



PROJECT CONCEPT NOTE

CARBON OFFSET UNIT (CoU) PROJECT

Title: 10 MW Solar Power Project in Gujarat, India by Waa Solar Limited

Version 1.0

Date 08/12/2021

First CoU Issuance Period: 7 years, 11 months

Date: 01/01/2014 to 30/11/2021



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

BASIC INFORMATION	
Title of the project activity	10 MW Solar Power Project in Gujarat, India by Waa Solar Limited
Scale of the project activity	Small Scale
Completion date of the PCN	03/12/2021
Project participants	Creduce Technologies Private Limited (Representator) CERA Sanitaryware Limited (Developer)
Host Party	India
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 17 Standardized Methodology: Not Applicable
Sectoral scopes	01 Energy industries (Renewable/Non-Renewable Sources)
Estimated amount of total GHG emission reductions	To be estimated during verification [An ex-ante estimate is 15,768 CoUs per year]

SECTION A. Description of project activity

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

The project activity is a 10 MW grid connected solar PV power project in District Surendernagar in the State of Gujarat, India. The promoter of the project activity is Waa Solar Limited. Waa Solar Limited has executed a contract agreement with Madhav Infra Projects Pvt. Ltd (MIPPL) to execute civil, mechanical and electrical works for the proposed project activity. The project is an operational activity with continuous reduction of GHG (a registered CDM Project with ID 6352), currently being applied under “Universe Carbon Registry” (UCR).

Purpose of the project activity:

The purpose of the proposed project activity is to generate electricity using a clean and renewable source of energy. As per the ex-ante estimate, the project will generate approximately 17,520 MWh of electricity per annum considering PLF of 20%. The power generated will be supplied to the Gujarat Urja Vikas Nigam Limited (GUVNL) and will replace the equal amount of power which would have been generated by fossil fuel-intensive thermal power plants in the North Eastern Western and North Eastern (NEWNE) grid. The project activity uses thin film 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. The technological details have been provided in Section A.4.3.

The estimated annual average and the total CO₂e emission reduction by the project activity is expected to be 15,768 tCO₂e, whereas actual emission reduction achieved during the first CoU period shall be submitted as a part of first monitoring and verification.

Since the project activity generates electricity through solar energy, a clean renewable energy source it will not cause any negative impact on the environment and thereby contributes to climate change mitigation efforts.

Project’s Contribution to Sustainable Development

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

The Government of India has stipulated 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, environment 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 has 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 life time. 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 decided 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. In addition, improvement in infrastructure will provide new opportunities for industries and economic activities to be setup 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 project activity would lead to 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 future.

Environmental well-being: The project activity will generate power using zero emissions solar based power generation facility which helps to reduce GHG emissions and specific pollutants like SO_x, NO_x, and SPM associated with the conventional thermal power generation facilities. The project utilizes solar energy for generating electricity which is a clean source of energy. Also, being a renewable resource, use of solar energy to generate electricity contributes to resource conservation. It reduces the dependence on fossil fuels and conserves natural resources which are on the verge of depletion. Thus the project causes no negative impact on the surrounding environment contributing to environmental well-being.

With regards to 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, 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 on the basis of any environmental risks which 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, project contributes to ESG credentials.

Under Social:

Social criteria reflect on the company's business relationships, qualitative employment, working conditions with regard to 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 relates to overall operational practices and accounting procedure of the organization. With respect to this project, the Project Proponent practices a good governance practice with transparency, accountability and adherence to local and national rules & regulations etc. This can be further referred from the company's annual report. Also, the project activity is a solar power project owned and managed by the proponent for which all required NOCs and approvals are received. 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 mitigations 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.

Nevertheless, a stakeholders' consultation process was conducted on 05/07/2011 to inform the local stakeholders about the project activity and the related benefits arising out of the project activity. A newspaper advertisement was published in a local newspaper Gujarat Samachar on 28/06/2011. The minutes of meeting of the stakeholder consultation process were prepared and were duly signed by the attendees. The feedback and inputs received from stakeholders confirm that no negative impact is foreseen by the stakeholders.

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
Village : Tikar (Parmar)
District : Surendranagar

The project site is in Village Tikar, Surendranagar district, Gujarat. The nearest railway station is Wankaner junction at a distance of about 30 kms from the project site. The nearest airport is in Rajkot and is at a distance of 100 kms from the project site. The project site is well connected from airport and railway station. The geographic co-ordinates of the project location has been given below.

Latitude $22^{\circ} 42' 30.3''$ N

Longitude $71^{\circ} 25' 6.84''$ E

The representative location map is included below:



(Location of district Surendernagar in Gujarat)

A.4. Technologies/measures >>

The project activity is using clean renewable solar energy to produce electricity. The project activity was allocated to the PP by Energy and Petrochemicals Department, Government of Gujarat as per the Gujarat Solar Power Policy 2009 and PP has installed 10 MW solar photovoltaic project. The applied technology is considered to be one of the most environment friendly technologies available as the operation of the Solar photovoltaic does not emit any GHGs or any other harmful gases unlike the operation of conventional power plants.

Photovoltaic module consists of several photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array. The project activity has used the reliable and proven technology from First Solar Malaysia to ensure that an environmentally safe and sound technology is only being implemented in the proposed project activity leading to the GHG reduction.

The technical arrangement of the project activity is as provided below:

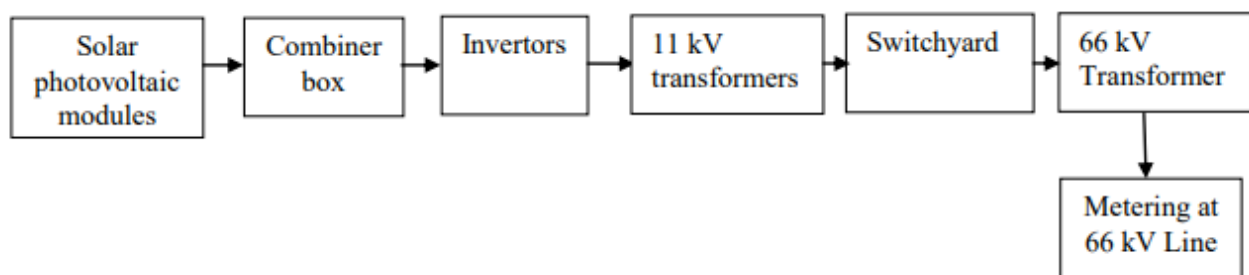


Table 1: Technical details of the project activity at standard test conditions as per the copy of Agreement on the sale and purchase of solar modules

S.No.	Parameters	Description		
	Modules			
1	Module model number	FS-377	FS-380	FS-382
2	Capacity of module	77.5 Wp	80 Wp	82.5Wp
3	Number of modules	63990 (Phase-I)+630 (Phase II)	23110 (Phase II)	40935 (Phase II)
4	Voltage at P_{max}	50.4 V	50.7 V	51 V
5	Current at P_{max}	1.54 A	1.58 A	1.62 A
6	Open circuit voltage (Voc)	61.7 V	61.7 V	62.0 V
7	Short circuit current (Isc)	1.75 A	1.76 A	1.78 A
8	Maximum system voltage (Vsys)	1000 V (600 UL)		
9	Length	1200 mm		
10	Width	600 mm		
11	Weight	12 kg		
12	Thickness	6.8 mm		
13	Area	0.72 m ²		
14	Module type	Cd Te (Thinfiln)		
15	Module make	First Solar		
16	Technology	Thin film solar photovoltaic		
17	Proposed area	60 acres		
	Invertor			
18	Manufacturer	SMA solar technology, Germany		
19	Invertor model	SMA-SC720-CP-10		
20	Number of strings per invertor	595		
21	Modules per string	15		
22	PV Voltage range	515 V-1000 V		
23	Nominal AC Output	720KVA@50°C		
24	Maximum efficiency	98.6%		
	Transformer			
25	Manufacturer	ABB limited Vadodara		
26	kVA rating	12000 kVA		
27	Rated voltage (HV winding)	66 kV		
28	Rated voltage (LV winding)	11 kV		
29	Rated frequency	50 Hz		

A.5. Parties and project participants >>

Party (Host)	Participants
India	<p>Creduce Technologies Private Limited (Representator) Contact person: Shailendra Singh Rao Mobile: +91 9016850742, 9601378723 Address: 2-O-13,14 Housing Board Colony, Banswara, Rajasthan - 327001, India</p> <p>Waa Solar Limited (Developer) Address: 74, Alkapuri Society, 101 Gayatri Apt, Tower B, Vadodara-390005, Gujarat, India</p>

A.6. Baseline Emissions>>

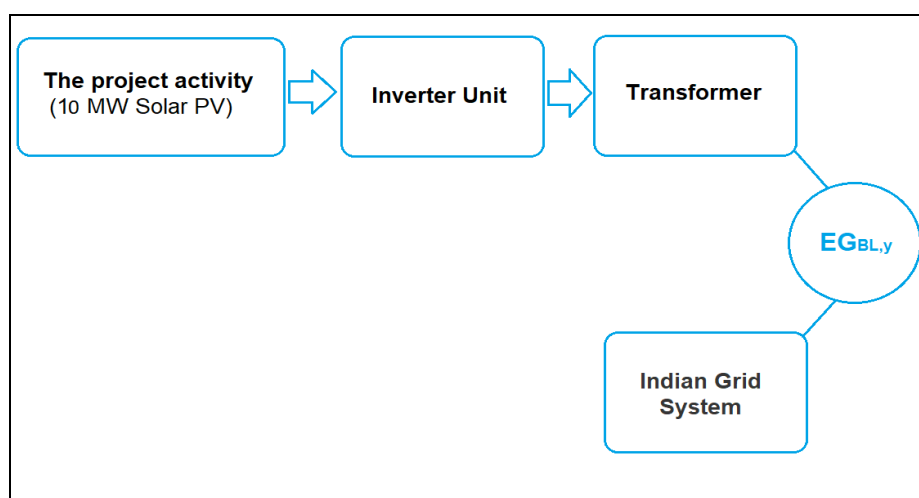
The baseline scenario identified at the PCN stage of the project activity is:

- Grid

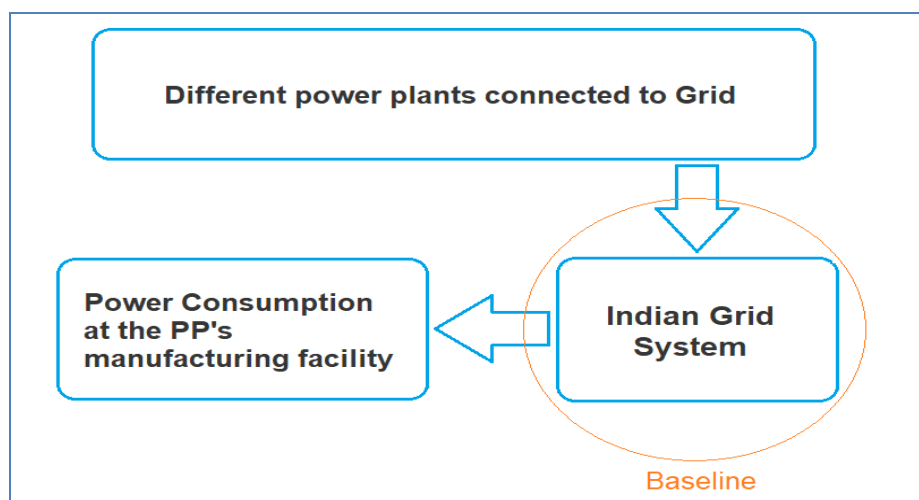
In the absence of the project activity, the equivalent amount of electricity would have been imported from the regional grid (which is connected to the unified Indian Grid system (NEWNE Grid)), which is carbon intensive due to predominantly sourced from fossil fuel-based power plants. Hence, baseline scenario of the project activity is the grid-based electricity system, which is also the pre-project scenario.

Schematic diagram showing the baseline scenario:

Project Scenario:



Baseline Scenario:



A.7. Debundling>>

This project activity 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 17)

Note: Project Proponent is applying the version 17 of the methodology as the project is a CDM registered project under the ID 3586 with the version 17 of the applied methodology.

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

The 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 10 MW which will qualify for a small scale project activity under Type-I of the Small Scale methodology. The project status is corresponding to the methodology AMS-I.D., version 18 and applicability of methodology is discussed below:

Applicability Criterion	Project Case
1. This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass: (a) Supplying electricity to a national or a regional grid; or (b) Supplying electricity to an identified consumer facility via national/regional grid through a contractual arrangement such as wheeling.	The project activity is a Renewable Energy Project i.e. solar power project which falls under applicability criteria option 1 (a) i.e., “Supplying electricity to a national/regional grid”. Hence, the project activity meets the given applicability criterion as well as satisfies the applicability illustration mentioned in Appendix of AMS-ID, version 17.
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)/unit(s); or (e) Involve a replacement of (an) existing plant(s).	The option (a) of applicability criteria 2 is applicable as project is a Greenfield plant /unit. Hence the project activity meets the given applicability criterion.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology:	The project activity involves installation of Solar PV (SPV), hence, this criterion is not applicable.

<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/m².</p> <p>(c) (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</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 10 MW solar power project, i.e. only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.</p>
<p>5. Combined heat and power (co-generation) systems are not eligible under this category</p>	<p>The project is a solar power project and thus the criterion is not applicable to this project activity.</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 distinct¹ from the existing units.</p>	<p>The proposed project is a greenfield 10 MW solar power project, i.e. only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.</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 proposed project is a greenfield 10 MW solar power project, i.e. only component is renewable power project below 15 MW, thus the criterion is not applicable to this project activity.</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>The proposed project is a greenfield 10 MW solar power project, hence, this criterion is not applicable to this project activity.</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>Not 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 17, “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 systems and the Indian grid system.

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO ₂	Yes	Main emission source
		CH ₄	No	Minor emission source
		N ₂ O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Solar power project Activity	CO ₂	No	No CO ₂ emissions are emitted from the project
		CH ₄	No	Project activity does not emit CH ₄
		N ₂ O	No	Project activity does not emit N ₂ O
		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 the approved consolidated methodology AMS-I.D. Version 17, 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 solar power plant to harness the green power from solar energy and supply the generated electricity to the grid. In the absence of the project activity, the equivalent amount of power would have been supplied by the Indian grid, which is fed mainly by fossil fuel fired plants. The power produced at grid from the other conventional sources which are predominantly fossil fuel based. Hence, the baseline for the project activity is the equivalent amount of power produced at the Indian grid.

A "grid emission factor" refers to a CO₂ emission factor (tCO₂/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO₂/MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021, the combined margin emission factor calculated from CEA database in India results into higher emission than the default value. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.

Net GHG Emission Reductions and Removals

Thus, $ER_y = BE_y - PE_y - LE_y$

Where:

ER_y = Emission reductions in year y (tCO₂/y)

BE_y = Baseline Emissions in year y (t CO₂/y)

PE_y = Project emissions in year y (tCO₂/y)

LE_y = Leakage emissions in year y (tCO₂/y)

Baseline Emissions

Baseline emissions include only CO₂ emissions from electricity generation in power plants that are displaced due to the project activity. The methodology assumes that all project electricity generation above baseline levels would have been generated by existing grid-connected power plants and the addition of new grid-connected power plants. The baseline emissions are to be calculated as follows:

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

BE_y	=	Baseline emissions in year y (t CO ₂)
$EG_{PJ,y}$	=	Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh)
$EF_{grid,y}$	=	UCR recommended emission factor of 0.9 tCO ₂ /MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

Project Emissions

As per AMS-I.D. version-17, only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a solar power project, project emission for renewable energy plant is nil.

Thus, PE_y = 0.

Leakage

As per paragraph 22 of AMS-I.D. version-17, '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:

Estimated annual baseline emission reductions (BE_y)

$$= 17,520 \text{ MWh/year} * 0.9 \text{ tCO}_2/\text{MWh}$$

$$= 15,768 \text{ tCO}_2\text{e/year (i.e. 15,768 CoUs/year)}$$

B.6. Prior History>>

The project activity was applied under Clean Development Mechanism (CDM) of UNFCCC to consider generation or issuance of carbon credits under the project title and ID “Project 6352: Solar Power Project in Gujarat, India by Waa Solar Limited” and got registered on 6 June 2012. However, the CDM verification did not take place due to low carbon pricing and higher investment required in the verification and issuance process.

The project was not applied under any other GHG mechanism; also for the current period of COUs, the CDM verification has also not been initiated. Hence project will not cause double accounting of carbon credits (i.e. COUs).

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

There is no change in the start date of crediting period.
The crediting under UCR has been considered from 01/01/2014.

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

Not applicable.

B.9. Monitoring period number and duration>>

First CoU Issuance Period: 7 years, 11 months

Date: 01/01/2014 to 30/11/2021 (inclusive of both dates).

B.8. Monitoring plan>>

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

Data / Parameter	UCR recommended emission factor
Data unit	tCO ₂ /MWh
Description	A "grid emission factor" refers to a CO ₂ emission factor (tCO ₂ /MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO ₂ /MWh for the 2014- 2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Hence, the same emission factor has been considered to calculate the emission reduction under conservative approach.
Source of data	https://a23e347601d72166dcd6-16da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardNov2021updatedVer2_301121081557551620.pdf
Value applied	0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of Data	For the calculation of Emission Factor of the grid
Additional Comment	The combined margin emission factor as per CEA database (current version 16, Year 2021) results into higher emission factor. Hence for 2021 vintage UCR default emission factor remains conservative.

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

Data / Parameter	EG _{PJ,y}
Data unit	MWh
Description	Net electricity supplied to the NEWNE grid facility by the project activity
Source of data	Energy Meter records and/or monthly generation statement
Measurement procedures (if any):	<p>Data Type: Measured</p> <p>Monitoring equipment: Energy Meters are used for monitoring</p> <p>Archiving Policy: Paper & Electronic</p> <p>Calibration frequency: Once in 5 years (as per CEA India provision).</p> <p>The Net electricity supplied to the grid by the project activity will be calculated as a difference of electricity exported to the grid, electricity imported from the grid (if any);</p> $EG_{PJ,y} = EG_{Export} - EG_{Import}$ <p>When the source of data directly provides the net units, then export and import values are not required as input parameters. The directly available value of net export quantity shall be used for calculation.</p>

	Cross Checking: Quantity of net electricity supplied to the grid will be cross checked from the monthly bills or invoices.
Measurement Frequency:	Monthly
Value applied:	17,520 (Annualized average value has been considered here)
QA/QC procedures applied:	Not required
Purpose of data:	The Data/Parameter is required to calculate the baseline emission.
Any comment:	Data will be archived electronically for a period of 36 months beyond the end of crediting period.