PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: Negative Carbon by AXS: 13,5 MW Solar Power Project in Brazil

Version 1.0

Date 22/05/2023

First CoU Issuance Period: 21 months

Date: 25/03/2022 to 31/12/2023

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

BASIC INFORMATION	
Title of the project activity	Negative Carbon by AXS: 13,5 MW Solar Power Project in Brazil
Scale of the project activity	Small Scale
Completion date of the PCN	05/05/2023
Project participants	**Project Owner**: AXS ENERGIA S/A **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 Standardized Methodology: Not Applicable
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of total GHG emission reductions	8.989,71 CoUs (8.989,71 tCO_{2eq})

SECTION A. Description of project activity

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

The project **Negative Carbon by AXS: 13,5 MW Solar Power Project in Brazil** consists of several project activities installed in Brazil, located in the state of Minas Gerais, at the villages São Gonçalo do Sapucaí, Passos, Carmo Do Paranaíba, and Itatiaiuçu. The promoter of the project is AXS ENERGIA S/A, a company which has the full ownership of the project activity.

The details of the registered project are as follows:

Purpose of the project activity:

The purpose of the project activity is to generate electricity by harnessing the solar energy, making use of solar photovoltaic technology. The proposed project activity involves installation of Solar photovoltaic power generation projects at different locations, with a total capacity of 13,5 MW.

Project Activity	Power Plant Name	Village/State	Energy Source	Installed capacity in MW	Annual generation in MWh/year	Commissioning date
1	Paulo Valias	São Gonçalo do Sapucaí (MG)	Solar PV	2,5	5.681	25/03/2022
2	Harmonia I	Passos (MG)	Solar PV	2,5	6.174	24/06/2022
3	Harmonia II	Passos (MG)	Solar PV	1,5	3.731	12/07/2022
4	Boa Vista I	Carmo Do Paranaíba (MG)	Solar PV	2,5	6.434	11/01/2023
5	Boa Vista II	Carmo Do Paranaíba (MG)	Solar PV	2,5	3.731	20/12/2022
6	Itatiaiuçu	Itatiaiuçu (MG)	Solar PV	2,0	4.731	31/03/2023

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, n. 687/2015, and federal law n. 14.300/2022. 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 installing solar plants to offset the consumption of businesses, 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, whereas customers receive credits that are offset in their 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 activity displaces an estimated average of **30.482 MWh/year** from the combined generation of 6 small-scale power plants. Over the entire crediting period, project activity will inject **35.171 MWh** of renewable and clean energy into the Brazilian grid, mitigating the total GHG emission reductions of **8.989,71 tCO2e**. Project activity, thus, contributes 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 is not 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 6 Solar photovoltaic power generation plants installed at different locations:

Project Activity	Country	State	Village	Latitude	Longitude
1	Brazil	Minas Gerais	São Gonçalo do Sapucaí	21°53'50.2"S	45°34'30.7"W
2	Brazil	Minas Gerais	Passos	20°40'35.4"S	46°35'50.2"W

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

3	Brazil	Minas Gerais	Passos	20°40'26.8"S	46°35'43.4"W
4	Brazil	Minas Gerais	Carmo Do Paranaíba	18°58'48.7"S	46°18'29.0"W
5	Brazil	Minas Gerais	Carmo Do Paranaíba	18°58'48.8"S	46°18'37.8"W
6	Brazil	Minas Gerais	Itatiaiuçu	20°11'26.8"S	44°25'40.6"W

A.4. Technologies/measures >>

Project activity consists of 6 installations at different locations, presenting the following features of technology and measures:

Parameter/ Project Activity	**1**	**2**	**3**	**4**	**5**	**6**
Number of **PV Modules**	7.280	7.280	4.368	5.600	5.600	4.480
Capacity of **PV Modules**	445/450 Wp	445/450 Wp	445/450 Wp	590 Wp	595 Wp	2.520 x 590 Wp 1.960 x 595 Wp
Manufacturer/ Model of **PV Modules**	Trina Solar/ TSM-DEG17MC.20(II)	Trina Solar/ TSM-DEG17MC.20(II)	Trina Solar/ TSM-DEG17MC.20(II)	Canadian Solar/ BiHiKu7	Canadian Solar/ BiHiKu7	Canadian Solar/ BiHiKu7
Number of **Inverters**	20	20	12	20	20	16
Capacity of **Inverters**	125 kW	125 kW	125 kW	125 kW	125 kW	125 kW
Manufacturer/ Model of **Inverters**	Sungrow/SG125HV	Sungrow/ SG125HV	Sungrow/ SG125HV	Sungrow/ SG125HV	Sungrow/ SG125HV	Sungrow/ SG125HV
Number of **Transformers**	3	3	2	3	3	2
Capacity of **Transformers**	2x 1.000 kW 1x 500 kW	2x 1.000 kW 1x 500 kW	1.000 kW	2x 1.000 kW 1x 500 kW	2x 1.000 kW 1x 500 kW	1.000 kW

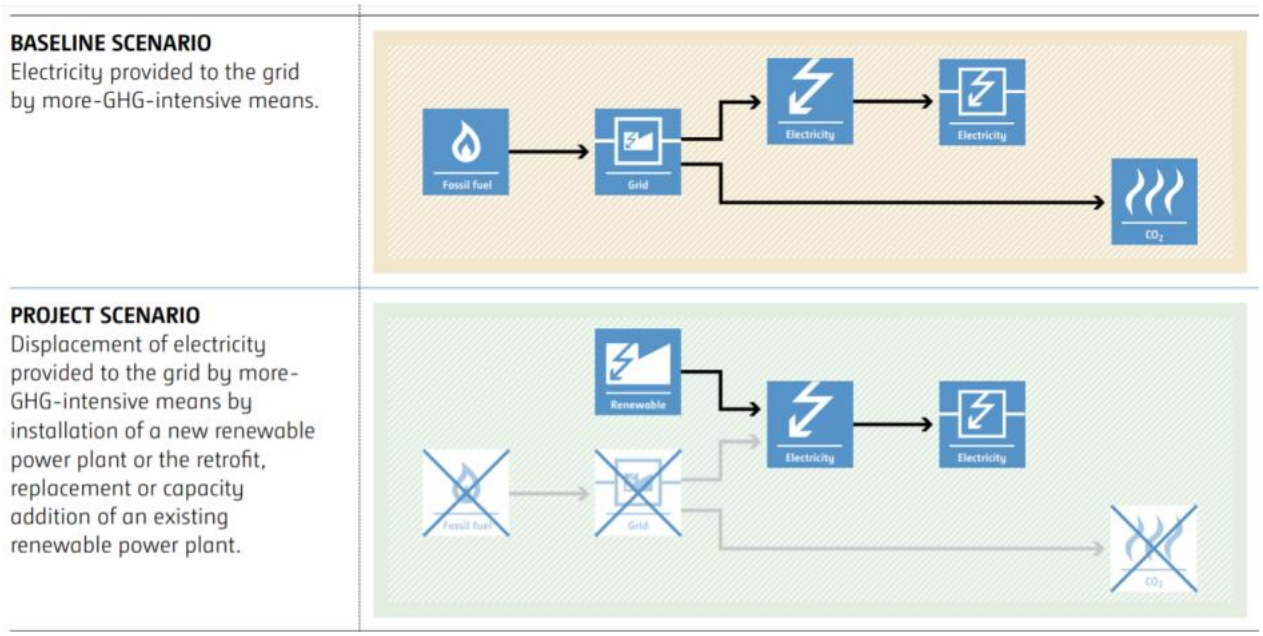
A.5. Parties and project participants >>

Party (Host)	Participants
Brazil	**Project Owner:** AXS ENERGIA S/A Address: R. Cruz e Souza, 57 - office 601 - Centro, Florianópolis - SC, 88020-700, Brazil
India	**Project Aggregator:** KOSHER CLIMATE INDIA (P) LTD. Address: Zee Plaza, No. 1678, 27th Main Rd Bangalore, Karnataka, India Code 560102 Email: narendra@kosherclimate.com

A.6. Baseline Emissions>>

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

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, 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>>

Project **Negative Carbon by AXS: 13,5 MW Solar Power Project in Brazil** 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 13,5 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: (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	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: (a) Install a Greenfield plant; (b) Involve a capacity addition in (an) existing plant(s); (c) Involve a retrofit of (an) existing plant(s); (d) Involve a rehabilitation of (an) existing plant(s); or (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: (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/m^2. (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 the installation of Solar photovoltaic plants. 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	The proposed project is a 13,5MW solar power project, with no non-renewable components involved in the project. The criterion is therefore not applicable.

fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	
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 due to the following reasons:

• Installations are uniquely identifiable based on its location coordinates;
• Project has dedicated commissioning certificates and connection points;
• Project is associated with energy meters which are dedicated to the consumption point for project developers.

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	Electricity generation in fossil fuel fired power	CO2	Yes	Main emission source
		CH4	No	Not identified in the

	that is dispatched due to the project activity			baseline methodology
		N2O	No	Not identified in the baseline methodology
Project Activity	Electricity generation in the 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) >>

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, Technology and Innovation[2] (data of 2022) and the proper calculation methodology, the grid emission factor of Brazil is **0,2556 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:

[2] CO2 emission factors for electricity generation in the National Interconnected System of Brazil - Base Year 2022.

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 0,2556 tCO2/MWh

Project Emissions:

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:

Project Activity -1
Estimated annual baseline emission reductions (BE_y)

= 5.681 MWh/year x 0,2556 tCO_2/MWh
= 1.452,0636 tCO_2/year (i.e., 1.452,0636 CoUs/year)

Project Activity -2
Estimated annual baseline emission reductions (BE_y)

= 6.174 MWh/year x 0,2556 tCO_2/MWh
= 1.578,0744 tCO_2/year (i.e., 1.578,0744 CoUs/year)

Project Activity -3
Estimated annual baseline emission reductions (BE_y)

= 3.731 MWh/year x 0,2556 tCO_2/MWh
= 953,6436 tCO_2/year (i.e., 953,6436 CoUs/year)

Project Activity -4
Estimated annual baseline emission reductions (BE_y)

= 6.434 MWh/year x 0,2556 tCO_2/MWh
= 1.644,5304 tCO_2/year (i.e., 1.644,5304 CoUs/year)

Project Activity -5
Estimated annual baseline emission reductions (BE_y)

= 3.731 MWh/year x 0,2556 tCO_2/MWh
= 953,6436 tCO_2/year (i.e., 953,6436 CoUs/year)

Project Activity -6
Estimated annual baseline emission reductions (BE_y)

= 4.731 MWh/year x 0,2556 tCO_2/MWh
= 1.209,2436 tCO_2/year (i.e., 1.209,2436 CoUs/year)

First CoUs Issuance Period: 25/03/2022 - 31/12/2023					
Project Activity	**Annual Generation (MWh)**	**Commissioning date**	**1st Issuance Generation (MWh)**	**Emission Factor (tCO2/MWh)**	**1st Issuance CoUs**
1	5.681	25/03/2022	6.646	0,2556	1.698,71
2	6.174	24/06/2022	9.388	0,2556	2.399,53
3	3.731	12/07/2022	5.489	0,2556	1.403,03
4	6.434	11/01/2023	6.240	0,2556	1.594,96
5	3.731	20/12/2022	3.843	0,2556	982,38
6	4.731	31/03/2023	3.564	0,2556	911,07
Total			**35.171**		**8.989,71**

B.6. Prior History>>

The project activity has not applied to any other GHG program for generation or issuance of carbon offsets or credits for the said crediting period.

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

The start date of crediting under UCR is considered as 25/03/2022.

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

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

B.9. Monitoring period number and duration>>

First Issuance Period: 21 months – **25/03/2022 to 31/12/2023**

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, Technology and Innovation estimates an emission factor of 0,2556 tCO2/MWh as per the year 2022.
Source of data	https://www.gov.br/mcti/pt-br/acompanhe-o-mcti/sirene/dados-e-ferramentas/fatores-de-emissao
Value(s) applied	0,2556 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)
Source of data:	Joint Meter Readings (JMRs)
Value(s) applied	30.482 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:	-