimed so far.

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

**Data and Parameters available (ex-ante values):**

Data/Parameter	UCR recommended emission factor
Data unit	tCO <sub>2</sub> /MWh
Description	A "grid emission factor" refers to a CO <sub>2</sub> emission factor (tCO <sub>2</sub> /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 <sub>2</sub> /MWh for the <b>2020 - 2023</b> 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	<a href="https://a23e347601d72166dcd616da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardAug2022updatedVer5_030822005728911983.pdf">https://a23e347601d72166dcd616da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardAug2022updatedVer5_030822005728911983.pdf</a>
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 2020-2024 vintage UCR default emission factor remains conservative.

Data/Parameter	UCR recommended emission factor
Data unit	tCO <sub>2</sub> /MWh
Description	A "grid emission factor" refers to a CO <sub>2</sub> emission factor (tCO <sub>2</sub> /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 tCO <sub>2</sub> /MWh for the <b>2024</b> vintage year as a fairly conservative estimate for Indian projects not previously verified under any GHG program.
Source of data	<a href="https://cea.nic.in/wp-content/uploads/2021/03/User_Guide_Version_20.0.pdf">https://cea.nic.in/wp-content/uploads/2021/03/User_Guide_Version_20.0.pdf</a>
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

	<p>Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized</p> <p>Annually Archiving Policy: Paper &amp; Electronic Calibration frequency: 5 years (as per CEA provision)</p> <p>For example, the difference between the measured quantities of the grid export and the import will be considered as net export: <math>EGPJ,y = EG_{Export} - EG_{Import}</math></p>
Monitoring frequency:	Monthly
QA/QC procedures:	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.
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	Data will be archived electronically for a period of <b>36 months</b> beyond the end of crediting period.