Monitoring Report

CARBON OFFSET UNIT (CoU) PROJECT

Title: 2 .107 MW Bundled Solar Power Project by Som Shiva Impex Lt d Gujarat

Version 1.0

Date of MR: 08 / 05 / 2024

1st CoU Issuance Period: 11 years,

1st Monitoring Period: 01 / 01/ 2013 to 31 /12 / 2023 (both dates inclusive)

Monitoring Report (MR)
CARBON OFFSET UNIT (CoU) PROJECT

Monitoring Report	
Title of the project activity	2.107 MW Bundled Solar Power Project by Som Shiva Impex Ltd., Gujarat
UCR Project Registration Number	433
Version	1.0
Completion date of the MR	08/05/2024
Monitoring period number and duration of this monitoring period	Monitoring Period Number: _01_ Duration of this monitoring Period: (first and last days included (01/01/2013 to 31/12/2023)
Project participants	M/s Maverik Incorporation (Aggregator) M/s Som Shiva Impex Limited (Project Owner)
Host Party	INDIA
Applied methodologies and standardized baselines	Applied Baseline Methodology: AMS-I.D.: "Grid connected renewable electricity generation", version 18 Standardized Methodology: Baseline: UCR Protocol Emission Factor
Sectoral scopes	01 Energy industries (Renewable/Non Renewable Sources)
Estimated amount of GHG emission reductions for this monitoring period in the registered PCN	2013: 1242 **CoUs** (1242 **tCO2eq**)
	2014: 1300 **CoUs** (1300 **tCO2eq**)
	2015: 1451 **CoUs** (1451 **tCO2eq**)
	2016: 2458 **CoUs** (2458 **tCO2eq**)
	2017: 2396 **CoUs** (2396 **tCO2eq**)
	2018: 2418 **CoUs** (2418 **tCO2eq**)
	2019: 2247 **CoUs** (2247 **tCO2eq**)
	2020: 2331 **CoUs** (2331 **tCO2eq**)
	2021: 2920 **CoUs** (2920 **tCO2eq**)
	2022: 2818 **CoUs** (2818 **tCO2eq**)
	2023: 2585 **CoUs** (2585 **tCO2eq**)
Total:	**24166 CoUs (24166 tCO2)**

SECTION A. Description of project activity

A.1. Purpose and general description of project activity >>

a) Purpose of the project activity and the measures taken for GHG emission reductions >>

The purpose of this 2.107 MW bundled solar power project activity by Som Shiva Impex Ltd. is to generate clean renewable electricity through solar photovoltaic technology, thereby reducing GHG emissions from fossil fuel-based grid electricity generation.

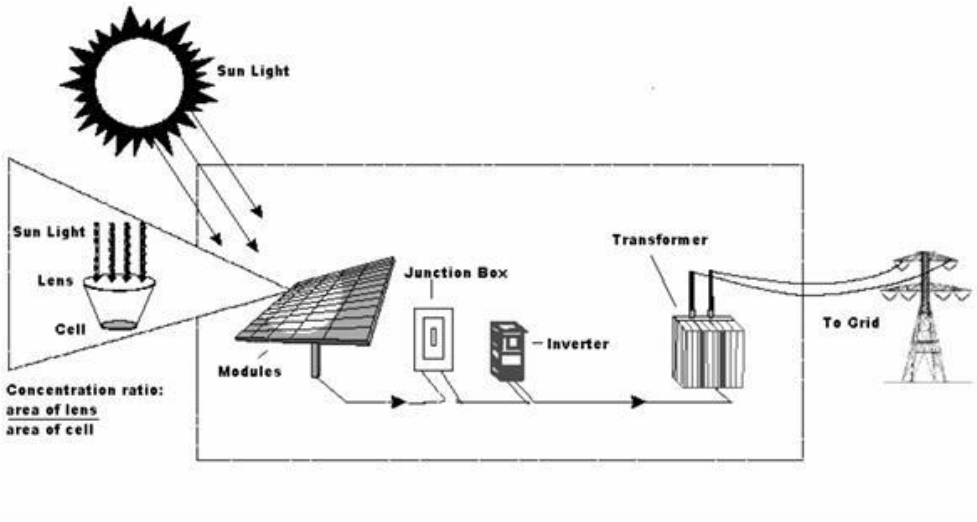
The key measures taken by the project activity to achieve GHG emission reductions are:

- Installation of a grid-connected solar PV power plant with a total capacity of 2.107 MW, comprising 1.007 MW for sale/supply to the regional grid and 1.1 MW for captive use by the project proponent agreement.
- Utilization of environmentally-friendly solar photovoltaic technology that does not involve any fossil fuel combustion or release of other GHGs during the electricity generation process.
- Generation and injection of renewable electricity into the Indian grid, thereby displacing an equivalent amount of electricity that would otherwise have been sourced from fossil fuel-based grid-connected power plants.

During the monitoring period from 01/01/2013 to 31/12/2023, the project activity generated **26857.205** MWh of renewable electricity, resulting in anthropogenic GHG emission reductions of **24166** tCO2e by avoiding grid electricity from fossil fuel sources. This directly contributes to climate change mitigation efforts.

b) Brief description of the installed technology and equipment>>

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.



System Description: Solar Photovoltaic power generator is the arrangement of all modules in series and parallel connections. In order to achieve a higher system voltage, modules are installed in a row arrangement, called a string. A higher system voltage has the advantage of lesser installation work,

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

Data Type: Measured Monitoring equipment: Energy Meters and inverter data are used for monitoring
Recording Frequency: Continuous monitoring and monthly recording from Energy Meters, Summarized

Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.

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

1st Monitoring Period: 11 Years
1st Monitored Dates: 01/01/2013 to 31/12/2023 (inclusive of both dates)

1st CoU Issuance Period: 11 Years
1st Crediting Period: 01/01/2013 to 31/12/2023 (inclusive of both dates)

UCR Project ID or Date of Authorization: 433
Start Date of Crediting Period: 01/01/2013
Project Commissioned: 30/12/2011

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
Carbon credits claimed up to	31/12/2023
Total ERs generated (tCO_{2eq})	24166 tCO2eq
Leakage	0

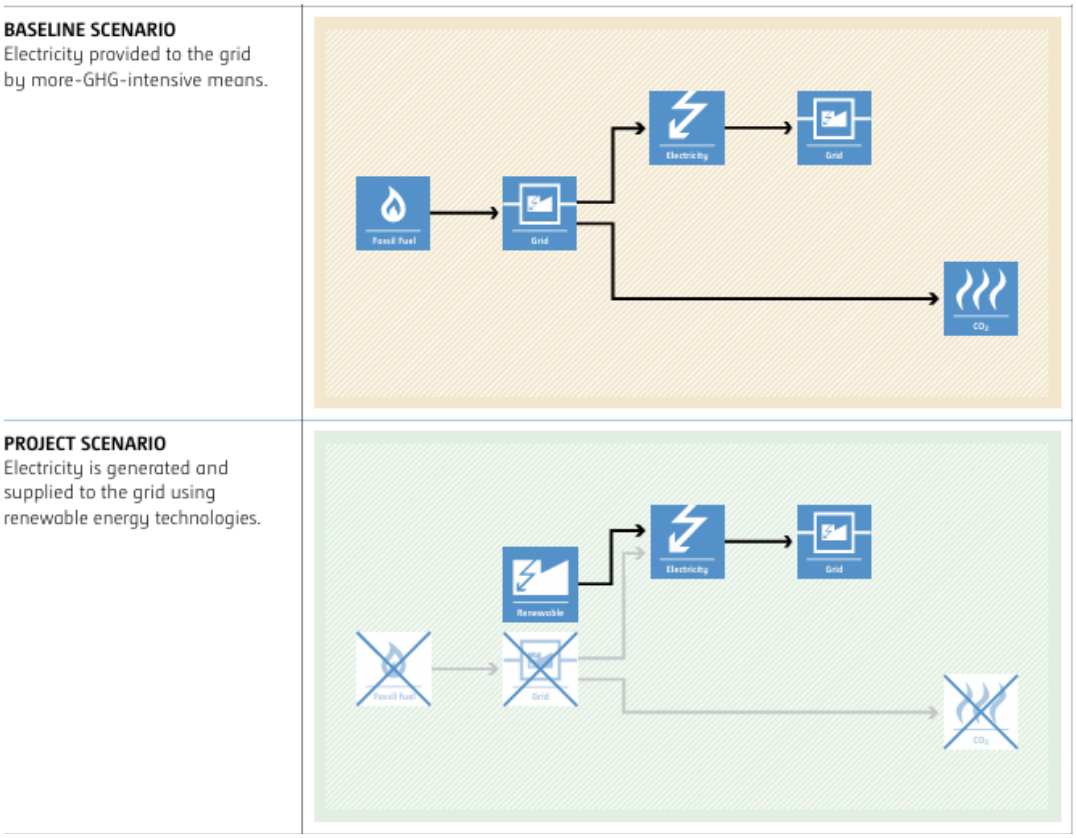
e) Baseline Scenario>>

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 grid (which is connected to the unified Indian Grid system (NEWNE Grid)), which is carbon intensive due to being predominantly sourced from fossil fuel-based power

plants. Hence, the 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:

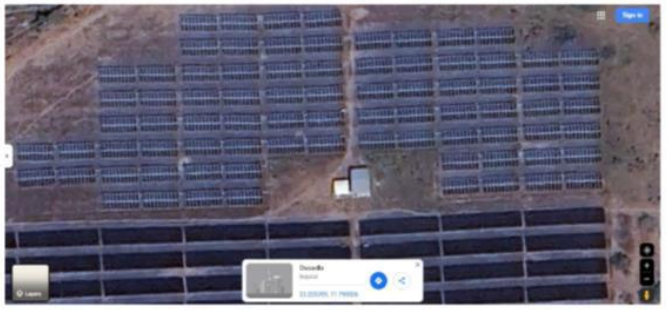


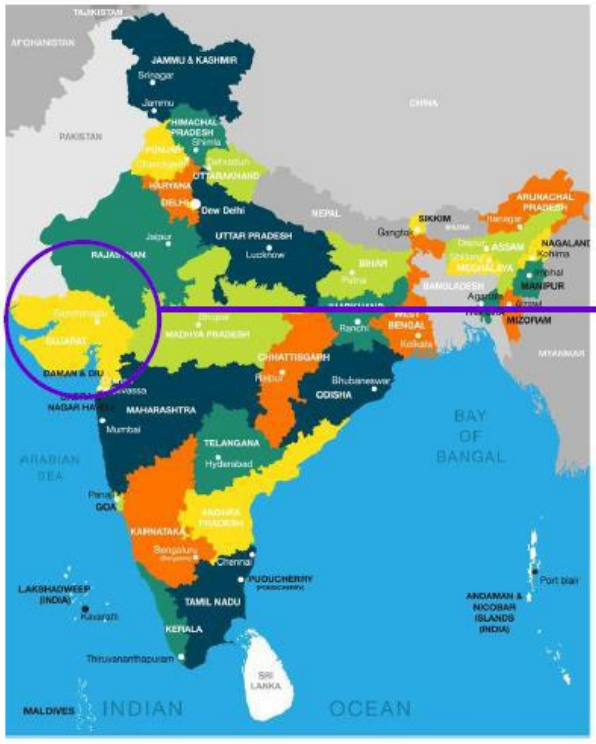
A.2. Location of project activity>>

The project site is situated in Savda village, located in the Surendranagar district of Gujarat, approximately 120 km from Ahmedabad via Viramgam-Patadi-Dasada. The existing Patadi 66 kV substation is around 3 km away from the proposed site. Moreover, the project site has good connectivity to the airport and railway station. The geographic coordinates of the project location are provided below.

District: Surendranagar
Village: Savda
Taluka: Dasada
State: Gujarat
Country: India

Village	**Savda**
Taluka	Dasada
District	Surendranagar
Longitude	71° 46′ 59.02″ E
Latitude	23° 10′ 55.86″ N
MSL (Mean Sea Level)	10 M
Maximum Temperature	45.6° C
Minimum Temperature	7.8° C
Average Rainfall	760 mm
Seismic Zone	III
Nearest Railway Station	Viramgam Railway Station
Nearest Airport	Ahmedabad International Airport
Connected Road	SH – 18
Nearest Port	Port of Navlakhi




JAMMU & KASHMIR
HIMACHAL PRADESH
UTTARAKHAND
HARYANA
Dew Delhi
UTTAR PRADESH
RAJASTHAN
BIHAR
SIKKIM
ARUNACHAL PRADESH
NAGALAND
MANIPUR
MIZORAM
BENGAL
MADHYA PRADESH
CHHATTISGARH
ODISHA
MAHARASHTRA
Mumbai
TELANGANA
Hyderabad
GOA
KARNATAKA
Bengaluru
Chennai
PUDUCHERRY
TAMIL NADU
KERALA
Thiruvananthapuram
LAKSHADWEEP (INDIA)
ANDAMAN & NICOBAR ISLANDS (INDIA)
Port Blair
MALDIVES
INDIAN OCEAN
BAY OF BANGAL
ARABIAN SEA
NEPAL
BANGLADESH
MYANMAR
CHINA
PAKISTAN
AFGHANISTAN
TAJIKISTAN
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Gulf of Khambhat
BANASKANTHA
PATAN
MEHSANA
SABARKANTHA
KUTCH
Bhuj
GANDHINAGAR
ARAVALI
Gandhinagar
AHMEDABAD
KHEDA
SURENDRANAGAR
Surendranagar
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PORBANDAR
Porbandar
Junagadh
JUNAGADH
Amreli
AMRELI
Bhavnagar
BHAVNAGAR
GIR SOMNATH
Veraval
ANAND
Anand
Nadiad
Godhra
PANCHMAHAL
Vadodara
VADODARA
CHHOTA UDAIPUR
BHARUCH
Bharuch
NARMADA
SURAT
Surat
TAPI
Vyara
Navsari
DANG
NAVSARI
Valsad
VALSAD
DAMAN & DIU
DADRA & NAGAR HAVELI
LEGEND
International Boundary
State/UT Boundary
District Boundary
State Capital
District Headquarter
Map not to Scale
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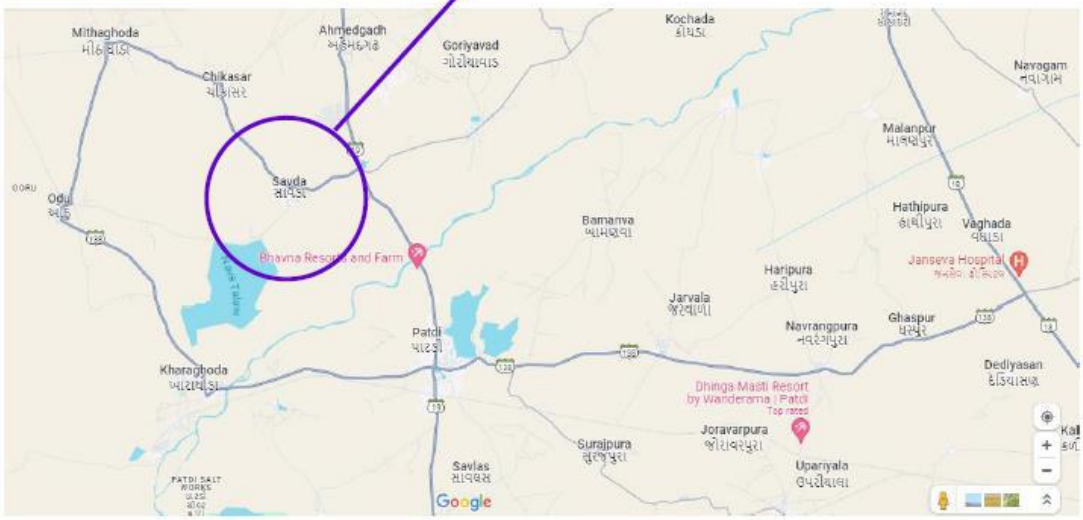

Mithaghoda
Ahmedgadh
Goriyavad
Kochada
Navagam
Chikasar
Malanpur
Sayda
Odu
Bamanva
Hathipura
Vaghada
Bhavna Resort and Farm
Janseva Hospital
Haripura
Jarvala
Navrangpura
Ghaspur
Patdi
Kharaghoda
Dediyasan
Dhinga Masti Resort by Wanderama | Patdi
Top rated
Joravarpura
Surajpura
Savlas
Upariyala
PATDI SALT WORKS
Google

A.3. Parties and project participants >>

Party (Host)	Participants
INDIA	**M/s Maverik Incorporation(Aggregator)** Contact Person: Nutan P Email: projects@maverikgroup.biz **M/s Som Shiva Impex Limited (Project Owner)** Address: Office:-301, 0scon Maii, Above Star India Bazaar, Satellite, Ahmedabad-380015° & Registered Office:-Plot no. 111, GIDC, Phase 1, Chattral, Tal: Kalol, Gandhinagar-382729

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

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

Sectoral Scope	: 01, Energy industries (Renewable/Non-renewable sources)
Type	: Type I - Renewable Energy Projects
Category	:AMS-I.D. (Title: "Grid connected renewable electricity generation", version 18)

Applied conditions 1 and 3

Illustration of respective situations under which each of the methodology ("AMS-I.D.: Grid connected renewable electricity generation", "AMS-I.F.: Renewable electricity generation for captive use and mini-grid" and "AMS-I.A.: Electricity generation by the user") applies is included in Table 2 below.

Table 2. Applicability of AMS-I.D, AMS-I.F and AMS-I.A based on project types

	Project type	AMS-I.A	AMS-I.D	AMS-I.F
1	Project supplies electricity to a national/regional grid		√	
2	Project displaces grid electricity consumption (e.g. grid import) and/or captive fossil fuel electricity generation at the user end (excess electricity may be supplied to a grid)			√
3	Project supplies electricity to an identified consumer facility via national/regional grid (through a contractual arrangement such as wheeling)		√	
4	Project supplies electricity to a mini grid[5] system where in the baseline all generators use exclusively fuel oil and/or diesel fuel			√
5	Project supplies electricity to household users (included in the project boundary) located in off grid areas	√		

The project involves generating grid-connected electricity through the construction and operation of a 2.107 MW solar power project, qualifying it as a small-scale project under Type I of the Small-Scale methodology (AMS-I.D., version 18).

Methodology key elements

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

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 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.5. Crediting period of project activity >>

Crediting period corresponding to this monitoring period: 11 years - 01/01/2013 to 31/12/2023 (both dates inclusive)

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

Provide the information and contact details of the person preparing this report.

M/s Maverik Incorporation (Aggregator)

Contact Person: Nutan P

Email: projects@maverikgroup.biz

M/s Som Shiva Impex Limited (Project Owner)

Address: Office:-301, 0scon Maii, Above Star India Bazaar, Satellite, Ahmedabad-380015° & Registered Office:-Plot no. 111, GIDC, Phase 1, Chattral, Tal: Kalol, Gandhinagar-382729

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>>

(a)Description of the installed technologies, technical processes and equipment;

- Solar PV modules arranged in series and parallel configurations to form strings, optimizing system voltage.
- Junction boxes connecting multiple strings in parallel before they enter string inverters.
- String inverters that convert DC power from solar modules into three-phase AC power using Maximum Power Point Tracking (MPPT) for efficiency.
- A Power Control Unit (PCU) managing the DC to AC conversion and ensuring maximum power output.
- Low Voltage (LV) panels distributing AC power within the system, incorporating safety devices like circuit breakers.
- A step-up transformer increasing AC voltage to grid-compatible levels for connection to the High-Tension (HT) power panel.
- The HT power panel integrating solar electricity into the grid, including measuring and protection devices for safe operation.

This setup enables efficient conversion and integration of solar-generated electricity into the electrical grid, maximizing system performance and scalability for future expansion.

Parameters	Description	
Location	Savda(1.007 MW) PPA	Savda (1 MW) Captive
Total number of Photovoltaic Modules	1593 / 7776	2304 / 2496
Rating of Photovoltaic Module	335 / 65 (Wp)	235 / 235 (Wp)
Module make	INV1-WAREE / INV2 ABOUND SOLAR	CANADIAN SOLAR
Technology	POLY / THIN FILM	POLY
LT Switchgear	SCHNEIDER	ABB
LT Cable	POLYCAB	POLYCAB
No. of Inverter	2 NOS.	2 NOS.
Invertor Capacity	500Kw	524 / 600
Invertor make	SMA	POWERONE
PV Connectors	FIZER	FIZER
Power Transformer 11/0.3 kV	DANISH PVT. LTD.	KOTSON

(b) Information on the implementation and actual operation of the project activity, including relevant dates (e.g. construction, commissioning, start of operation). If the project activity consists of more than one site, describe the status of implementation and start date of operation for each site. If the project activity is implemented in phases, indicate the progress of the project activity achieved in each phase.

Implementation:

The project activity consists of two solar power plant sites bundled together.
Site 1: 1.1 MW ground-mounted solar plant located at Survey Number 305, Village: Savda, Taluka: Dasada, District: Surendranagar, Gujarat.
Site 2: 1.007 MW ground-mounted solar plant located at Survey Number 305, Village: Savda, Taluka: Dasada, District: Surendranagar, Gujarat.

Operation:

The project has been implemented and is currently operational.
Site 1 (1.1 MW) was commissioned and started operation on 29/01/2016.
Site 2 (1.007 MW) was commissioned and started operation earlier on 30/12/2011.

Type	Total installed Capacity in MW	Village	Taluka	District	Commissioning date
Ground mounted	1.1 MW	Savda	Dasada	Surendranagar	29/01/2016
	1.007 MW	Savda	Dasada	Surendranagar	30/12/2011

The project is a bundled activity with a total installed capacity of 2.107 MW, consisting of one 1.1 MW plant for captive use and one 1.007 MW plant for grid-connected power. Power Purchase Agreement (PPA) and Connectivity Permission Procedure (CPP) for captive use were signed with the Gujarat Energy Development Agency (GEDA) on the respective commissioning dates for regulatory compliance.

2. *List of Grid Connected Solar Power Projects under Gujarat State Policy*

Sl. No.	Project Developer	District	Capacity (MW)
1	2	3	4
54.	EMCO Ltd.	Surendranagar	5
55.	Environmental System Pvt. Ltd.	Surendranagar	5
56.	Louroux Bio Energies Ltd.	Surendranagar	25
57.	Millennium Synergy (Gujarat) Pvt. Ltd.	Surendranagar	9.27
58.	Rajesh Power Services Pvt. Ltd.	Surendranagar	1
59.	Rasna Marketing Services LLP	Surendranagar	1
60.	Som Shiva (Impex) Ltd.	Surendranagar	1
61.	Visual Percept Solar Projects Pvt. Ltd.	Surendranagar	25
62.	Waa Solar Pvt. Ltd.	Surendranagar	10.22
	TOTAL CAPACITY		654.81 MW

Source Rajya Sabha 2012 MNRE

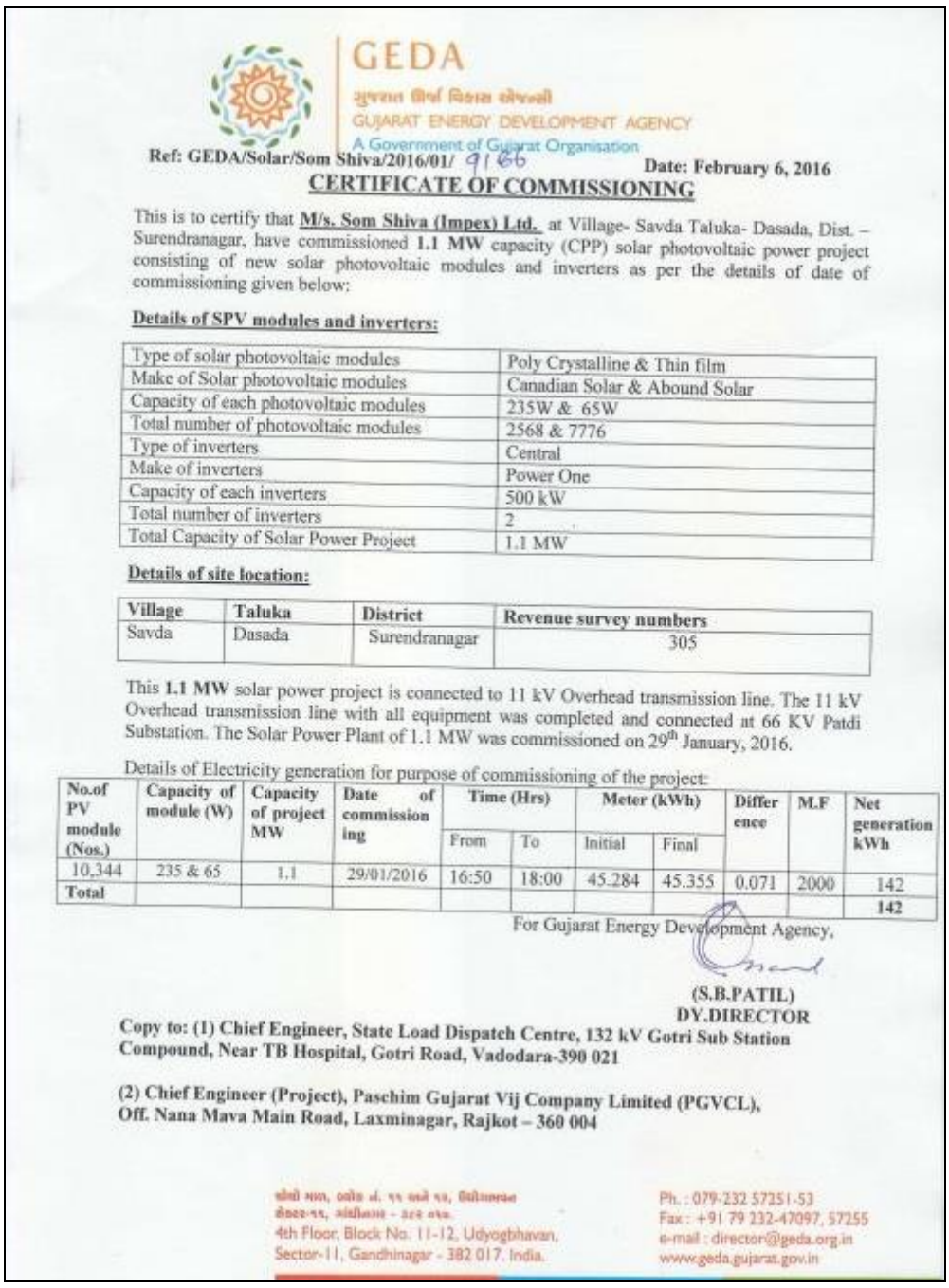
The project proponent, M/s Som Shiva Impex Limited, has 100% ownership of the project activity. The project is currently registered under the Universal Carbon Registry (UCR) for continuous greenhouse gas emission reductions.

In summary, the implementation of the 2.107 MW solar project was completed in phases, with the first site (1.007 MW) commissioned on 30/12/2011 and the second site (1.1 MW) commissioned on 29/01/2016. Both sites are located at the same location in Savda Village, Dasada Taluka, Surendranagar District, Gujarat, and have been operational since their respective commissioning dates. The 1.1 MW solar power project is connected to 11 kv overhead transmission line. The 11 kv overhead transmission line with all equipment was completed and connected at the 66 KV Patdi Substation.

Captive Plant 1.1 M W

PPA Plant 1.007 MW

SR. NO	Plant	Grid Connected/off grid	Net Metering	Start Date of CoU claim
1	Savda(1.007 MW) PPA	Grid connected	Yes	1st Jan 2013
2	Savda (1 MW) Captive	Grid connected	Yes	1st Feb 2016



GEDA
ગુજરાત ઊર્જા વિકાસ એજન્સી
GUJARAT ENERGY DEVELOPMENT AGENCY
A Government of Gujarat Organisation

Ref: GEDA/Solar/Som Shiva/2016/01/ 9166 Date: February 6, 2016

CERTIFICATE OF COMMISSIONING

This is to certify that **M/s. Som Shiva (Impex) Ltd.** at Village- Savda Taluka- Dasada, Dist. – Surendranagar, have commissioned **1.1 MW** capacity (CPP) solar photovoltaic power project consisting of new solar photovoltaic modules and inverters as per the details of date of commissioning given below:

Details of SPV modules and inverters:

Type of solar photovoltaic modules	Poly Crystalline & Thin film
Make of Solar photovoltaic modules	Canadian Solar & Abound Solar
Capacity of each photovoltaic modules	235W & 65W
Total number of photovoltaic modules	2568 & 7776
Type of inverters	Central
Make of inverters	Power One
Capacity of each inverters	500 kW
Total number of inverters	2
Total Capacity of Solar Power Project	1.1 MW

Details of site location:

Village	Taluka	District	Revenue survey numbers
Savda	Dasada	Surendranagar	305

This **1.1 MW** solar power project is connected to 11 kV Overhead transmission line. The 11 kV Overhead transmission line with all equipment was completed and connected at 66 KV Patdi Substation. The Solar Power Plant of 1.1 MW was commissioned on 29th January, 2016.

Details of Electricity generation for purpose of commissioning of the project:

No.of PV module (Nos.)	Capacity of module (W)	Capacity of project MW	Date of commissioning	Time (Hrs)		Meter (kWh)		Difference	M.F	Net generation kWh
				From	To	Initial	Final			
10,344	235 & 65	1.1	29/01/2016	16:50	18:00	45.284	45.355	0.071	2000	142
Total										142

For Gujarat Energy Development Agency,

(S.B.PATIL)
DY.DIRECTOR

Copy to: (1) Chief Engineer, State Load Dispatch Centre, 132 kV Gotri Sub Station Compound, Near TB Hospital, Gotri Road, Vadodara-390 021

(2) Chief Engineer (Project), Paschim Gujarat Vij Company Limited (PGVCL), Off. Nana Mava Main Road, Laxminagar, Rajkot – 360 004

4th Floor, Block No. 11-12, Udyogbhavan, Sector-11, Gandhinagar - 382 017. India.
Ph. : 079-232 57251-53
Fax : +91 79 232-47097, 57255
e-mail : director@geda.org.in
www.geda.gujarat.gov.in

Commissioning Certificate

राज्य भार प्रेषण केंद्र
State Load Dispatch Centre
Gujarat Energy Transmission Corporation Ltd.

GETCO

STATE ENERGY ACCOUNT UNDER ABT FOR SEPTEMBER, 2020

No. F-Guj-SLDC-22/SCH /SEA/2020-21/09.6/730 Date :3rd April, 2021

RENEWABLE ENERGY SUPPLIED FOR USE OF THEIR OWN CONSUMPTION EITHER THROUGH WHEELING AND OTHER ARRAGNEMENT/THIRD PARTY SALE CREDITED IN SCHEDULED TO DISTRIBUTION LICENSEE

All Figures in MWH

SR NO	Station	Month	TOTAL	DGVCL	MGVCL	UGVCL	PGVCL	TPAECo	TSECo	DPT	MUPL	TPL-D	Energy drawn from Discom
	Total from pre-page		5240570.699	1083325.412	617275.8658	810763.7443	899943.9743	659555.42	224704.25	0		0	-
1	WEG(W)	For Sept 2020	121531.295	33928.475	14815.796	17611.145	13850.925	28659.816	9236.994	345.305	1964.442	1118.397	
2	GACL 20 MW (Solar)	For Sept 2020	3105.236	2173.665	931.571								-22.632
3	GSFC LTD (Solar)	For Sept 2020	1701.962		1701.962								-10.624
4	Guj. Alkalies and Chem. Ltd (Solar)	For Sept 2020	2007.138		2007.138								-18.262
5	IOCL Solar	For Sept 2020	1015.011	60.901	498.370	65.976	372.509	17.255					-6.993
6	K P I Global	For Sept 2020	5655.090	5583.557					71.533				-39.327
7	MADHU SILICA PVT LTD(SOLAR)	For Sept 2020	695.719				695.719						-5.125
8	ONGC A (Solar)	For Sept 2020	616.870	104.868		512.002							-6.668
9	Rallis India Ltd	For Sept 2020	412.685	124.837		188.391						89.457	-4.950
10	Som Shiva(Impex)	For Sept 2020	83.037			83.037							-1.442
11	SSNL, Sama (Solar)	For Sept 2020	811.736				811.736						-14.531
12	SSNNL, 25 MW (Solar)	For Sept 2020	2898.855				2898.855						-42.480
13	SSNNL MBC (SHP)	For Sept 2020	0.000				0.000						-13.374
14	SSNNL SBC (SHP)	For Sept 2020	1965.414				1965.414						-11.41
15	SSNNL SBC -II (SHP)	For Sept 2020	1857.818				1857.818						-10.64
16	SSNNL VBC (SHP)	For Sept 2020	0.0003				0.000						-15.06
17	SSNNL KBC(SHP)	For Sept 2020	0				0.000						-49.72
	TOTAL	For Sept 2020	5384928.566	1125301.716	637230.703	829224.295	922396.950	688232.491	234012.777	345.305	1964.442	1217.854	-208.457

NOTE:No PPA energy for WEG(W) for the month SEPT 2020 = 1205.716

Captive consumption via wheeling evidence (Source GETCL)

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

The project activity is using clean renewable solar energy to produce electricity. The applied technology is solar photovoltaic (SPV).

System Description: Solar Photovoltaic power generator is the arrangement of all modules in series and parallel connections. Modules are installed in rows called strings to achieve a higher system voltage. The calculated number of strings are connected in parallel to a junction box. These junction boxes are then connected to string inverters. The Power Control Unit (PCU) converts the solar-generated DC power into conventional 3-phase AC power. PCU operates on Maximum Power Point Tracking (MPPT) mode to ensure maximum output from the solar generators at different ambient conditions. The conventional AC power from the inverter is fed through the LV (Low Voltage) panel to the main step-up transformer. From the transformer, power is fed to the HT (High Tension) power panel and required measuring & protection devices before connecting to the grid.

The other key technical details provided are:

Parameter	Description
Total installed capacity	2.107 MW
Number of photovoltaic modules	1593/7776 for 1.007 MW plant and 2304/2496 for 1.1 MW plant
Module ratings	335/65 Wp and 235/235 Wp
Module technology	Polycrystalline and Thin Film
Number of inverters	2 for each plant
Inverter capacities	500 kW and 524/600 kW
Inverter make	SMA and POWERONE

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.

- 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.

Social benefits:

- Employment opportunities created for local workforce during construction and operation phases
- Contributes to alleviation of poverty in the surrounding area through sustained employment opportunities over the project lifetime

Environmental benefits:

- The project utilizes clean renewable solar energy for power generation, avoiding emissions from fossil fuel-based electricity generation

- Being a solar PV project, there are no emissions of GHGs or other harmful gases during operation
- The project concept note states that as per Central Pollution Control Board guidelines, solar projects fall under the "White category" which do not require Environmental Clearance as they do not lead to any negative environmental impacts

Economic benefits:

- The project represents a clean technology investment decision supported by carbon revenues, facilitating flow of clean energy investments into the host country India
- It creates temporary and permanent employment opportunities, both skilled and semi-skilled jobs in the region
- Availability of electricity replaced in the grid will directly and indirectly improve the economy and lifestyle of the area
- Success of such projects provides opportunities for setting up new industries and economic activities in the region
- Local people will get better prices for their land, resulting in overall economic development of the area

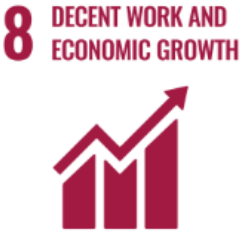
United Nations Sustainable Development Goals:

The project activity generates electrical power using solar energy which is generated from solar panels, there by 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)
13 CLIMATE ACTION  SDG 13: Climate Action	13.2: Integrate climate change measures into national policies, strategies and planning Target: **24166 tCO2** for the Monitored Period 01	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)
 SDG 7: Affordable and Clean Energy	7.2: By 2030, increase substantially the share of renewable energy in the global energy mix Target: **<u>26857.205 MWh</u>** for the Monitored Period 01	7.2.1: Renewable energy share in the total final energy consumption
 SDG 8: Decent Work and Economic Growth	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 Target: Training, O&M staff	8.5.1: Average hourly earnings of female and male employees, by occupation, age and persons with disabilities

B.3. Baseline Emissions>>

This section establishes the emission displacement rates/coefficients/factors based on the applicable methodology selected for this project.

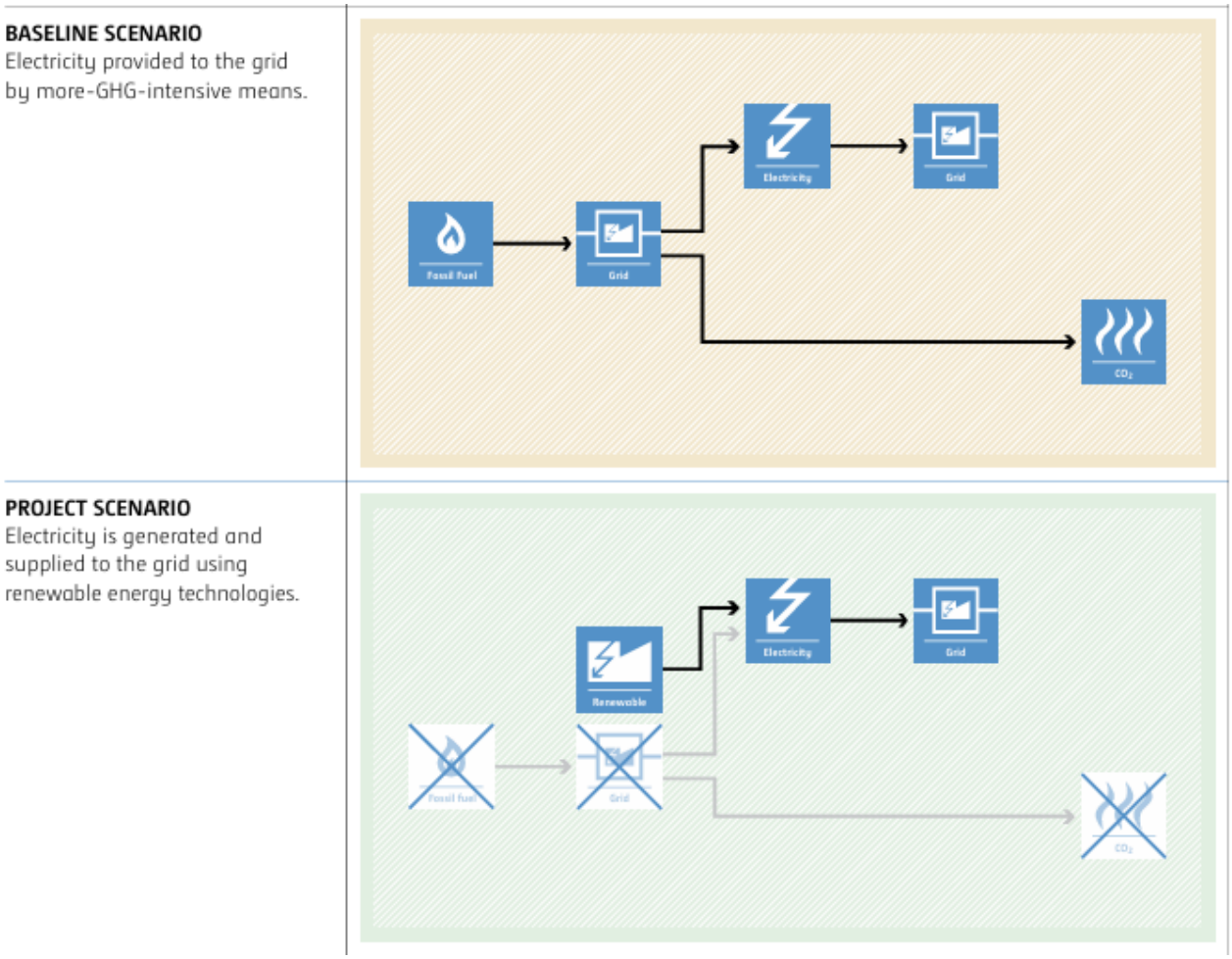
As per paragraph 19 of the approved consolidated methodology AMS-I.D. Version 18, when the project activity involves installing a new grid-connected renewable power plant/unit, the baseline scenario is defined as:

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

In this project, a new grid-connected solar power plant has been set up to harness renewable solar energy and supply the generated electricity both to the grid and for captive use by the project proponent (PP). Without this project activity, an equivalent amount of electricity would have been supplied by the Indian grid, which is predominantly fossil fuel-based. Therefore, the baseline scenario is the equivalent amount of power that would have been generated by the fossil fuel-dominated Indian grid.

The "grid emission factor" refers to the CO2 emission factor (tCO2/MWh) associated with each unit of

electricity supplied by the grid system. The UCR recommends using an emission factor of 0.9 tCO2/MWh for Indian projects during 2013-2020, as a conservative estimate for projects not previously verified under any GHG program. Additionally, for the 2021-2023 period, the combined margin emission factor calculated from the Central Electricity Authority (CEA) database in India is higher than this default value. Hence, the same emission factor of 0.9 tCO2/MWh has been conservatively applied to calculate the emission reductions from this project activity.



B.4. Debundling>>

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

SECTION C. Application of methodologies and standardized baselines

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

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

Sectoral Scope: 01, Energy industries (Renewable/Non-renewable sources)
Type: I - Renewable Energy Projects
Category: AMS-I.D. (Title: "Grid connected renewable electricity generation", version 18)

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

The project involves generating grid-connected electricity through the construction and operation of a 2.107 MW solar power project. This project qualifies as a small-scale activity under Type I of the Small Scale Methodology (AMS I.D., version 18). The methodology outlines criteria for such projects, supporting sustainable development goals by promoting renewable energy generation and reducing greenhouse gas emissions.

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 is classified as a Renewable Energy Project that aligns with applicability criteria option (a) which involves i.e., "Supplying electricity to a national or a regional grid". Therefore, the project activity fulfils this specific applicability criterion.
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).	Applicability criterion: (a)Applies to the project as it involves establishing a new greenfield plant or unit. Therefore, the project activity aligns with this specific applicability criterion.
3. Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in existing reservoir, with no change in the volume of the reservoir; or (b) The project activity is implemented in existing reservoir, where the volume of the reservoir(s) is	The project involves installing Solar PV (SPV), making this criterion irrelevant or not applicable.

increased and the power density as per definitions given in the project emissions section, is greater than 4 W/m2. (c) The project activity results in new reservoirs and the power density of the power plant, as per definitions given in the project emissions section, is greater than 4 W/m2	
4. If the new unit has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the new unit co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The proposed project is a 2.107 MW solar power project, qualifying as a renewable power project below 15 MW. Therefore, this criterion is not applicable to this project activity
5. Combined heat and power (co-generation) systems are not eligible under this category	This criterion is not applicable to the project activity since it exclusively involves solar power generation units.
6. In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct1 from the existing units.	This criterion does not apply to the project site because there are no other renewable energy power generation facilities currently present.
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.	The project activity, being a new installation without any retrofitting or replacement measures, does not fall under the scope of this criterion.
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.	This criterion does not apply to the project activity since it exclusively involves solar power generation units
9. In case biomass is sourced from dedicated	This criterion is not applicable to the project

plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.	activity as it solely comprises a solar power project without any involvement of biomass.

C.3 Applicability of double counting emission reductions >>

The project ensures no double accounting of emission reductions through:

- Unique location identification, which ties reductions to specific coordinates.
- Dedicated commissioning certificate and connection point, providing clear project recognition.
- Use of dedicated energy meters solely for the project's consumption point, ensuring accurate tracking and attribution of emission reductions.

These measures ensure transparency and integrity in tracking emission reductions, preventing overlap or duplication of reduction claims with other projects or entities. Each reduction is uniquely attributed to the project's activities, enhancing credibility within carbon accounting and offsetting initiatives.

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

As per applicable methodology AMS-I.D. Version 18, "The spatial extent of the project boundary includes the project power plant and all power plants connected physically to the electricity system that the project power plant is connected to."

Thus, the project boundary includes the Solar PV systems and the Indian grid system.

Sources		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO_2	Yes	Main emission source
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source
		Other	No	No other GHG emissions were emitted from the project
Project	Greenfield Hydro Electric Power project Activity	CO_2	No	No CO2 emissions are emitted from the project
		CH_4	No	Project activity does not emit CH4
		N_2O	No	Project activity does not emit N2O
		Other	No	No other emissions are emitted from the project

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

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.

Since this is a grid-connected solar power project, in the absence of the project activity, the equivalent amount of electricity would have been supplied by the Indian grid, which is predominantly fossil fuel-based.

NET GHG EMISSION REDUCTIONS AND REMOVALS

$$ERy = BEy – PEy - LEy$$

Where:

- ERy = Emission reductions in year y (tCO2/y)
- BEy = Baseline Emissions in year y (t CO2/y)
- PEy = Project emissions in year y (tCO2/y)
- LEy = 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:

Calculations for Baseline GHG Emissions:

1. Convert Net electricity generated in units to MWh
2. The baseline emissions are calculated using the following formula:

$$BEy = EGpj,y * EFgrid,y$$

Where,

- BEy = Baseline emissions in year y (tCO2)
- EGpj,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)
- EFgrid,y = UCR recommended emission factor of 0.9 tCO2/MWh has been considered. (Reference: General Project Eligibility Criteria and Guidance, UCR Standard, page 4)

PROJECT EMISSIONS

As per AMS-I.D. version-18, only emission associated with the fossil fuel combustion, emission from operation of geo-thermal power plants due to release of non-condensable gases, emission from water reservoir of Hydro should be accounted for the project emission. Since the project activity is a solar power project, project emission for renewable energy plant is nil.

Thus, PEy =0.

LEAKAGE

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

Hence, LEy= 0

The actual emission reduction achieved during the 1st CoU period (i.e., period for this monitoring report) is calculated in detail in separate spreadsheet. The same is provided as attachment below for reference.

Overall emission reduction achieved by the proposed bundled project activity for this monitoring period (01/01/2013 to 31/12/2023) is demonstrated below

Net Electricity Generation (MWh) = 26857.205 MWh
Baseline Emissions = 26857.205MWh x 0.9 = 24166 tCO2

ERy = BEy – PEy – LEy

C.6. Prior History>>

The project activity had submitted a prior consideration notification to the UNFCCC CDM executive board (EB) on 04/04/2011 for a project titled "1 MW Solar Power CDM Project by Som Shiva (Impex) Ltd. At Gujarat, India" (source:https://cdm.unfccc.int/Projects/PriorCDM/notifications/index_html?s=6820).

The project activity has however, not applied for a transition under the Article 6.4 mechanism and has never been registered as a CDM project activity, nor been issued CERs in the past and the capacity or the total project as a whole has not been applied for any other voluntary environmental crediting or certification mechanism. Hence the project activity will not cause double accounting of carbon credits (i.e., COUs).

C.7. Monitoring period number and duration>>

1st CoU Issuance Period: 11 years crediting Period: 01/01/2013 to 31/12/2023

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

The start date of the 1st crediting period is considered as 01/01/2013.

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

Detailed step-by-step calculations for baseline emissions and emission reductions for both the PPA and Captive Plant

Som Shiva Impex Limited
PPA Plant-Year wise power generation details {PPA Plant 1.007 MW}

Sr. No.	YEAR	UNITS (KWh)	ER (CoU)
1	2013	13,80,210	1242
2	2014	14,45,380	1300
3	2015	16,12,730	1451
4	2016	16,16,540	1454
5	2017	15,20,740	1368
6	2018	16,03,440	1443
7	2019	15,34,060	1380
8	2020	15,94,100	1434
9	2021	15,53,540	1398
10	2022	16,08,960	1448
11	2023	14,46,500	1301
	TOTAL	**16916 (MWh)**	**15219**

Som Shiva Impex Limited
Captive-Year wise power generation details Captive
{Plant 1.1 M W}

Sr. No.	YEAR	UNITS (KWh)	ER (CoU)
1	2016	11,14,695	1003
2	2017	11,41,603	1027
3	2018	10,83,770	975
4	2019	9,63,014	866
5	2020	9,96,756	897
6	2021	16,91,964	1522
7	2022	15,22,519	1370
8	2023	14,26,684	1284
	TOTAL	**9941.005 (MWh)**	**8944**

- Convert net electricity generation units to MWh by dividing by 1000
- Calculate baseline emissions by multiplying net MWh by 0.9 tCO2/MWh emission factor
- Sum the yearly baseline emissions for PPA and Captive plants separately
- Add the total baseline emissions from both plants to get the overall figure

Total Baseline Emissions = Captive Plant Total + PPA Plant Total
= **24166 tCO2**

Emission Reductions = Total Baseline Emissions
= 24166 tCO2 or 24166 COUs

C.10. Monitoring plan>>

Data and Parameters available (ex-post values):

Data/Parameter	UCR recommended emission factor
Data unit	tCO2 /MWh
Description	A "grid emission factor" refers to a CO2 emission factor (tCO2/MWh) which will be associated with each unit of electricity provided by an electricity system. The UCR recommends an emission factor of 0.9 tCO2/MWh for the 2013 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 Value(s) applied	https://a23e347601d72166dcd616da518ed3035d35cf0439f1cdf449c9.ssl.cf2.rackcdn.com//Documents/UCRStandardAug2022updatedVer5_030822005728911983.pdf 0.9
Measurement methods and procedures	-
Monitoring frequency	Ex-ante fixed parameter
Purpose of data Additional Comments	For the calculation of the Emission Factor of the grid. The combined margin emission factor as per CEA database (current version, Year 2023) results into higher emission factor. Hence for 2022 2023 vintage UCR default emission factor remains conservative.

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

Data/Parameter	E_{GPJ}, facility, y
Data unit	MWh
Description	Total electricity produced by the project activity
Source of data	Electricity Generation data though monitoring system
Measurement procedures(if any)	Data Type: Measured Monitoring equipment: Energy Meters and inverter data are used for monitoring Recording Frequency: Continuous monitoring and Monthly recording from Energy Meters, Summarized Annually Archiving Policy: Paper & Electronic Calibration

	frequency: 5 years (as per CEA provision) For example, the difference between the measured quantities of the grid export and the import will be considered as net export: $E_{GPJ,y} = EG_{Export} - EG_{Import}$
Monitoring frequency	Monthly
QA/QC procedures:	Calibration of the Main meters will be carried out once in five (5) years as per National Standards (as per the provision of CEA, India) and faulty meters will be duly replaced immediately as per the provision of power purchase agreement.
Purpose of data Any comment	The Data/Parameter is required to calculate the baseline emission. Data will be archived electronically for a period of 36 months beyond the end of crediting period.

Som Shiva Impex Limited
PPA Plant-Year wise power generation details {PPA Plant 1.007 MW}

Sr. No.	YEAR	UNITS (KWh)
1	2013	13,80,210
2	2014	14,45,380
3	2015	16,12,730
4	2016	16,16,540
5	2017	15,20,740
6	2018	16,03,440
7	2019	15,34,060
8	2020	15,94,100
9	2021	15,53,540
10	2022	16,08,960
11	2023	14,46,500
	TOTAL	**16916 (MWh)**

Som Shiva Impex Limited
Captive-Year wise power generation details Captive
{Plant 1.1 M W}

Sr. No.	YEAR	UNITS (KWh)
1	2016	11,14,695
2	2017	11,41,603
3	2018	10,83,770
4	2019	9,63,014
5	2020	9,96,756
6	2021	16,91,964
7	2022	15,22,519
8	2023	14,26,684
	TOTAL	**9941.005 (MWh)**