# PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

**Title:** 10MW Solar Power Project by EVOLUA: MAR and NP

Version 1.0

Date 01/02/2023

First CoU Issuance Period: 2 years, 2 months

Date: 06/10/2020 to 31/12/2022

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

| BASIC INFORMATION | |
|---|---|
| Title of the project activity | 10 MW Solar Power Project by EVOLUA: MAR and NP |
| Scale of the project activity | Small Scale |
| Completion date of the PCN | 01/02/2023 |
| Project participants | **Project Owner**: EVOLUA ENERGIA PARTICIPAÇÕES S.A.<br>**Project Aggregator**: Kosher Climate India Private Limited |
| Host Party | Brazil |
| Applied methodologies and standardized baselines | Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 18<br>Standardized Methodology: Not Applicable |
| Sectoral scopes | 01 Energy industries (Renewable/NonRenewable Sources) |
| Estimated amount of total GHG emission reductions | 28.239,25 CoUs (28.239,25 $tCO_{2eq}$) |
| | |

## SECTION A. Description of project activity

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

The 10 **MW Solar Power Project by EVOLUA: MAR and NP** consist of three project activities installed in Brazil, state of Minas Gerais, at the villages named Pirapora and Nova Ponte. The promoter of the project is the Brazilian company EVOLUA ENERGIA PARTICIPAÇÕES S.A., which is a holding company that owns solar power plants under its subsidiaries and uses the energy in a business model that reduces the energy tariff cost to people and small businesses.

**Purpose of the project activity:**

The purpose of the proposed project activity is to generate electricity by harnessing the solar energy, making use of solar photovoltaic technology and thereby feeding the generated electricity to the Brazilian national grid. The proposed project activity involves installation of Solar photovoltaic power generation projects at different locations, with a total project capacity of 10MW.
More details are as follows:

| Power Plant Name | Village | Energy Source | Installed capacity in MW | Annual generation in MWh/year | Commissioning date |
|---|---|---|---|---|---|
| Marambaia | Pirapora | Solar PV | 5,000 | 14.837 | 06/10/2020 |
| Nova Ponte I | Nova Ponte | Solar PV | 2,500 | 6.678 | 27/08/2021 |
| Nova Ponte II | Nova Ponte | Solar PV | 2,500 | 6.678 | 17/09/2021 |

Having each power plant an installed capacity equal or under 5 MW, they are classified as *mini-generation* units under the *electricity compensation system* regulated by Brazil's ANEEL (National Electric Energy Agency), in accordance with normative resolutions n. 482/2012, 687/2015, and most recently the federal law 14.300 of 2022. Under the electricity compensation system, the active energy injected by a consumer unit with distributed mini-generation is transferred, through a free loan to the local distributor and then subsequently compensated with consumption offsetting.

By gathering individuals and small businesses in cooperatives and consortiums, the Project Owner is able to provide them with energy from the Solar Plants within the energy compensation scheme: the generated electricity is injected into the national grid and is received by the customers in form of credits, which are offset in the customer's monthly energy bill. Therefore, the project activity has the purpose of contributing to the transformation of the Brazilian energy matrix through the economic incentives of a clean, renewable, and also cheaper energy source.

**Emission reduction and impact of the project activity:**

It is expected that the project replaces anthropogenic emissions of greenhouse gases (GHGs) at approximately **13.033 tCO2e per year**, displacing an estimated average of 28.193 MWh/year from the generation-mix of power plants connected to the Brazilian grid. Project activity is expected to mitigate the total GHG emission reductions of 28.239 tCO2e over the entire crediting period, thereby

contributing to climate change mitigation efforts.

Being a clean renewable energy source, solar power plants cause no negative impact on the environment. The project activity is thus promoting sustainable development, as defined by the United Nations, since economic advancement and progress have been fostered “(...) without compromising the ability of future generations to meet their own needs” (United Nations General Assembly, 1987, p. 43).

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

There is no harm associated with project activity, and hence an environmental impact assessment study wasn't required by Brazilian regulations: according to the National Environment Council's (CONAMA) Resolution nº 1/1986[1], electricity generation plants under 10 MW are exempted from preparing an environmental impact study to be submitted for approval by the competent state body. Thus, no mitigation measures are applicable.

Instead, there are social, environmental, economic and technological benefits which contribute to sustainable development, as described:

**Social benefits:**

- Employment opportunities created for the local workforce during project's construction and implementation phases;
- Employment opportunities to be created throughout the lifetime of the project activity;
- Development of rural and remote regions around project activity;

**Environmental benefits:**

- Use of solar energy - a clean energy source - for generating electricity
- Power generation with zero emission of GHG gases or specific pollutants like SOx, NOx, and SPM
- Effort to minimize the dependence of the Brazilian energy matrix on fossil fuels
- Use of solar energy, which is also a renewable energy source, contributes to the conservation of natural resources
- Minimum impact on land, water and soil at project surroundings

**Economic benefits:**

- It fosters clean technology and clean energy investments in Brazil.
- It fosters the business development of local service providers in Brazil.
- Project activity can also provide new opportunities for industries and economic activities to be set in the area around the projects, developing rural and remote regions.
- It promotes energy cost reduction to consumers.
- Success of these kinds of projects will pave the way for the expansion of the shared distribution generation model in the national scenario, and therefore the consolidation of solar photovoltaic energy generation as one of the main sources in Brazil.

## A.3. Location of project activity >>

Project activity consists of 3 Solar photovoltaic power generation projects installed at different locations:

**Installation 1: Marambaia**

Country: Brazil

[1] Reference:
https://www2.ima.al.gov.br/wizard/docs/RESOLU%c3%87%c3%83O%20CONAMA%20N%c2%ba001.1986.pdf

State: Minas Gerais (MG)
Subregion: North Minas Gerais
Village: Pirapora
Code: 39270-000

Latitude: 17°24'14.5"S
Longitude: 44°55'37.1"W


(Source: Raphael Lorenzeto de Abreu/Wikipedia)

**Installation 2: Nova Ponte I**

Country: Brazil
State: Minas Gerais (MG)
Subregion: Triângulo Mineiro
Village: Nova Ponte
Code: 38160-000

Latitude: 19°07'37.1"S
Longitude: 47°42'44.4"W


(Source: Raphael Lorenzeto de Abreu/Wikipedia

**Installation 3: Nova Ponte II**

Country: Brazil
State: Minas Gerais (MG)
Subregion: Triângulo Mineiro
Village: Nova Ponte

Code: 38160-000

Latitude: 19°07'37.1"S
Longitude: 47°42'44.4"W


(Source: Raphael Lorenzeto de Abreu/Wikipedia)

## A.4. Technologies/measures >>

The technologies and measures are presented next. .

**Image 1**. Nova Ponte's PV modules.

Project activity consists of 3 installations - named *Marambaia, Nova Ponte I* and *Nova Ponte II* - at different locations. Each installation presents the following features of the technology:

### Installation 1: Marambaia

The *mini-generator* installations comprise: solar energy generator with installed capacity of 5.000 kW (5x1.000 kW), three-phase, connected directly to the consumer distribution system of the regional utility company. Detailed information of the equipment is presented next:

| Parameter | Description |
|---|---|

| | |
|---|---|
| Number of **Photovoltaic Modules** | 17.920 |
| Capacity of **Photovoltaic Modules** | 435 Wp |
| Manufacturer/Model of **Photovoltaic Modules** | Longi Solar/ LR4-72HPH-435M |
| Number of **Inverters** | 40 |
| Capacity of **Inverters** | 125 kW |
| Manufacturer/Model of **Inverters** | Sungrow/SG125HV |
| Number of **Transformers** | 5 |
| Capacity of **Transformers** | 1 MW |
| Manufacturer/Model of **Transformers** | Blutrafos |

The photovoltaic modules are fixed in metallic aluminium structures installed on the ground, in order to obtain the necessary mechanical resistance to support them against the weather. The attachment structures allow for an east-west tilt of +/- 60°, given the orientation of the rows of modules towards geographic north. Such characteristics allow the best use of solar radiation incident on the modules throughout the day and year, due to the physical limitations imposed by the area available for installation.

The inverters and electrical protection panels are installed in a clean, dry, ventilated and accessible place. The direct current and alternating current conductors are installed in suitable and dimensioned conduits, in order to protect the insulation against mechanical stress and bad weather.

**Installation 2: Nova Ponte I**

The *mini-generator* installations comprise: solar generators with an installed capacity of 2.500 kW (1.000 kW, 1.000 kW and 500 kW), three-phase, connected directly to the distribution system of the regional utility company. Detailed information of the equipment is presented next:

| Parameter | Description |
|---|---|
| Number of **Photovoltaic Modules** | 7.920 |
| Capacity of **Photovoltaic Modules** | 440W |
| Manufacturer/Model of **Photovoltaic Modules** | Trina Solar/ TSM-DEG15MC.20(ii)-1500V-440W |
| Number of **Inverters** | 17 |
| Capacity of **Inverters** | 16 x 150kW<br>1 x 100kW |
| Manufacturer/Model of **Inverters** | SMA/SHP 150<br>SMA/SHP100 |
| Number of **Transformers** | 10 |

| | |
|---|---|
| Capacity of **Transformers** | 0,25 MW |
| Manufacturer/Model of **Transformers** | Blutrafos |

**Installation 3: Nova Ponte II**

The *mini-generator* installations comprise: solar generators with an installed capacity of 2.500 kW (1.000 kW, 1.000 kW and 500 kW), three-phase, connected directly to the distribution system of the regional utility company. Detailed information of the equipment is presented next:

| Parameter | Description |
|---|---|
| Number of **Photovoltaic Modules** | 7.920 |
| Capacity of **Photovoltaic Modules** | 440W |
| Manufacturer/Model of **Photovoltaic Modules** | Trina Solar/ TSM-DEG15MC.20(ii)-1500V-440W |
| Number of **Inverters** | 17 |
| Capacity of **Inverters** | 16 x 150kW<br>1 x 100kW |
| Manufacturer/Model of **Inverters** | SMA/SHP150<br>SMA/SHP100 |
| Number of **Transformers** | - |
| Capacity of **Transformers** | - |
| Manufacturer/Model of **Transformers** | Blutrafos |

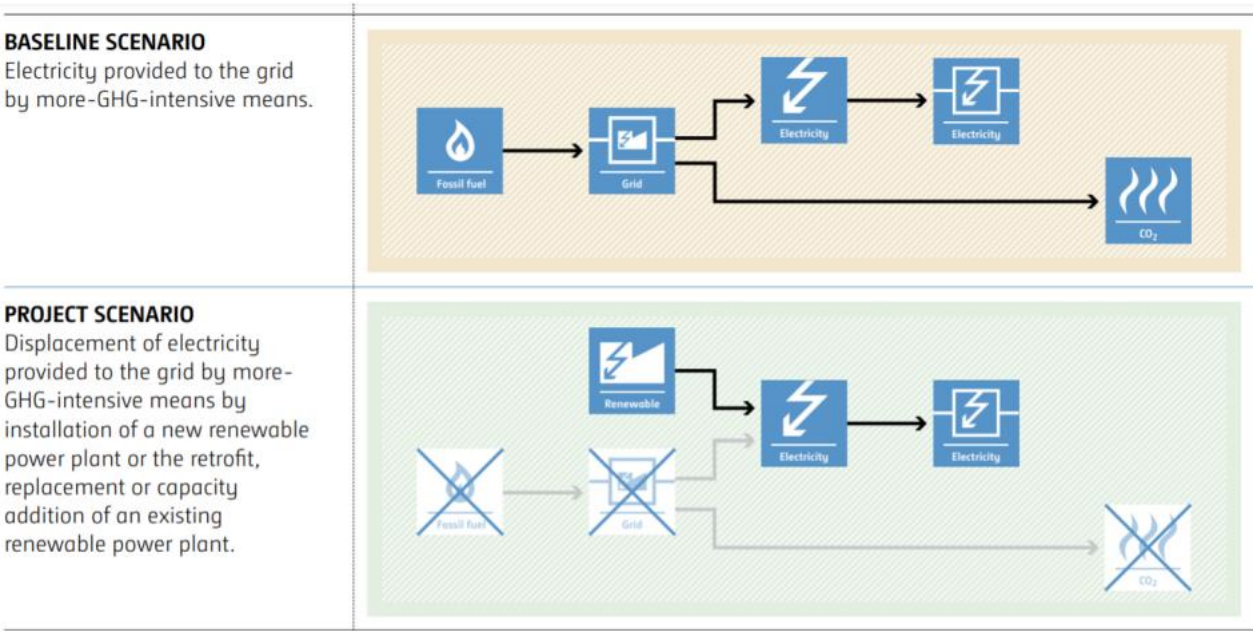
## A.5. Parties and project participants >>

| Party (Host) | Participants |
|---|---|
| Brazil | **Project Owner:** EVOLUA ENERGIA PARTICIPAÇÕES S.A. |
| India | **Project Aggregator:** KOSHER CLIMATE INDIA (P) LTD. |

## A.6. Baseline Emissions>>

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

The project activity involves harnessing the power of solar energy to produce electricity and to supply it to the local distributor, subsequently offsetting the energy consumption of the customers. In the absence of the project activity, the equivalent amount of power would have been supplied by the operation of grid-connected power plants and by the addition of other-more-GHG-intensive generation sources.
Therefore, the baseline scenario for the project activity is the equivalent amount of electricity generated from the Brazilian national grid.




## A.7. Debundling>>

This **10 MW Solar Power Project by EVOLUA: MAR and NP** project is not a debundled component of a larger project activity.

## SECTION B. Application of methodologies and standardized baselines

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

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

TYPE – I - Renewable Energy Projects

CATEGORY – AMS. I.D. (Title: "Grid connected renewable electricity generation", version 18)

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

Project activity involves generation of grid connected electricity from the construction and operation of solar power-based power projects with an installed capacity of 10 MW, qualifying as a small-scale project activity under Type-I of the Small-Scale methodology. The project status corresponds to the methodology AMS-I.D. version 18, and its applicability 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:<br>(a) Supplying electricity to a national or a regional grid; or<br>(b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling | All the project activities involve setting up of a renewable energy (photovoltaic) generation plant that injects electricity to the Brazilian regional grid system. Thus, the project meets applicability conditions (a). |
| 2. This methodology is applicable to project activities that:<br>(a) Install a Greenfield plant;<br>(b) Involve a capacity addition in (an) existing plant(s);<br>(c) Involve a retrofit of (an) existing plant(s);<br>(d) Involve a rehabilitation of (an) existing plant(s); or<br>(e) Involve a replacement of (an) existing plant(s) | Project activity is a Greenfield plant and satisfies this applicability condition (a), since it involves the installation of new solar photovoltaic power plants in Brazil. |
| 3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:<br>(a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or<br>(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 $W/m^2$. | The project activity involves the installation of Solar photovoltaic plants. Hence, this criterion is not applicable. |

| | |
|---|---|
| (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2. | |
| 4. If the new unit has both renewable and 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 a 10 MW solar power project, with no non-renewable components involved in the project. The criterion is therefore not applicable. |
| 5. Combined heat and power (co-generation) systems are not eligible under this category | Not relevant to the project activity, since it involves only solar photovoltaic 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 distinct 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 or replacement, to qualify as a small-scale project, the total output of the retrofitted 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. |
| 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 | Not relevant to the project activity as it involves only solar photovoltaic 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. | Not relevant to the project activity as it involves only solar photovoltaic power generating units. |

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

There is no double counting of emission reductions for the project activities - Marambaia, Nova Ponte I, Nova Ponte II - 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 developers.
It is informed that the solar power plants involved in the current project are also under registration within the local Brazilian mechanism JUNDU[2]. It is assured that there will not be double issuance of credits, therefore credits might be issued under JUNDU only for periods that were not issued under UCR.

## 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 photovoltaic modules and the respective Brazilian grid system, as per the following scenario:

| Scenario | Source | GHG | Included? | Justification/Explanation |
|---|---|---|---|---|
| Baseline | Grid Connected Electricity Generation | CO2 | Yes | Main emission source |
| | | CH4 | No | Not identified in the baseline methodology |
| | | N2O | No | Not identified in the baseline methodology |
| Project Activity | Greenfield solar Power Project activity | CO2 | No | Zero-emissions grid connected electricity generation from renewable energy |
| | | CH4 | No | Zero-emissions grid connected electricity generation from renewable energy |
| | | N2O | No | Zero-emissions grid connected electricity generation from renewable energy |

## B.5. Establishment and description of baseline scenario (UCR Standard or Methodology) >>

[2] Website: https://www.jundu.earth/pt-br/

As per paragraph 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 new solar power plants to harness the power of solar energy and inject electricity into the Brazilian regional grid. In the absence of the project activity, the equivalent amount of power would have been generated by the operation and/or insertion of more-GHG-intensive grid-connected power plants. Hence, the baseline for the project activity is the equivalent amount of power produced at the Brazilian grid.

A "grid emission factor" refers to a $CO_2$ emission factor ($tCO_2/MWh$) which will be associated with each unit of electricity provided by an electricity system. As per the most recent data from Brazil's Ministry of Science and Technology[3] (data of 2021) and the proper calculation methodology, the grid emission factor of Brazil is **0,4623 tCO2/MWh**.

**Net GHG Emission Reductions and Removals:**

$$ER_y = BE_y - PE_y - LE_y$$

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

**Baseline Emissions:**

Baseline emissions include only $CO_2$ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants.

The baseline emissions are to be calculated as follows:

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

Where:

BEy = 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 this project activity in year y (MWh)
$EF_{grid,y}$ = Brazilian Ministry of Science and Technology recommends an emission factor of 0,4623 tCO2/MWh.

**Project Emissions:**

[3] CO2 emission factors for electricity generation in the National Interconnected System of Brazil - Base Year 2021.

As per paragraph 39 of AMS-I.D. (version 18, dated 28/11/2014), for most renewable energy project activities emission is zero. Since, all the projects are run of river project and does not involve any reservoir, the project emission is zero.

Hence, $PE_y = 0$

**Leakage:**

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

Hence, $LE_y = 0$

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

**Marambaia**
Estimated annual baseline emission reductions ($BE_y$)

= 14.837 MWh/year x 0,4623 $tCO_2$/MWh
= 6.859,1 $tCO_2$/year (i.e., 6.859,1 CoUs/year)

**Nova Ponte I**
Estimated annual baseline emission reductions ($BE_y$)

= 6.678 MWh/year x 0,4623 $tCO_2$/MWh
= 3.087,2 $tCO_2$/year (i.e., 3.087,2 CoUs/year)

**Nova Ponte II**
Estimated annual baseline emission reductions ($BE_y$)

= 6.678 MWh/year × 0,4623 tCO2/MWh
= 3.087,2 tCO2/year (i.e.,3.087,2 CoUs/year)

| Project's Power Plants | Net Generation (MWh/year) | Emission Factor (tCO2/MWh) | Emission Reduction (tCO2/year) |
|---|---|---|---|
| Marambaia | 14.837 | 0,4623 | 6.859,1 |
| Nova Ponte I | 6.678 | 0,4623 | 3.087,2 |
| Nova Ponte II | 6.678 | 0,4623 | 3.087,2 |
| **Total** | **28.193** | | **13.033,5** |

## B.6. Prior History>>

Regarding project activity's prior history, it is informed that the power plants are also under registration at the local brazilian mechanism JUNDU[4], which shall issue credits for periods that had no issuance under UCR, in order to avoid double counting.

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

The start date of crediting under UCR is considered as 06/10/2020.

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

There are no permanent changes from the registered PCN monitoring plan and applied methodology.

**B.9. Monitoring period number and duration>>**

First Issuance Period: 2 years, 2 months – 06/10/2020 to 31/12/2022.

**B.8. Monitoring plan>>**

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

| Data/Parameter | Brazilian Government 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 Brazilian Ministry of Science and Technology estimates an emission factor of 0,4623 tCO2/MWh. |
| Source of data | https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao |
| Value(s) applied | 0,4623 $tCO_2$ /MWh |
| Measurement methods and procedures | - |
| Monitoring frequency | Ex-ante fixed parameter |
| Purpose of data | Calculation of Emission Factor of the grid |

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

| Data / Parameter: | EG BL, y |
|---|---|
| Data unit: | MWh/year |
| Description: | Quantity of net electricity supplied to the grid as a result of the implementation of the project activity in year y (MWh) |

[4] Website: https://www.jundu.earth/pt-br/

| | |
|---|---|
| Source of data: | Monthly Joint Meter Readings (JMRs) |
| Value(s) applied | 28.193 MWh |
| Measurement procedures (if any): | The Net electricity generation by the Solar power plant is recorded by the project proponent in the record logs. At the end of every month, Energy bill is generated based on the total monthly electricity exported to the grid. |
| Monitoring frequency: | Monthly |
| QA/QC procedures: | Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the invoices raised by the project participant to the grid. |
| Any comment: | - |