



# MONITORING REPORT

CARBON OFFSET UNIT (CoU) PROJECT



**UCR PROJECT ID: 216**

**Title: 550 KW Solar Power Project Vandana Global Ltd, Chhattisgarh**

Version 3.0

Date of MR: 09/09/2023

**1<sup>st</sup> CoU Issuance Period:** 01/01/2013-31/12/2022

**1<sup>st</sup> Monitoring Period:** 01/01/2013-31/12/2022

**1<sup>st</sup> Crediting Period Duration:** 10 years 00 months

**8** DECENT WORK AND  
ECONOMIC GROWTH



**13** CLIMATE  
ACTION



**7** AFFORDABLE AND  
CLEAN ENERGY





## MONITORING REPORT (MR) CARBON OFFSET UNIT (CoU) PROJECT

### BASIC INFORMATION

Title of the project activity	550 KW Solar Power Project Vandana Global Ltd, Chhattisgarh
UCR Project ID	216
Scale of the project activity	Small Scale
Completion date of the PCN	09/09/2023
Project participants	Vandana Global Limited (Project Proponent) <b>Aggregator:</b> Carbon Equalizers, KATNI UCR ID : 660687753 (Aggregator)
Host Party	India
Applied methodologies and standardized baselines	Type I (Renewable Energy Projects) <b>UNFCCC Methodology Category</b> <b>AMS-I.F.</b> Small-scale Methodology, <i>Renewable electricity generation for captive use and mini-grid</i> Ver 05  UCR Protocol Standard Baseline EF
Sectoral scopes	01 Energy industries (Renewable/NonRenewable Sources)
Estimated amount of total GHG emission reductions for the crediting period per year	<b>2013: 0 CoUs (0 tCO<sub>2</sub>eq)</b> <b>2014: 624 CoUs (624 tCO<sub>2</sub>eq)</b> <b>2015: 561 CoUs (561 tCO<sub>2</sub>eq)</b> <b>2016: 598 CoUs (598 tCO<sub>2</sub>eq)</b> <b>2017: 559 CoUs (559 tCO<sub>2</sub>eq)</b> <b>2018: 493 CoUs (493 tCO<sub>2</sub>eq)</b> <b>2019: 415 CoUs (415 tCO<sub>2</sub>eq)</b> <b>2020: 294 CoUs (294 tCO<sub>2</sub>eq)</b> <b>2021: 377 CoUs (377 tCO<sub>2</sub>eq)</b> <b>2022: 227 CoUs (227 tCO<sub>2</sub>eq)</b>  <b>Total: 4148 CoUs (4148 tCO<sub>2</sub>eq/yr)</b>

## SECTION A. Description of project activity

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

The project activity titled, **550 KW Solar Power Project Vandana Global Ltd, Chhattisgarh**, is located within the Industrial Growth Centre Siltara, Village: Sondra, Mandal: Raipur, District: Raipur, State: Chhattisgarh, Country: India.

This is a single project activity of capacity 550KW, which is a ground mounted captive solar power generation activity by 'M/s Vandana Global Limited' (Project Proponent or PP). PP has the full ownership of the project activity. This project is an operational activity with continuous reduction of GHGs, currently being applied under "Universal Carbon Registry" (UCR), which rewards solar programs with carbon incentives as opposed to carbon finance in other international programs. It's now widely accepted that the world needs to ramp up clean technologies by 2030 to prevent permanent climate disaster, and carbon incentive policies, such as the UCR CoU program, will be key to such efforts. India is aiming for 450 GW of renewables and 500 GW of non-fossil capacity by 2030. With 110 GW already installed (as of 2021-22), the nation needs to deploy 340 GW of new renewable energy capacity (on average, 42.5 GW of renewable energy per year for the next eight years) to meet the 2030 target and offer the world some hope in combating climate change. That would require the country's solar capacity to rise fivefold to 280 GW from 54 GW during this period. This translates to 29 GW of new solar capacity additions every year on average until the end of this decade – a far faster pace than the nation's record annual addition of 15 GW renewable energy (14 GW of solar and 1 GW wind) in fiscal 2021-22.

#### **Purpose of the project activity:**

The purpose of the proposed project activity is to generate electricity using a clean and renewable source of energy i.e., solar radiation, for captive use. The project activity of 550 KW is the installation and operation of a solar power plant in Raipur district in the state of Chhattisgarh as per the details listed below:

Village	District	Type	Total installed capacity kW	1 <sup>st</sup> Commissioning date
Sondra	Raipur	Ground mounted-Captive	550	10/06/2012

As per the ex-post estimate, this project activity generates approximately **694 MWh** (maximum historical) of electricity per annum considering an average PLF of 20%. The project activity uses Poly Crystalline 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.

**b). Purpose of the project activity:**

The purpose of the proposed project activity is to generate electricity for captive usage using a clean and renewable source of energy i.e., solar radiation.

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.

The average life time of the Photovoltaic Panel is around 20 years as per the equipment supplier specification. Solar radiation is converted directly into electricity by solar cells (photovoltaic cells). In such cells, a small electric voltage is generated when light strikes the junction between a metal and a semiconductor (such as silicon) or the junction between two different semiconductors. 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 estimated average CO<sub>2</sub>e emission reductions by the project activity is **4148** tCO<sub>2</sub>e over the first monitored period. 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.

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

Unit	Capacity	Total no. of Solar PV Panels	Rating of each Solar PV Panel (Watt)	Make of Solar PV Panels	Make of Main Meter	Commissioning Date
1	SOLAR-1 (100KW)	708	280	LANCO SOLAR	L&T	08/03/2013
	SOLAR-2 (100KW)				L&T	08/03/2013
2	SOLAR-3 (50KW)	540			L&T	14/02/2013
	SOLAR-4 (100KW)				L&T	14/02/2013
3	SOLAR-5 (100KW)	720			L&T	10/06/2012
	SOLAR-6 (100KW)				L&T	10/06/2012
TOTAL		1968				

UCR Project ID: 216

Commissioning Date: 10/06/2012

1<sup>st</sup> CoU Issuance Period: 01/01/2013-31/12/2022

1<sup>st</sup> Monitoring Period: 01/01/2013-31/12/2022

1<sup>st</sup> Crediting Period: 10 years 00 months

### Commissioning Certificates

**ABSTRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF SPV POWER PLANTS**

JCC No. RO Raipur Dated 10/06/12

Name of the Installation Site: Vandana Global Ltd, Silara Works, Admin Bldg & Staff quarter. (Plant 1)

Capacity of the SPV Power Plants installed: 100 kWp Plant No. SPVPP

Work order No: VGL/ SOLAR/ LANCO/ 11-12/ 002 Extension no. (1116/SPV/RAJEE) Date: (14/06/2012)

Actual date of commissioning: 10.6.12

Stipulated date of commissioning as per W.O: 31.5.12

Extension granted till: \_\_\_\_\_ vide HO letter no. \_\_\_\_\_ dated \_\_\_\_\_

Name & address of the contractor:  
M/s LANCO Solar Energy Pvt Ltd, Phase 1,  
Udyog Vihar, Gurgaon - 122016

This is hereby certified that the contractor M/s LANCO Solar Energy Pvt Ltd, Gurgaon  
Has successfully installed and commissioned the 100kWp SPV power plant at  
Vandana Global Ltd Silara works on 10/06/12 with major  
components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order  
mentioned at Sr. No. (3) above.

The work has been executed as per the work order and the SPV power plant of 100 kWp capacity is  
handed over in good working condition. We shall provide complete warranty against all manufacturing defects and  
defective/wrong installation for a period of five years from the date of handing over. The above-mentioned the  
SPV power plant has been handed over by the contractor to the Executive Engineer, Regional Office,  
beneficiary CM/S Vandana Global  
EREDA Raipur in fully satisfactory working condition. Alimahi

Date: \_\_\_\_\_  
Place: \_\_\_\_\_  
Sign: \_\_\_\_\_  
Seal: \_\_\_\_\_  
(Contractor's representative)

Solar photovoltaic power plant at Vandana Global Ltd - Administrative Bldg and Staff quarter  
of 100kWp verified and taken over.

Date: \_\_\_\_\_  
Place: \_\_\_\_\_  
Name: RAJESH GYANI  
Executive Engineer  
Chhattisgarh Renewable  
Energy Development Agency  
Regional Office, Raipur  
Name: ALOK TIWARI  
Asst. Engineer  
Chhattisgarh State Renewable  
Energy Development Agency  
Regional Office, Raipur  
Name: MUKESH  
Executive Engineer  
Vandana Global Ltd  
Seal: \_\_\_\_\_



# TRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF SPV POWER PLANTS

RO RAIPUR

Dated \_\_\_\_\_

Location of the Installation Site: Vandana Global Ltd, Siltara Works, Cooling tower of power plant (Plant 2)

Capacity of the SPV Power Plants installed: 100 kWp

Plant No. SPVPP

Work order No: VGL/SOLAR/LANCO/11-12/262 [Sanction dated 23.1.12] 1116/1116/SPV

Date:

Actual date of commissioning: 10.6.12

Stipulated date of commissioning as per W.O: 31.5.12

Extension granted till: \_\_\_\_\_ vide HO letter no. \_\_\_\_\_ dated \_\_\_\_\_

Name & address of the contractor:

M/s. LANCO Solar Energy Pvt Ltd, Phase 1,

Udyog Vihar, Gurgaon - 122016

This is hereby certified that the contractor M/s. LANCO Solar Energy Pvt Ltd, Gurgaon Has successfully installed and commissioned the 100kWp SPV power plant at Vandana Global Ltd, Siltara on 10.6.12 with major components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order mentioned at Sr. No. (3) above.

The work has been executed as per the work order and the SPV power plant of 100 kWp capacity is handed over in good working condition. We shall provide complete warranty against all manufacturing defects and defective/erroneous installation for a period of five years from the date of handing over. The above-mentioned the SPV power plant has been handed over by the contractor to the Executive Engineer, Regional Office, CREDA, RAIPUR in fully satisfactory working condition. Beneficiary

Date:  
Place:

Sign:  
Seal:  
(Contractor's Representative)

Solar photovoltaic power plant at VANDANA GLOBAL LTD, SILTARA, Cooling tower of power plant of 100kWp verified and taken over.

Date:  
Place:

Name: RAJEEV GYANI Name: ALOK TIWARI Name: MOHESH BHARGAVA  
Executive Engineer Asst. Asst. Engineer Asst. Engineer  
Chief Engineer, Renewable Energy Development Agency, State Renewable Energy Development Agency, State Renewable Energy Development Agency  
Regional Office, Raipur Regional Office, Raipur Regional Office, Raipur



# **ABSTRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF SPV POWER PLANTS**

- JCC No. \_\_\_\_\_ District Raipur RO Raipur Dated \_\_\_\_\_
- (1) Name of the Installation Site: Vandana Global Ltd, near Staff quarter South facing boundary wall
  - (2) Capacity of the SPV Power Plants installed: 100kWp Plant No. 03
  - (3) Work order No: SOA/SONR/LANCO/12-13/16A Date: 10.5.12
  - (4) Sanction No. 14139/SPV/MNRE Sanction (Ratna)/11-12 Date: \_\_\_\_\_
  - (5) Actual date of commissioning: 24.11.12 08.03.13 APR 13
  - (6) Stipulated date of commissioning as per W.O: 30.1.12
  - (7) Extension granted till: \_\_\_\_\_ vide HO letter no. \_\_\_\_\_ dated \_\_\_\_\_
  - (8) Name & address of the contractor:

M/s LANCO Solar Energy Pvt Ltd, Plot No.229  
Udyog Vihar Phase-1, Gurgaon - 122016

This is hereby certified that the contractor M/s LANCO Solar Energy Pvt Ltd has successfully installed and commissioned the 100kWp SPV power plant at Vandana Global Ltd staff quarter South facing wall on 24.11.12 (date) with major components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order mentioned at Sr. No. (3) above.

The work has been fully executed as per the work order and the SPV power plant at Vandana Global Ltd, Raipur of 100 kWp capacity is handed over in good working condition. We shall provide complete warranty against all manufacturing defects and defective/erroneous installation for a period of 5 years from the date of handing over. (The warranty certificate, operation & maintenance manual, necessary spare parts, tool kit & engineering documents have been handed over to Vandana Global Ltd. The above-mentioned the SPV power plant has been handed over by the contractor to Vandana Global Ltd, Raipur in fully satisfactory working condition.

Date: \_\_\_\_\_  
Place: \_\_\_\_\_

Sign: \_\_\_\_\_  
Seal: \_\_\_\_\_  
(Contractor's Representative)

Solar photovoltaic power plant at Vandana Global Ltd near staff quarter south facing wall of 100 kWp verified and taken over.

Date: 25.10.12  
Place: Raipur

Name: \_\_\_\_\_  
Seal: \_\_\_\_\_  
LANCO  
Representative

Name: MUKESH BARGAVA  
Seal: \_\_\_\_\_  
Beneficiary

ALOK TIWARI  
Asstt. Engineer  
Chhattisgarh State Renewable  
Energy Development Agency  
Regional Office, Raipur



**ABSTRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF  
SPV POWER PLANTS**

JCC No. \_\_\_\_\_ District Raipur RO Raipur Dated \_\_\_\_\_  
Name of the Installation Site: Vandana Global Ltd, near watch tower south facing wall  
Capacity of the SPV Power Plants installed: 100 kWp Plant No. 02  
(3) Work order No: VGL/SOLAR/LANCO/12-13/16A Date: 10-5-12  
(4) Sanction No. 14139/SPV/MNFE Sanction (Raipur) /11-12 Date: \_\_\_\_\_  
(5) Actual date of commissioning: 28.11.12 08.03.13 Actual  
(6) Stipulated date of commissioning as per W.O: 30.11.12  
(7) Extension granted till: \_\_\_\_\_ vide HQ letter no. \_\_\_\_\_ dated \_\_\_\_\_  
(8) Name & address of the contractor:  
M/s LANCO Solar Energy Pvt Ltd, Plot No.229  
Udyog Vihar Phase-1, Gurgaon - 122016

This is hereby certified that the contractor M/s LANCO Solar Energy Pvt Ltd has successfully installed and commissioned the 100 kWp SPV power plant at Vandana Global Ltd near watch tower south on 28.11.12 (date) with major components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order mentioned at Sr. No. (3) above.

The work has been fully executed as per the work order and the SPV power plant at Vandana Global Ltd, Raipur of 100 kWp capacity is handed over in good working condition. We shall provide complete warranty against all manufacturing defects and defective/erroneous installation for a period of 5 years from the date of handing over. (The warranty certificate, operation & maintenance manual, necessary spare parts, tool kit & engineering documents have been handed over to Vandana Global Ltd. The above-mentioned the SPV power plant has been handed over by the contractor to Vandana Global Ltd, Raipur in fully satisfactory working condition.

Date: 28.11.12  
Place: Raipur

Sign: \_\_\_\_\_  
Seal: \_\_\_\_\_  
(Contractor's representative)

Solar photovoltaic power plant at watch tower south facing boundary wall, Vandana Global Ltd, Raipur of 100 kWp verified and taken over.

Date: 28.11.12  
Place: Raipur

Name: \_\_\_\_\_  
Seal: \_\_\_\_\_  
Representative: \_\_\_\_\_

Name: MUKESH  
Seal: \_\_\_\_\_  
Beneficiary



Atul Tiwari  
Asst. Engineer  
Chhattisgarh State Renewable  
Energy Development Agency  
Regional Office, Raipur



## ABSTRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF SPV POWER PLANTS

JCC No. \_\_\_\_\_ District Raipur RO Raipur Dated 10/5

(1) Name of the Installation Site: Vandana Global Ltd near watch tower west facing boundary wall

(2) Capacity of the SPV Power Plants installed: 100Wp Plant No. 01

(3) Work order No: VGL/2014/LANCO/12-12/16A Date: 10/5/12

(4) Sanction No. 14139/SPV/MNRE Sanction (Purva)/11-12 Date: \_\_\_\_\_

(5) Actual date of commissioning: 10-11-12 14-02-13 Actual

(6) Stipulated date of commissioning as per W.O. 30-11-12

(7) Extension granted till: \_\_\_\_\_ vide HO letter no. \_\_\_\_\_ dated \_\_\_\_\_

(8) Name & address of the contractor:  
M/s LANCO Solar Energy Pvt Ltd, Plot No. 229  
Udyog Vihar Phase-1, Gurgaon - 122016

This is hereby certified that the contractor M/s LANCO Solar Energy Pvt Ltd has successfully installed and commissioned the 100Wp SPV power plant at Vandana Global Ltd near watch tower west on \_\_\_\_\_ (date) with major components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order mentioned at Sr. No. (3) above.

The work has been fully executed as per the work order and the SPV power plant at Vandana Global Ltd, Raipur of 100 kWp capacity is handed over in good working condition. We shall provide complete warranty against all manufacturing defects and defective/erroneous installation for a period of 5 years from the date of handing over. (The warranty certificate, operation & maintenance manual, necessary spare parts, tool kit & engineering documents have been handed over to Vandana Global Ltd. The above-mentioned the SPV power plant has been handed over by the contractor to Vandana Global Ltd, Raipur, in fully satisfactory working condition.

Date: \_\_\_\_\_  
Place: Raipur

Sign: \_\_\_\_\_  
Seal: \_\_\_\_\_  
(Contractor Representative)

Solar photovoltaic power plant at Watch tower west facing wall, Vandana Global Ltd, Raipur of 100 kWp verified and taken over.

Date: \_\_\_\_\_  
Name: \_\_\_\_\_  
Seal: \_\_\_\_\_  
Place: \_\_\_\_\_  
Representative

Name: MUKESH KUMAR GANA  
Seal: \_\_\_\_\_  
Beneficiary



**ABSTRACT OF JOINT COMMISSIONING CERTIFICATE (JCC) OF  
SPV POWER PLANTS**

Location: District Raipur RO Raipur Dated: \_\_\_\_\_  
Name of the Installation Site: Vandana Global Ltd near gate 4 west facing boundary wall  
Capacity of the SPV Power Plants installed: 50 kWp Plant No. 04  
Work order No. VGL/SOLAR/LANCO/12-12/16A Date: 10.5.12  
Sanction No. 19139/SPV/MINRE Sanction (Part xx)/11-12 Date: \_\_\_\_\_  
Actual date of commissioning: 24.11.2012 11.02.13 Actual  
Proposed date of commissioning as per W.O: 30.11.2012  
Extension granted till: \_\_\_\_\_ vide HO letter no. \_\_\_\_\_ dated \_\_\_\_\_  
Name & address of the contractor:  
M/s LANCO Solar Energy Pvt Ltd, Plot No.229  
Mayapuri Vihar Phase-1, Gurgaon - 122016

This is hereby certified that the contractor M/s LANCO Solar Energy Pvt Ltd has successfully installed and commissioned the 50 kWp SPV power plant at Vandana Global Ltd near gate 4 west wall on 24.11.12 (date) with major components as mentioned in Annexure I appended herewith as per the terms and conditions of the work order mentioned at Sr. No. (3) above.

The work has been fully executed as per the work order and the SPV power plant at Vandana Global Ltd of 50 kWp capacity is handed over in good working condition. We shall provide complete warranty against all manufacturing defects and defective/erroneous installation for a period of 5 years from the date of handing over. (The warranty certificate, operation & maintenance manual, necessary spare parts, tool kit & engineering documents have been handed over to Vandana Global Ltd. The above-mentioned the SPV power plant has been handed over by the contractor to Vandana Global Ltd, Raipur in fully satisfactory working condition.

Date: \_\_\_\_\_  
Place: \_\_\_\_\_

Sign: [Signature]  
Seal: [Seal]  
(Contractor's representative)

Solar photovoltaic power plant at Vandana Global Ltd near gate 4 west facing wall of 50 kWp verified and taken over.

Date: \_\_\_\_\_  
Place: \_\_\_\_\_

Name: [Signature]  
Seal: [Seal]  
LANCO Representative

Name: M. K. S. Bhatnagar  
Seal: [Seal]  
Beneficiary



**d). Total GHG emission reductions achieved or net anthropogenic GHG removals by sinks achieved in this monitoring period>>**

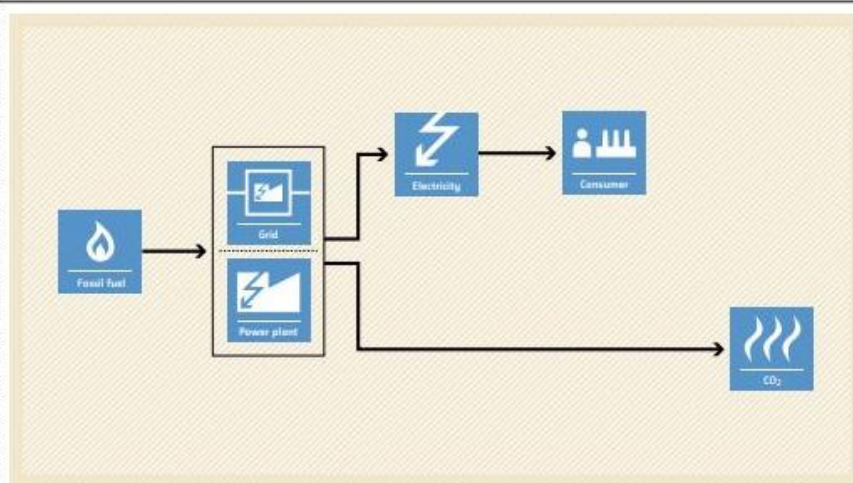
The total GHG emission reductions achieved in this monitoring period is as follows:

Summary of the Project Activity and ERs Generated for the Monitoring Period	
Start date of this Monitoring Period	01/01/2013
CoUs claimed up to	31/12/2022
Total ERs generated in this crediting period (tCO <sub>2</sub> eq)	4148 tCO <sub>2</sub> eq
Leakage	0
Project Emissions	0

**e). Baseline Scenario>>As per the approved consolidated methodology AMS-IF. Version 05**

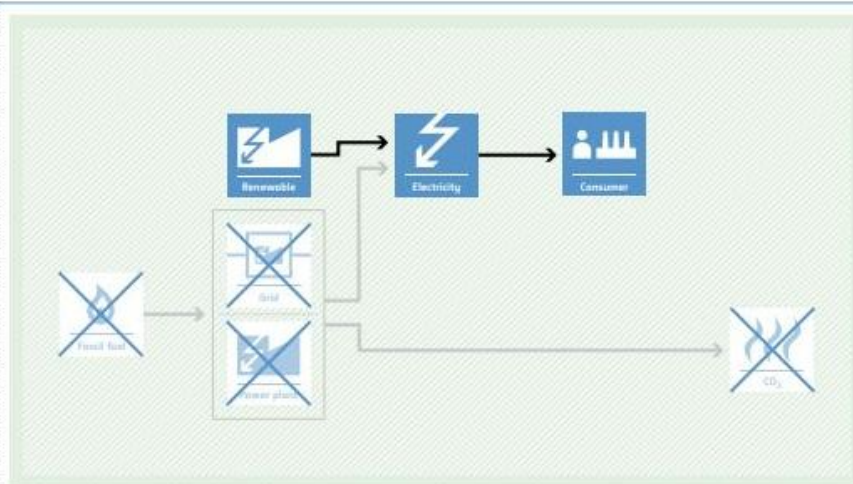
**BASELINE SCENARIO**

Electricity would have been supplied by one or more energy sources such as a national or a regional grid or a fossil-fuel-fired captive power plant or a carbon-intensive mini-grid.



**PROJECT SCENARIO**

Electricity is supplied using renewable energy technologies.



As per the UNFCCC Methodology, eligible projects comprise of renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s).

The project activity displaces electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit, i.e. in the absence of the project



activity, the users would have been supplied electricity from:

(a) A national or a regional grid (grid hereafter)

The baseline scenario identified at the PCN (ver 2.0) stage and this MR of the project activity is:

*The product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor*

## **A.2. Location of project activity>>**

Country : India

Industrial Area: Siltara

Village : Sondra

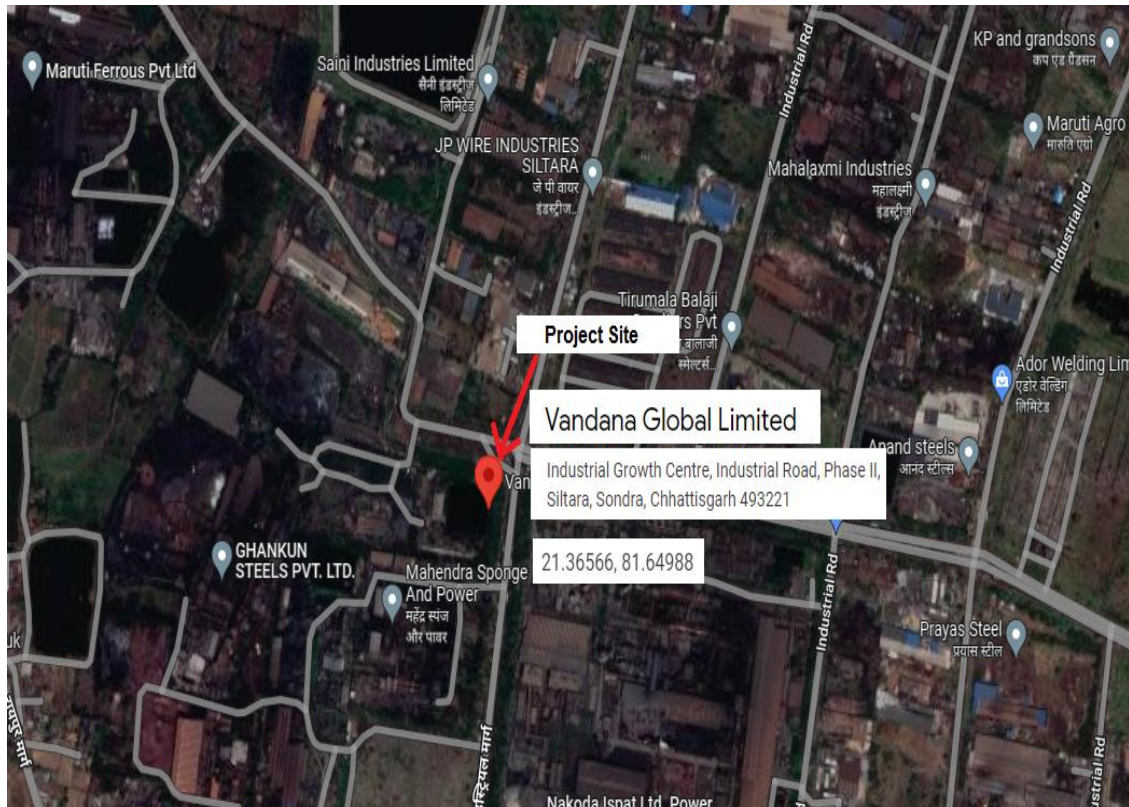
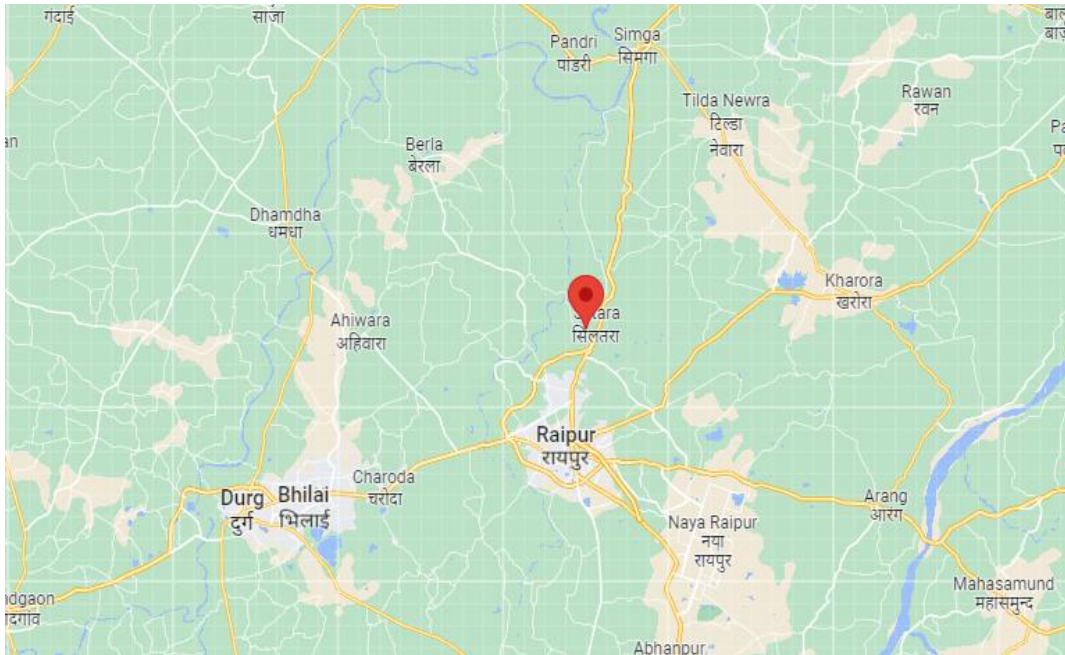
District : Raipur

Latitude: 21° 21' 56.3754"N Longitude: 81° 38' 59.5674"

The representative location map is included below:







### A.3. Parties and project participants >>

Party (Host)	Participants
India	Vandana Global Limited, Siltara Industrial Area, Ph-II, Raipur (C.G.), India

### A.4. References to methodologies and standardized baselines >>

**SECTORAL SCOPE** - 01 Energy industries (Renewable/Non-Renewable Sources)

**TYPE** - Renewable Energy Projects

**CATEGORY** - *AMS-I.F. – Renewable electricity generation for captive use and mini-grid, ver 05*

This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit, i.e. in the absence of the project activity, the users would have been supplied electricity from:

(a) *A national or a regional grid (grid hereafter)*

### A.5. Crediting period of project activity >>

**1<sup>st</sup> CoU Issuance Period:** 01/01/2013-31/12/2022

**1<sup>st</sup> Monitoring Period:** 01/01/2013-31/12/2022

**1<sup>st</sup> Crediting Period:** 10 years 00 months

### A.6. Contact information of responsible persons/entities >>

Aggregator: Carbon Equalizers, KATNI

UCR ID : 660687753

Contact: Mr Vikas Chamadia

Email: [vikaschamadia@rediffmail.com](mailto:vikaschamadia@rediffmail.com)

Mob: 9303068600

## SECTION B. Implementation of project activity

### B.1. Description of implemented registered project activity >>

#### a) Provide information on the implementation status of the project activity during this monitoring period in accordance with UCR PCN>>

There is a minor change to the start date of crediting period in the registered PCN (ver 01) which began from 01/01/2014 onwards. **The start date of crediting under UCR for PCN (ver 02) is now considered as 01/01/2013 and ends 31/12/2022**, however, no GHG emission reduction has been claimed so far.

This MR uses the methodology which comprises renewable energy generation units, such as photovoltaic, that supplies renewable electricity to user(s). The project activity displaces electricity from an electricity distribution system that is supplied by at least one fossil fuel fired generating unit, i.e. in the absence of the project activity, the users would have been supplied electricity from:  
*A national or a regional grid (grid hereafter)*

Unit	Capacity	Total no. of Solar PV Panels	Rating of each Solar PV Panel (Watt)	Make of Solar PV Panels	Make of Main Meter	Commissioning Date
1	SOLAR-1 (100KW)	708	280	LANCO SOLAR	L&T	08/03/2013
	SOLAR-2 (100KW)				L&T	08/03/2013
2	SOLAR-3 (50KW)	540			L&T	14/02/2013
	SOLAR-4 (100KW)				L&T	14/02/2013
3	SOLAR-5 (100KW)	720			L&T	10/06/2012
	SOLAR-6 (100KW)				L&T	10/06/2012
TOTAL		1968				

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

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 supplier 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:

The project activity is using clean renewable solar energy to produce electricity. 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 a number of photovoltaic cells connected by circuits and sealed in an environmentally protective laminate, which forms the fundamental building blocks of the complete PV generating unit. Several PV panels mounted on a frame are termed as PV Array. The project activity has used the reliable and proven technology to ensure that an environmentally safe and sound technology is only being implemented in the proposed project activity leading to the GHG reduction.

Each power production unit will in general constitute the following equipment:

1. Solar Photovoltaic modules
2. Inverters
3. Transformers
4. Circuit breakers
5. Mounting structures
6. Cables and hardware.
7. Junction box and distribution boxes.
8. Earthing kit.
9. Control room equipment.
10. System for control and monitoring.
11. Evacuation system

The technology used does not pose any threat to the environment in comparison to the fossil fuel-fired power plants. The technology to be applied in the project activity is proven technology and can hence be considered safe and sound technology. The project does not involve any transfer of technology from any Annex 1 country. There is no Public funding (ODA and/ or Annex I countries) for the project activity.

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

The Indian economy is highly dependent on “Coal” as fuel to generate energy and for production processes. Thermal power plants are the major consumers of coal in India and yet the basic electricity needs of a large section of population are not being met. This results in excessive demands for electricity and places immense stress on the environment.

Changing coal consumption patterns will require a multi-pronged strategy focusing on demand, reducing wastage of energy and the optimum use of renewable energy (RE) sources. This project is a greenfield activity where grid power is the baseline. 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 guide lines 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: 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 small-scale Solar Projects.

12. 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 small-scale 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. Provides employment to local communities through construction and maintenance of units.


#### United Nations Sustainable Development Goals:

The project activity generates electrical power using wind energy which is generated from windmills, thereby displacing non-renewable fossil resources resulting to sustainable, economic and environmental development. In the absence of the project activity equivalent amount of power generation would have taken place through fossil fuel dominated power generating stations.

Thus, the renewable energy generation from project activity will result in reduction of the greenhouse gas emissions. Positive contribution of the project to the following Sustainable Development Goals:

- SDG13: Climate Action
- SDG 7: Affordable and Clean Energy
- SDG 8: Decent Work and Economic Growth

Development Goals	Targeted SDG	Target Indicator (SDG Indicator)
 <p>SDG 13: Climate Action</p>	<p>13.2: Integrate climate change measures into national policies, strategies and planning</p> <p>Target: 4148 tCO<sub>2</sub> for the Monitored Period 01</p>	<p>13.2.1: Number of countries that have communicated establishment or operationalization of an integrated policy/ strategy/ plan which increases their ability to adapt to the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)</p>
 <p>SDG 7: Affordable and Clean Energy</p>	<p>7.2: By 2030, increase substantially the share of renewable energy in the global energy mix</p> <p>Target: 4614 MWh for the Monitored Period 01</p>	<p>7.2.1: Renewable energy share in the total final energy consumption</p>

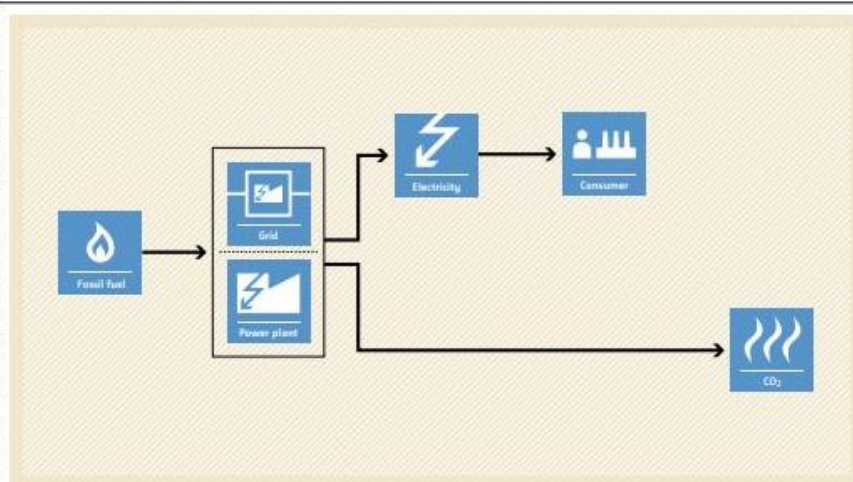
<p><b>8 DECENT WORK AND ECONOMIC GROWTH</b></p>  <p>SDG 8: Decent Work and Economic Growth</p>	<p>8.5: By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value</p> <p>Target: Training, O&amp;M staff</p>	<p>8.5.1: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities</p>
---	---	--

### B.3. Baseline Emissions>>

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.

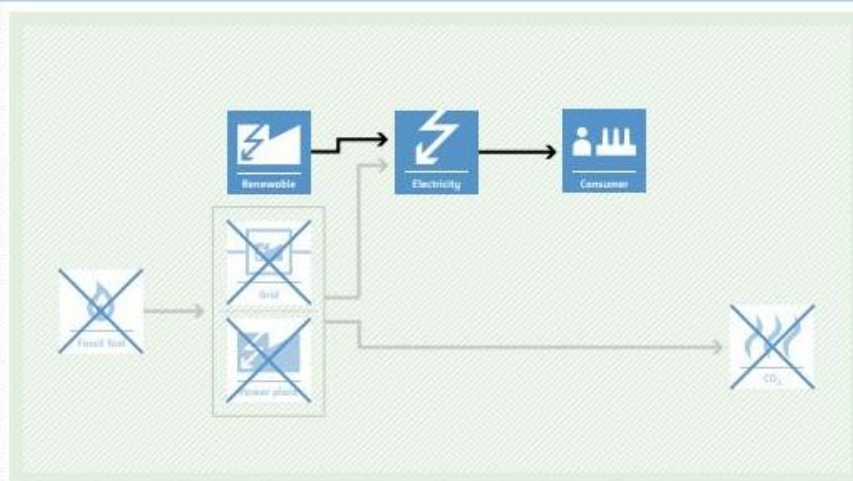
#### BASLINE SCENARIO

Electricity would have been supplied by one or more energy sources such as a national or a regional grid or a fossil-fuel-fired captive power plant or a carbon-intensive mini-grid.



#### PROJECT SCENARIO

Electricity is supplied using renewable energy technologies.



Thus, this project activity was a voluntary investment which replaced equivalent amount of electricity from the Indian grid. The project proponent was not bound to incur this investment as it was not mandatory by national and sectoral policies. Thus, the continued operation of the project activity would continue to replace fossil fuel-based power plants and help fight against the impacts of climate change. The Project Proponent hopes that UCR carbon incentives under the CoU

program from 2013-2022 vintage years accumulated as a result of carbon credits generated will help repay scale up the project capacity and help in the continued maintenance of this project activity. The baseline scenario identified at the PCN stage of the project activity is:

- *The product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.*

#### **B.4. Debundling>>**

This project activity is not a de-bundled component of a larger project activity.

## SECTION-C: Application of methodologies and standardized baselines

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

Sectoral Scope: 01 Energy industries (Renewable/Non-Renewable Sources)

TYPE I – Renewable Energy Projects

Applied UNFCCC CDM Modified Baseline Methodology: *AMS-I.F. – Renewable electricity generation for captive use and mini-grid, ver 05*

This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). The project activity will displace electricity from an electricity distribution system that is or would have been supplied by at least one fossil fuel fired generating unit, i.e. in the absence of the project activity, the users would have been supplied electricity from:

(a) A national or a regional grid (grid hereafter)

#### Methodology key elements

<b>Typical project(s)</b>	Production of electricity using renewable energy technologies such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s)
<b>Type of GHG emissions mitigation action</b>	Renewable energy: Displacement of electricity that would be provided to the user(s) by more-GHG-intensive means

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

The project status is corresponding to the methodology AMS-I.F., version 05 and applicability of methodology is discussed below:

This project is included within the UCR Standard Positive List of technologies and are within the small-scale CDM thresholds (e.g. installed capacity up to 15 MW). The positive list comprises of: (a) renewable electricity generation technologies of installed capacity up to 15 MW, (b) Solar technologies (photovoltaic and solar thermal electricity generation);
Project activity involves installation of captive use solar photovoltaic power generation with capacity 550kw which is less than 15MW.
The project activity involves installation of Solar PV (SPV). Hence, the activity is not a hydro power project or combined heat and power (co-generation) systems.
Project displaces grid electricity consumption (e.g. grid import).
The project activity is a new installation, it does not involve any retrofit measures nor any replacement.
Landfill gas, waste gas, wastewater treatment and agro-industries projects are not relevant to the project activity. No biomass is involved, the project is only a solar power project.
The technology/measure allowed under the grid connected Solar PV based generation systems displace equivalent quantity of electricity from the regional grid in India. The testing/certifications; all the equipment of the solar project activity will be complying with applicable national/ international standards. The above details may be verified from one or more of the following documents: <input type="checkbox"/> Technology Specification provided by the technology supplier



<input type="checkbox"/> Purchase order copies <input type="checkbox"/> EPC contracts <input type="checkbox"/> Power purchase agreement <input type="checkbox"/> Project commissioning certificates
The project activity is a voluntary coordinated action
As per the Ministry of Environment and Forest (MoEF), Govt. of India Office Memorandum dated 13/05/2011, it had received specific clarification regarding the applicability of EIA Notification, 2006 in respect of Solar Photo Voltaic (PV) Power plants. It was further clarified in the above memorandum that both Solar PV power projects are not covered under the ambit of EIA Notification, 2006 and no environment clearance is required for such projects under provisions thereof.
This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s). Hence this methodology is applicable and fulfilled for the solar project activity.
The project activity involves installation of new power plants at listed sites where there was no renewable energy power plant operating prior to implementation of project.
Project and leakage emissions from biomass are not applicable.

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

The renewable electricity units are monitored with a unique energy meter located within the project activity boundary. The project activity will not apply to India's NDC carbon ecosystem/market and has not been registered under any other GHG mechanism for carbon offsets/credits in the past.

### C.4. Project boundary, sources and greenhouse gases (GHGs)>>

The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system and encompasses the physical, geographical site of the solar power plant and the energy metering equipment.

	Source	GHG	Included?	Justification/Explanation
Baseline	Grid-connected electricity	CO <sub>2</sub>	<b>Included</b>	Major source of emission
		CH <sub>4</sub>	Excluded	Excluded for simplification. This is conservative
		N <sub>2</sub> O	Excluded	Excluded for simplification. This is conservative
Project Activity	Greenfield solar power project	CO <sub>2</sub>	Excluded	Excluded for simplification. This is conservative
		CH <sub>4</sub>	Excluded	Excluded for simplification. This is conservative
		N <sub>2</sub> O	Excluded	Excluded for simplification. This is conservative

#### Net GHG Emission Reductions and Removals

Thus,  $ER_y = BE_y - PE_y - LE_y$  Where:

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

$BE_y$  = 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)

Project Emissions (PE<sub>y</sub>) for the following categories of project activities, including relevant definitions, shall be considered following the procedure described in the ACM0002:

- Emissions related to the operation of geothermal power plants (e.g. noncondensable gases, electricity/fossil fuel consumption);
- Emissions from water reservoirs of hydro power plants.
- For the other types of renewable energy projects, PE<sub>y</sub> = 0

Hence PE<sub>y</sub> = 0

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

Commissioning Date of first installation: 10/06/2012

**Estimated Annual Emission Reductions:**  $BE_y = EG_{BL,y} \times EF_{CO_2, GRID, y}$

BE<sub>y</sub> = Emission reductions in a year y.

where:

EG<sub>BL,y</sub> = Quantity of net electricity supplied to the grid as a result of the implementation of the UCR project activity in year y (MWh)

EF<sub>Grid,CO<sub>2</sub>,y</sub> = CO<sub>2</sub> emission factor of the grid in year y (t CO<sub>2</sub>/MWh) as determined by the UCR Standard.

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

The baseline scenario identified at the PCN (ver 2.0) stage of the project activity is:

- *The product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.*

Total Capacity: 550 KWh

Commissioning Date of first installation: 10/06/2012

**Estimated Annual Emission Reductions:**  $BE_y = EG_{BL,y} \times EF_{CO_2, GRID, y}$

BE<sub>y</sub> = Emission reductions in a year y.

where:

EG<sub>BL,y</sub> = Quantity of net electricity supplied to the grid as a result of the implementation of the UCR project activity in year y (MWh)

EF<sub>Grid,CO<sub>2</sub>,y</sub> = CO<sub>2</sub> emission factor of the grid in year y (t CO<sub>2</sub>/MWh) as determined by the UCR Standard.

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 2013-2020 years as a fairly conservative estimate for Indian projects not previously verified under any GHG program. Also, for the vintage 2021-22, the combined margin emission factor calculated from CEA database in India results into same emission factors as that of the default value. Hence, the same emission factor has been considered to calculate the emission reduction.

#### Net GHG Emission Reductions and Removals

$$\text{Thus, } ER_y = BE_y - PE_y - LE_y$$

Where:

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

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

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

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

#### Baseline Emissions

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

Where:

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

$EG_{PJ,y}$  = 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).

$EF_{grid,y}$  = UCR recommended emission factor of 0.9 tCO<sub>2</sub>/MWh has been considered, this is conservative as compared to the combined margin grid emission factor which can be derived from Database of Central Electricity Authority (CEA), India. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

#### Project Emissions

$$PE_y = 0$$

#### Leakage Emissions

All projects other than Biomass projects have zero leakage.

Hence,  $LE_y = 0$

Total Emission Reduction (ER) by the project activity for the current monitoring period is calculated as below:

Year	ER (tCO2)
2013	00
2014	624
2015	561
2016	598
2017	559
2018	493
2019	415
2020	294
2021	377
2022	227
<b>Total ERs</b>	<b>4148</b>

## C.6. Prior History>>

The project was not applied under any other GHG mechanism. Hence project will not cause double accounting of carbon credits (i.e., COUs).

## C.7. Monitoring period number and duration>>

**Monitoring Period No:** 01

**1<sup>st</sup> Monitoring Period:** 01/01/2013 to 31/12/2022

## C.8. Changes to start date of crediting period >>

There is a minor change to the start date of crediting period in the registered PCN (ver 01) which began from 01/01/2014 onwards. **The start date of crediting under UCR for PCN (ver 02) is now considered as 01/01/2013 and ends 31/12/2022,** however, no GHG emission reduction has been claimed so far.

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

This MR has been prepared against PCN (version 2) which has been updated against the applied methodology from the registered PCN as under:

### **Original Methodology:**

***AMS-I.D. - “Grid connected renewable electricity generation”, Version 18.0***

This methodology comprises of activities that include the construction and operation of a power plant that uses renewable energy sources and supplies electricity to the grid (Greenfield power plant).

### **Updated Methodology**

***AMS-I.F. – Renewable electricity generation for captive use and mini-grid, ver 05***

This methodology comprises renewable energy generation units, such as photovoltaic, hydro, tidal/wave, wind, geothermal and renewable biomass that supply electricity to user(s).



## C.10. Monitoring plan>>

The project activity essentially involves generation of electricity from Solar Radiation, the employed SPV can only convert solar energy into electrical energy and cannot use any other input fuel for electricity generation, thus no special ways and means are required to monitor leakage from the project activity.

PP is the project implementer and monitors the electricity generated by the project activity. The data is already archived electronically and is stored since 10/06/2012.

Sr. no.	Unit	Capacity	Total no. of Solar PV Panels	Make of Main Meter	Sr. no (Main Meters)
1	1	SOLAR-1 (100KW)	708	L&T	12023582
2		SOLAR-2 (100KW)		L&T	12010955
3	2	SOLAR-3 (50KW)	540	L&T	9591042
4		SOLAR-4 (100KW)		L&T	9591079
5	3	SOLAR-5 (100KW)	720	L&T	11532753
6		SOLAR-6 (100KW)		L&T	12081051

To ensure that the data is reliable and transparent, the PP has established Quality Assurance and Quality Control (QA&QC) measures to effectively control and manage data reading, recording, auditing as well as archiving data and all relevant documents. The data is monitored on a daily basis and is submitted to PP on a daily basis.

PP has implemented QA&QC measures to calibrate and ensure the accuracy of metering and safety aspects of the project operation. The metering devices are calibrated and inspected properly and periodically, according to state electricity board's specifications and requirements to ensure accuracy in the readings.

### Meter Details (Used in the 1<sup>st</sup> Monitored Period):

Sr. no.	Particular	Solar 1 (100 kWp)	Solar 2 (100 kWp)	Solar 3 (50 kWp)	Solar 4 (100 kWp)	Solar 5 (100 kWp)	Solar 6 (100 kWp)
1	Sr. no. of Solar Generation meter	12023582	12010955 (MOD-WR300BC5200)	9591042 (MOD-WR300BC5200)	9591079 (MOD-WR300BC5200)	11532753 (MOD-WR300BC5200)	12081051 (MOD-WR300BC5200)
2	Make	L&T	L&T	L&T	L&T	L&T	L&T
3	Model name	NA	NA	NA	NA	NA	NA
4	Use Period	2013-2022	2013-2022	2013-2022	2013-2022	2013-2022	2013-2022
5	Accuracy class	0.5S	0.5S	0.5S	0.5S	0.5S	0.5S
6	CT ratio	200/5A	200/5A	200/5A	200/5A	200/5A	200/5A

Data / Parameter:	EGy																																						
Data unit:	MWh	<table><tr><th>Year</th><th>KWh</th><th>MWh</th></tr><tr><td>2013</td><td>0</td><td>0</td></tr><tr><td>2014</td><td>694275</td><td>694.275</td></tr><tr><td>2015</td><td>624198</td><td>624.198</td></tr><tr><td>2016</td><td>664762</td><td>664.762</td></tr><tr><td>2017</td><td>621582</td><td>621.582</td></tr><tr><td>2018</td><td>548518</td><td>548.518</td></tr><tr><td>2019</td><td>461896</td><td>461.896</td></tr><tr><td>2020</td><td>327127</td><td>327.127</td></tr><tr><td>2021</td><td>419539</td><td>419.539</td></tr><tr><td>2022</td><td>252749</td><td>252.749</td></tr><tr><td></td><td>Total</td><td>4614.646</td></tr></table>		Year	KWh	MWh	2013	0	0	2014	694275	694.275	2015	624198	624.198	2016	664762	664.762	2017	621582	621.582	2018	548518	548.518	2019	461896	461.896	2020	327127	327.127	2021	419539	419.539	2022	252749	252.749		Total	4614.646
Year	KWh	MWh																																					
2013	0	0																																					
2014	694275	694.275																																					
2015	624198	624.198																																					
2016	664762	664.762																																					
2017	621582	621.582																																					
2018	548518	548.518																																					
2019	461896	461.896																																					
2020	327127	327.127																																					
2021	419539	419.539																																					
2022	252749	252.749																																					
	Total	4614.646																																					
Description:	Quantity of net electricity generated by the Project Activity in year y																																						
Source of data:	Main Meter Unit Readings, Direct measurement																																						
Measurement procedures (if any):	Daily : Direct measurement using electricity meters																																						
Monitoring frequency:	<p>Continuously, aggregated at least annually</p> <p>Calibration Frequency: The calibration is done following the relevant applicable National Guidelines updated from time to time during the operation of the project activity.</p> <p>Entity responsible: Aggregator</p> <p>The electricity meter is subject to regular maintenance and testing in accordance with the stipulation of the meter supplier or national requirements. The calibration of meters, including the frequency of calibration, is done in accordance with national standards or requirements set by the meter supplier. The accuracy class of the meters is in accordance with the stipulation of the meter supplier or national requirements. The PP calibrates the meters every year and uses the meters with at least 0.5 accuracy class (e.g. a meter with 0.2 accuracy class is more accurate and thus it is accepted). Copies of the 2022 calibration report is presented below.</p>																																						
QA/QC procedures:	Monitoring frequency: Continuous Measurement frequency: Hourly Recording frequency: Monthly																																						
Purpose of Data	-Calculation of baseline emissions																																						

**2022 Calibration Test Reports of Meters (all prior year reports will also be provided to auditor for review)**

**CALIBRATION CERTIFICATE**

Certificate No. : BA/2K22/562A/06  
 Indenter : M/s. VANDANA GLOBAL LIMITED  
 PHASE-II, SILTARA INDUSTRIAL GROWTH CENTER,  
 SILTARA, RAIPUR, CHHATISGARH

Gauge for Calibration	ENERGY METER
Make/Model	LT/ER300P
Range	ASSORTED
Least Count	ASSORTED
CT Ratio.	200/5A
Instrument Sr. No.	11532753
Instrument Id. No.	EM-1
Location	27 NO SOLAR UNIT
Accuracy	Class 0.5S
Visual Inspection	OK
Date of Calibration	08/10/2022
Suggested Due Date of Calibration	07/10/2023
ENVIRONMENTAL CONDITION	
Temperature	25 $\pm$ 2 $^{\circ}$ C
Humidity	50 $\pm$ 10%RH

Format No. : Q5 19 F, Status - 02
Equipment & Master Used For Calibration
1. 3 Ph ENERGY METER
Make : CONZERV
Sr.No. : 340180044083
Certificate No. : C & IJ/CAL/21-10/038
Next Due Date : 16/10/2022
Traceability : C&I
CC-2216
URL NO-CC221621000001919F

Calibration performed: At site  
 Discipline: Electro Technical Calibration [Group - Others Energy]  
 Calibration Results:

Sr. No.	PARAMETER	Difference Indicated Value on UUC	Measured Reading on Master	Error	Error in %
1	Mode : 3P 4W	(Wh)	(Wh)	$\pm$ Wh	
	AC POWER	1000	999.877	0.123	0.012
	Freq: 50 Hz	1000	999.849	0.151	0.015
	PF: Unity	1000	999.827	0.173	0.017
	Voltage : 440 V	1000	999.807	0.193	0.019
	Load : 100% (5A)	1000	999.788	0.212	0.021

**Uncertainty of Measurement:  $\pm 0.037\%$**  (The uncertainty stated is the expanded uncertainty of measurement Obtained by multiplying the standard uncertainty by the coverage factor  $k=2$  corresponds to confidence level of 95.45%)

**NOTE: -**

1. The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
2. This report should not be reproduced except in full without our prior permission in writing.
3. Calibration certificate without signature are not valid.
4. All our certificates are Traceable to National standard.
5. UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
 (Mr. Sanjay Sharma)  
 Technical Manager

## CALIBRATION CERTIFICATE

Certificate No. : BA/2K22/562A/05  
Indenter : M/s. VANDANA GLOBAL LIMITED  
PHASE-II, SILTARA INDUSTRIAL GROUT CENTER,  
SILTARA, RAIPUR, CHHATISGARH

Format No. : QS 19 F, Status - 02

Gauge for Calibration	ENERGY METER	
Make/Model	LT/ER300P	
Range	ASSORTED	
Least Count	ASSORTED	
CT Ratio.	-/5A	
Instrument Sr. No.	12081051	
Instrument Id. No.	EM-1	
Location	27 NO SOLAR UNIT	
Accuracy	Class 0.5S	
Visual Inspection	OK	
Date of Calibration		08/10/2022
Suggested Due Date of Calibration		07/10/2023
ENVIRONMENTAL CONDITION		
Temperature	25 ±2 °C	
Humidity	50±10%RH	

Equipment & Master Used For Calibration	
1.3 Ph ENERGY METER	
Make	: CONZERV
Sr.No.	: 340180044083
Certificate No.	: C & I/CAL/21-10/038
Next Due Date	: 16/10/2022
Traceability	: C & I
CC-2216	
URL NO-CC221621000001919F	

Calibration performed: At site  
Discipline: Electro Technical Calibration [Group - Others Energy]

Calibration Results:

Sr. No.	PARAMETER	Difference indicated Value on UUC	Measured Reading on Master	Error	Error in %
1	Mode : 3P 4W	(Wh)	(Wh)	± Wh	
	AC POWER	1000	999.778	0.222	0.022
	Freq:50 Hz	1000	999.746	0.254	0.026
	PF: Unity	1000	999.675	0.325	0.033
	Voltage : 440 V	1000	999.578	0.422	0.042
	Load : 100% (5A)	1000	999.486	0.514	0.052

**Uncertainty of Measurement: ±0.037%** (The uncertainty stated is the expanded uncertainty of measurement. Obtained by multiplying the standard uncertainty by the coverage factor k=2 corresponds to confidence level of 95.45%)

**NOTE: -**

1. The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
2. This report should not be reproduced except in full without our prior permission in writing.
3. Calibration certificate without signature are not valid.
4. All our certificates are Traceable to National standard.
5. UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
(Mr. Sanjay Sharma)  
Technical Manager



## CALIBRATION CERTIFICATE

Certificate No. : BA/2K22/562A/04  
Indenter : M/s. VANDANA GLOBAL LIMITED  
PHASE-II, SILTARA INDUSTRIAL GROWTH CENTER,  
SILTARA, RAIPUR, CHHATISGARH

Format No. : Q5 19 F, Status - 02

Gauge for Calibration	ENERGY METER	
Make/Model	LT/ER300P	
Range	ASSORTED	
Least Count	ASSORTED	
CT Ratio.	-/5A	
Instrument Sr. No.	12023582	
Instrument Id. No.	EM-1	
Location	CINTER AREA	
Accuracy	Class 0.5S	
Visual Inspection	OK	
Date of Calibration		08/10/2022
Suggested Due Date of Calibration		07/10/2023
ENVIRONMENTAL CONDITION		
Temperature	25 ± 2 °C	
Humidity	50 ± 10% RH	

Equipment & Master Used For Calibration	
1. 3 Ph ENERGY METER	
Make	: CONZERV
Sr.No.	: 340180044083
Certificate No. : C & IJ/CAL/21-10/038	
Next Due Date : 16/10/2022	
Traceability	: C&Ij
CC-2216	
URL NO-CC221621000001919F	

Calibration performed: At site

Discipline: Electro Technical Calibration [Group - Others Energy]

Calibration Results:

Sr. No.	PARAMETER	Difference indicated Value on UUC (Wh)	Measured Reading on Master (Wh)	Error ± Wh	Error in %
1	Mode : 3P 4W				
	AC POWER	1000	999.866	0.134	0.013
	Freq: 50 Hz	1000	999.645	0.355	0.036
	PF: Unity	1000	999.512	0.488	0.049
	Voltage : 440 V	1000	999.365	0.635	0.064
	Load : 100% (5A)	1000	999.064	0.936	0.094

Uncertainty of Measurement: ±0.037% (The uncertainty stated is the expanded uncertainty of measurement Obtained by multiplying the standard uncertainty by the coverage factor k=2 corresponds to confidence level of 95.45%)

### NOTE: -

1. The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
2. This report should not be reproduced except in full without our prior permission in writing.
3. Calibration certificate without signature are not valid.
4. All our certificates are Traceable to National standard.
5. UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
(Mr. Sanjay Sharma)  
Technical Manager

## CALIBRATION CERTIFICATE

Certificate No. : BA/2K22/562A/03  
Indenter : M/s. VANDANA GLOBAL LIMITED  
PHASE-II, SILTARA INDUSTRIAL GROWTH CENTER,  
SILTARA, RAIPUR, CHHATISGARH

Format No. : QS 19 F, Status – 02

Gauge for Calibration	ENERGY METER
Make/Model	LT/ER300P
Range	ASSORTED
Least Count	ASSORTED
CT Ratio.	-/5A
Instrument Sr. No.	12010955
Instrument Id. No.	EM-1
Location	CINTER AREA
Accuracy	Class 0.5S
Visual Inspection	OK
Date of Calibration	08/10/2022
Suggested Due Date of Calibration	07/10/2023
ENVIRONMENTAL CONDITION	
Temperature	25 ±2 °C
Humidity	50±10%RH

Equipment & Master Used For Calibration
1. 3 Ph ENERGY METER
Make : CONZERV
Sr.No. : 340180044083
Certificate No. : C & I / CAL / 21-10 / 038
Next Due Date : 16/10/2022
Traceability : C&I
CC-2216
URL NO-CC221621000001919F

Calibration performed: At site  
Discipline: Electro Technical Calibration [Group – Others Energy]

Calibration Results:

Sr. No.	PARAMETER	Difference indicated Value on UUC	Measured Reading on Master	Error	Error in %
1	Mode : 3P 4W	(Wh)	(Wh)	± Wh	
	AC POWER	1000	999.856	0.144	0.014
	Freq:50 Hz	1000	999.839	0.161	0.016
	PF: Unity	1000	999.836	0.164	0.016
	Voltage : 440 V	1000	999.822	0.178	0.018
	Load : 100% (5A)	1000	999.818	0.182	0.018

**Uncertainty of Measurement: ±0.037%** (The uncertainty stated is the expanded uncertainty of measurement  
Obtained by multiplying the standard uncertainty by the coverage factor k=2 corresponds to confidence level of 95.45%)

### NOTE: -

1. The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
2. This report should not be reproduced except in full without our prior permission in writing.
3. Calibration certificate without signature are not valid.
4. All our certificates are Traceable to National standard.
5. UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
(Mr. Sanjay Sharma)  
Technical Manager

## CALIBRATION CERTIFICATE

Certificate No.  
Indenter

: BA/2K22/562A/02  
: M/s. VANDANA GLOBAL LIMITED  
PHASE-II, SILTARA INDUSTRIAL GROWTH CENTER,  
SILTARA, RAIPUR, CHHATISGARH

Format No. : QS 19 F, Status - 02

Gauge for Calibration	ENERGY METER	
Make/Model	LT/ER300P	
Range	ASSORTED	
Least Count	ASSORTED	
CT Ratio.	200/5A	
Instrument Sr. No.	09591042	
Instrument Id. No.	EM-1	
Location	JIGGING AREA	
Accuracy	Class 0.5S	
Visual Inspection	OK	
Date of Calibration		08/10/2022
Suggested Due Date of Calibration		07/10/2023
ENVIRONMENTAL CONDITION		
Temperature	25 ±2 °C	
Humidity	50±10%RH	

Equipment & Master Used For Calibration	
1. 3 Ph ENERGY METER	
Make	: CONZERV
Sr.No.	: 340180044083
Certificate No.	: C &I/CAL/21-10/038
Next Due Date	: 16/10/2022
Traceability	: C&I
CC-2216	
URL NO-CC221621000001919F	

Calibration performed: At site

Discipline: Electro Technical Calibration [Group - Others Energy]

Calibration Results:

Sr. No.	PARAMETER	Difference Indicated Value on UUC	Measured Reading on Master	Error	Error in %
1	Mode : 3P 4W	(Wh)	(Wh)	± Wh	
	AC POWER	1000	999.672	0.328	0.033
	Freq:50 Hz	1000	999.580	0.420	0.042
	PF: Unity	1000	999.478	0.522	0.052
	Voltage : 440 V	1000	999.370	0.630	0.063
	Load : 100% (5A)	1000	999.255	0.745	0.075

**Uncertainty of Measurement: ±0.037%** (The uncertainty stated is the expanded uncertainty of measurement Obtained by multiplying the standard uncertainty by the coverage factor k=2 corresponds to confidence level of 95.45%)

**NOTE: -**

1. The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
2. This report should not be reproduced except in full without our prior permission in writing.
3. Calibration certificate without signature are not valid.
4. All our certificates are Traceable to National standard.
5. UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
(Mr. Sanjay Sharma)  
Technical Manager

## CALIBRATION CERTIFICATE

Certificate No. : BA/2K22/562A/01  
 Indenter : M/s. VANDANA GLOBAL LIMITED  
 PHASE-II, SILTARA INDUSTRIAL GROUT CENTER,  
 SILTARA, RAIPUR, CHHATISGARH

Format No. : Q5 19 F, Status - 02

Gauge for Calibration	ENERGY METER	
Make/Model	LT/ER300P	
Range	ASSORTED	
Least Count	ASSORTED	
CT Ratio.	200/5A	
Instrument Sr. No.	09591079	
Instrument Id. No.	EM-1	
Location	JIGGING AREA	
Accuracy	Class 0.5S	
Visual Inspection	OK	
Date of Calibration		08/10/2022
Suggested Due Date of Calibration		07/10/2023
ENVIRONMENTAL CONDITION		
Temperature	25 ±2 °C	
Humidity	50±10%RH	

Equipment & Master Used For Calibration	
1. 3 Ph ENERGY METER	
Make	: CONZERV
Sr.No.	: 340180044083
Certificate No.	: C & I/CAL/21-10/038
Next Due Date	: 16/10/2022
Traceability	: C&I
CC-2216	
URL NO-CC221621000001919F	

Calibration performed: At site  
 Discipline: Electro Technical Calibration [Group - Others Energy]

Calibration Results:

Sr. No.	PARAMETER	Difference Indicated Value on UUC	Measured Reading on Master	Error	Error in %
1	Mode : 3P 4W	(Wh)	(Wh)	± Wh	
	AC POWER	1000	999.569	0.431	0.043
	Freq:50 Hz	1000	999.556	0.444	0.044
	PF: Unity	1000	999.486	0.514	0.051
	Voltage : 440 V	1000	999.467	0.533	0.053
	Load : 100% (5A)	1000	999.365	0.635	0.064

Uncertainty of Measurement: ±0.037% (The uncertainty stated is the expanded uncertainty of measurement obtained by multiplying the standard uncertainty by the coverage factor k=2 corresponds to confidence level of 95.45%)

### NOTE: -

- The calibration results reported in this certificate are valid at the time of and the stated condition of measurement.
- This report should not be reproduced except in full without our prior permission in writing.
- Calibration certificate without signature are not valid.
- All our certificates are Traceable to National standard.
- UUC: Unit under calibration, GUT: Gauge under testing.

Calibrated By (Manish Kumar)

Issued / Approved By  
 (Mr. Sanjay Sharma)  
 Technical Manager

Data/Parameter	EF, CO <sub>2</sub> , GRID, y
Data unit	tCO <sub>2</sub> /MWh
Description	Fixed
Value of data applied	0.9 UCR Standard Protocol As per Standard
Measurement methods and procedures	A "grid emission factor" refers to a CO <sub>2</sub> emission factor (tCO <sub>2</sub> /MWh) which will be associated with unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO <sub>2</sub> /MWh for the 2013 - 2022 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.

Monitoring frequency	NA
Purpose of data	To estimate baseline emissions
Additional Comment	The combined margin emission factor as per CEA database (current Version 16, Year 2021 and 2022) results into higher emission factor. Hence for 2021-22 vintage UCR default emission factor remains conservative.



