



**Verified Carbon
Standard**

BUNDLED ROOFTOP SOLAR POWER PROJECT BY SPPL 01

Project title	Bundled Rooftop Solar Power Project by SPPL 01
Project ID	4071
Crediting period	05-01-2023 TO 04-01-2030
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1 PROJECT DETAILS

1.1 Summary Description of the Project

The project involves installation of Solar Photovoltaic (SPV) Panels on rooftops in various districts of Tamil Nadu, India. The sole purpose of project activity is to install solar power plant for captive purpose and surplus generated electricity can be supplied to grid and further equivalent energy will be consumed from grid through net metering arrangement with state electricity board. The end users of the project activity are the project proponents as the project's primary objective is to reduce the project site's reliance on grid electricity, thereby avoiding greenhouse gas emissions.

Under the concept of Net Metering, the customers are charged only for the net power that they consume from the electricity service provider that has accumulated over a specific period. In other words, if their renewable energy generating systems make more electricity than consumed, they may be credited or paid for the excess electricity contributed to the grid over the same period. Net metering is also a way to increase the energy in the power grid to keep up with increase in demand during peak power use times, and this is of particular interest to states facing power shortages.

The project activity is set up to generate solar electricity for meeting the captive requirement of the industrial premises and surplus electricity, in case of any exigency scenarios will be exported to the grid through a net metering arrangement with the State Electricity Board. The capacity of the solar rooftop installation is limited to contracted load at the industrial premises and the electricity generated is primarily used for captive use.

According to the VCS Program Definitions, v4.5, Grid-Connected Electricity Generation is "The generation of electricity primarily for delivery to a national or regional grid where at least 50% of annual electricity generation (by quantity of energy, not capacity) is planned to be delivered to such a grid. Generation of electricity for on-site self-consumption, delivery to a micro-grid, distributed mini-grid, or off grid consumption is not included in this definition". Our project activity conforms that actual electricity exported to the grid only in exigency situations shall be less than 50% of the total electricity generated. Thus, our project does not fall under the definition of Grid connected Electricity Generation project.

We acknowledge that Table 1 of the VCS Standard v4.5 excludes grid-connected electricity generation activities using solar PV from the scope of the VCS program. However, we emphasize that our project's primary objective of solar generation is to meet captive use and net metering is done only for allowing us to supply surplus energy in case of any exigency scenarios.

The location of the project.

The project location for Project Activity is in state of Tamil Nadu, India and details are provided in Section 1.13 of this document.

An explanation of how the project is expected to generate GHG emission reductions or removals.

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 one or more sources listed below: a) A national or a regional grid (grid hereafter); (b) Fossil fuel fired captive power plant; (c) A carbon intensive mini grid

A brief description of the scenario existing prior to the implementation of the project.

The baseline scenario would be either continued use of fossil fuel dominated grid connected electricity generation or fossil fuel used in power plant or carbon intensive electricity.

An estimate of annual average and total GHG emission reductions and removals

The average annual GHG emission reduction from the first project activity is **13511 tCO₂e.t CO₂e**

Project Activity:

The details of the project activity are as below;

S. No	Site	Installed Capacity (MW)	Date of Commissioning
1	Sri Jayajothi and Company Private Limited.		
	Unit 1	0.96	07/03/2024
	Unit 2	0.96	07/03/2024
	PC Unit	0.88	07/03/2024
	OE Unit	0.96	08/03/2024
2	Shri Harikrishna Cotton Mills Private Limited	0.99	05/01/2023

3	KM Knitwear Private limited		
	Spinning Division	1.40	Commissioned on 14/08/2024, yet Commissioning certificate to be issued.
	Unit 14	0.05	Commissioned , yet Commissioning certificate to be issued.
4	Acsen Tex Private limited	1.8216	07/01/2023
	TOTAL	8.0216	

The annual estimated emission reductions over crediting period are **13511**

tCO₂ e/annum

1.2 Audit History

Audit type	Period	Program	Validation/verification body name	Number of years
Validation	(05/01/2023 to 04/01/2030)	VCS	4K Earth Science Pvt Ltd	Seven year

1.3 Sectoral Scope and Project Type

Sectoral scope ¹	01 - Energy industries (renewable / non-renewable sources)
Project activity type	I - Renewable Energy Projects

1.4 Project Eligibility

1.4.1 General eligibility

The project activity involves installation and generation of electricity using renewable energy resources i.e., by using the solar energy (renewable sources) replacing electricity

¹ Projects, activities, or methodologies may be developed under any of the 16 VCS sectoral scopes: <https://verra.org/programs/verified-carbon-standard/vcs-program-details/#sectoral-scopes>

supply from a fossil-fuel dominated electricity, thus leads to reductions of anthropogenic GHG emissions from atmosphere. Hence the project activity is eligible under sectoral scope 1 i.e., energy industries (renewable/ non-renewable sources) under the scope of the VCS Program. In line with methodology, project activity may displace electricity from fossil fuel fired captive power plant or displaces electricity from carbon intensive mini grid.

The project activity is set up to generate solar electricity for meeting the captive requirement of the industrial premises and surplus electricity, in case of any exigency scenarios will be exported to the grid through a net metering arrangement with the State Electricity Board. The capacity of the solar rooftop installation is limited to contracted load at the industrial premises and the electricity generated is primarily used for captive use.

According to the VCS Program Definitions, v4.5, Grid-Connected Electricity Generation is “The generation of electricity primarily for delivery to a national or regional grid where at least 50% of annual electricity generation (by quantity of energy, not capacity) is planned to be delivered to such a grid. Generation of electricity for on-site self-consumption, delivery to a micro-grid, distributed mini-grid, or off grid consumption is not included in this definition”. Our project activity conforms that actual electricity exported to the grid only in exigency situations shall be less than 50% of the total electricity generated. Thus, our project does not fall under the definition of Grid connected Electricity Generation project.

We acknowledge that Table 1 of the VCS Standard v4.5 excludes grid-connected electricity generation activities using solar PV from the scope of the VCS program. However, we emphasize that our project's primary objective of solar generation is to meet captive use and net metering is done only for allowing us to supply surplus energy in case of any exigency scenarios.

1.4.2 AFOLU project eligibility

Not Applicable

1.4.3 Transfer project eligibility

Not Applicable

1.5 Project Design

Indicate if the project has been designed as:

☐ Single location or installation

☒ Multiple locations or project activity instances (but not a grouped project)

☐ Grouped project

1.5.1 Grouped project design

Not Applicable

1.6 Project Proponent

Organization name	Sri Jayajothi Power Management Company Private Limited.
Contact person	Mr. D. Venkadesan
Title	General Manager
Address	70, Alagai Nagar, Rajapalayam Virudhunagar District, Tamil Nadu-626 117.India.
Telephone	+91 98426 89058
Email	electrical@jayajothi.com

Organization name	Shri Harikrishna Cotton Mills Private Limited
Contact person	Mr. S. Saravanakumar
Title	Managing Director
Address	NH-7 Kottaiyur – Agaram Village, Thadicombu – 624 709, Dindugal District
Telephone	+91 99444 97420
Email	gmaccounts@evereadymills.com

Organization name	KM Knitwear Private Limited
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Contact person	Mr. K. S. Vishnu Prabu
Title	Director
Address	14E, Lakshmi Nagar, First St, City Garden, Tirupur-641602
Telephone	+91 98439 98300
Email	jvs@kmknitwear.com

Organization name	Acsen Tex Private Limited
Contact person	Mr. Abhishiek Senthilnathan
Title	Chief Executive Officer (CEO)
Address	47, Co-operative colony, Upplipalayam, Coimbatore 641 015
Telephone	+91 99409 58786
Email	abi@acsen.in

1.7 Other Entities Involved in the Project

Organization name	Solaura Power Private Limited
Role in the project	Project Consultant
Contact person	Mr. V. R. Ramesh
Title	Director
Address	2nd floor ,Brigade Enterprises Ltd, OMR Road, Kottivakkam, Chennai, Tamil Nadu – 600096
Telephone	+91 90008 77756
Email	vrr@solaurapower.com

1.8 Ownership

The renewable energy technology installed at site of the project activity is under ownership of respective SPV/Project Proponent. The commissioning certificate / Noted for Record (NFR)/CEIG approval from electricity board for project activity are the supporting documents to demonstrate the project ownership. This demonstrates the right of use according to clause 3.7.1 (3) of VCS Standard (v4.5) – “a project ownership arising by virtue of a statutory, property or contractual right in the plant, equipment or process that generates GHG emission reductions and/or removals”.

1.9 Project Start Date

Project start date	05-01-2023
Justification	The start date of the crediting period is the earliest commissioned date of the unit among the 8 units comprising the project activity, which is in accordance to the section 3.8 of the VCS Standard v4.5' The project start date of a non-AFOLU project is the date on which the project began generating GHG emission reductions or carbon dioxide removals.'.

1.10 Project Crediting Period

Crediting period	☒ Seven years, twice renewable ☐ Ten years, fixed ☐ Other (state the selected crediting period and justify how it conforms with the VCS Program requirements)
Start and end date of first or fixed crediting period	05-01-2023 to 04-01-2030

1.11 Project Scale and Estimated GHG Emission Reductions or Removals

:

☒ < 300,000 tCO₂e/year (project)

☐ ≥ 300,000 tCO₂e/year (large project)

Calendar year of crediting period	Estimated GHG emission reductions or removals (tCO ₂ e)
05-- January -2023 to 31-December-2023	13363
01-January-2024 to 31-December- 2024	13511
01-January-2025 to 31-December- 2025	13511
01-January-2026 to 31-December- 2026	13511
01-January-2027 to 31-December- 2027	13511
01-January-2028 to 31-December- 2028	113511
01-January-2029 to 31-December- 2029	13511
01-January 2030 to 04-January 2030	148
Total estimated ERRs during the first or fixed crediting period	96145
Total number of years	7
Average annual ERRs	13735

1.12 Description of the Project Activity

The project involves installation of Solar Photovoltaic (SPV) Panels on rooftops in various districts of Tamil Nadu State, India. The sole purpose of project activity is to install solar power plant for captive purpose and surplus generated electricity can be supplied to grid and further equivalent energy will be consumed from grid through net metering arrangement with state electricity board.

Under the concept of Net Metering, the customers are charged only for the net power that they consume from the electricity service provider that has accumulated over a specific period. In other words, if their renewable energy generating systems make more electricity than consumed, they may be credited or paid for the excess electricity contributed to the grid over the same period. Net metering is also a way to increase the energy in the power grid to keep up with increase in demand during peak power use times, and this is of particular interest to states facing power shortages.

The project activity is set up to generate solar electricity for meeting the captive requirement of the industrial premises and surplus electricity, in case of any exigency scenarios will be exported to the grid through a net metering arrangement with the State Electricity Board.

The capacity of the solar rooftop installation is limited to contracted load at the industrial premises and the electricity generated is primarily used for captive use.

According to the VCS Program Definitions, v4.5, Grid-Connected Electricity Generation is “The generation of electricity primarily for delivery to a national or regional grid where at least 50% of annual electricity generation (by quantity of energy, not capacity) is planned to be delivered to such a grid. Generation of electricity for on-site self-consumption, delivery to a micro-grid, distributed mini-grid, or off grid consumption is not included in this definition”. Our project activity conforms that actual electricity exported to the grid only in exigency situations shall be less than 50% of the total electricity generated. Thus, our project does not fall under the definition of Grid connected Electricity Generation project.

We acknowledge that Table 1 of the VCS Standard v4.5 excludes grid-connected electricity generation activities using solar PV from the scope of the VCS program. However, we emphasize that our project's primary objective of solar generation is to meet captive use and net metering is done only for allowing us to supply surplus energy in case of any exigency scenarios.

As the total capacity is less than 15 MW capacity, small scale methodology AMS I.F is applicable for proposed project activity.

As per the applicable methodology, a Greenfield power plant is defined as “a new renewable energy power plant that is constructed and operated at a site where no renewable energy power plant was operated prior to the implementation of the project activity”.

Technical Specifications

S.No	PV Module Specifications/Details	Value
1	Type	Mono PERC
2	Voltage	1500 V
3	Efficiency	20.5%
4	Lifetime	25 years
S.No	Inverter Details	Value
1	Rating	82.8 KW
2	Max Input Voltage	1000 V _{dc}
3	Min Input Voltage	750 V _{dc}
4	Max Efficiency	98.3%

1.13 Project Location

S.NO	ENTITY	LOCATION	INSTALLED CAPACITY (AC MW)	GEODETIC CORDINATES
1	Sri Jayajothi Power Management Company private limited	Unit I Rajapalayam, Virudhunagar District, Tamilnadu, India.	0.96	9°26'37.77"N (9.4438), 77°33'49.46"E (77.5637)
		Unit 2 NallaManaickenpatti, Virudhunagar District, Tamilnadu, India.	0.96	9°23'08.17"N (9.3861), 77°34'28.68 E"(77.5741)
		PC Unit Rajapalayam Virudhunagar District, Tamilnadu, India.	0.88	9°26'36.47"N (9.4434), 77°33'55.40"E (77.5653)
		OE Unit Virudhunagar District, Tamilnadu,India	0.96	9°31'37.66" N (9.5271), 77°56'35.50"E (77.9432)
2	Shri Harikrishna Cotton Mills Private Limited	536-Dharapuram Karur Main Road, Kannivadi (POST), Mulanur-639 202. TirupurDistrict.Tamilnadu,India.	0.99	10°48'42.1"N (10.8117), 77°44'51.7"E (77.7477)
3	KM Knitwear Private Limited	Spinning Division, Avinashpalayam, Tirupur District, Tamilnadu, India.	1.4	10°58'02.4"N (10.9673), 77°23'49.5"E (77.3970)
		Unit 14, Tirupur District, Tamilnadu, India.	0.05	11°13'31.9"N (11.2255), 77°21'31.0"E (77.3586)
4	Acscen Tex Private Limited	Attur, Salem District, Tamilnadu, India.	1.8216	11°35'03.2"N (11.5842), 78°42'22.0"E (78.7061)

1.14 Conditions Prior to Project Initiation

The project is a Greenfield solar power project and does not involve generation of GHG emissions for the purpose of their subsequent reduction, removal, or destruction. Prior to the

initiation of the project activity, the equivalent amount of electricity would have been drawn from grid connected or new power plants, in Indian Grid. The grid is predominantly coal based and therefore is a major source of carbon dioxide emissions in India. The main emission in the pre project scenario is the power plants connected to the Indian Grid, and main GHG involved is CO₂. The baseline identified in section 2.4 is same as the pre-project scenario.

As per methodology, the baseline scenario would be either continued use of fossil fuel dominated grid connected electricity generation or fossil fuel used in power plant or carbon intensive electricity.

1.15 Compliance with Laws, Statutes and Other Regulatory Frameworks

The Project has received necessary approvals for development and commissioning for each PV Plant from the state Nodal agencies and complies to the local laws and regulations.

The relevant national laws and regulations pertaining to generation of energy in India are:

- Electricity Act 2003 ²
- National Electricity Policy 2005³
- Tariff Policy 2006⁴
- The Project activity conforms to all the applicable laws and regulations in India:
- Power generation using solar energy is not a legal requirement or a mandatory option.
- There are state and sectoral policies, framed primarily to encourage solar power projects. These policies have also been drafted realizing the extent of risks involved in the projects and to attract private investments.
- The Indian Electricity Act, 2003 (May 2007 Amendment)⁵ does not influence the choice of fuel used for power generation.

² <https://cercind.gov.in/Act-with-amendment.pdf>

³ [https://cea.nic.in/wp-content/uploads/legal_affairs/2020/09/National%20Electricity%20Policy%20\(1\).pdf](https://cea.nic.in/wp-content/uploads/legal_affairs/2020/09/National%20Electricity%20Policy%20(1).pdf)

⁴ https://cea.nic.in/wp-content/uploads/legal_affairs/2020/09/Tariff%20policy.pdf

⁵ https://www.iitr.ac.in/wfw/web_ua_water_for_welfare/power/Electricity_Act_2007.pdf

There is no legal requirement on the choice of a particular technology for power generation.

1.16 Double Counting and Participation under Other GHG Programs

1.16.1 No Double Issuance

Is the project receiving or seeking credit for reductions and removals from a project activity under another GHG program?

☐ Yes ☒ No

1.16.2 Registration in Other GHG Programs

Is the project registered or seeking registration under any other GHG programs?

☐ Yes ☒ No

1.16.3 Projects Rejected by Other GHG Programs

Has the project been rejected by any other GHG programs?

☐ Yes ☒ No

1.17 Double Claiming, Other Forms of Credit, and Scope 3 Emissions

1.17.1 No Double Claiming with Emissions Trading Programs or Binding Emission Limits

Are project reductions and removals or project activities also included in an emissions trading program or binding emission limit? See the *VCS Program Definitions* for definitions of emissions trading program and binding emission limit.

☐ Yes ☒ No

1.17.2 No Double Claiming with Other Forms of Environmental Credit

Has the project activity sought, received, or is planning to receive credit from another GHG-related environmental credit system? See the *VCS Program Definitions* for definition of GHG-related environmental credit system.

☐ Yes ☒ No

1.17.3 Supply Chain (Scope 3) Emissions

Do the project activities specified in Section 1.12 affect the emissions footprint of any product(s) (goods or services) that are part of a supply chain?

☐ Yes

☒ No

1.18 Sustainable Development Contributions

Contribution to sustainable development:

Apart from generation of renewable electricity, the project activity contributes to the sustainable development of the region - socially, environmentally, and economically. Ministry of Environment and Forests has stipulated economic, social, environment and technological well-being as the four indicators of sustainable development. The project contributes to sustainable development using the following ways.

- **Social well-being:** The project helped in generating employment opportunities during the construction and operation phases. The project activity leads to development in infrastructure in the region like development of roads and promotes business with improved power generation.
- **Economic well-being:** The project is a clean technology investment in the region, which would not have been taken place in the absence of the VCS benefits. The project activity also helps to reduce the demand supply gap in the state. The project activity creates local employment generation which helps economic well-being of local people.

The project activity is solar renewable energy project to use electricity generated for captive purpose. The project activity thus reduces GHG emissions by displacing the fossil fuel dominated grid-based electricity with renewable electricity. The project activity provides direct and indirect employment opportunities for local persons towards installation, operation, and maintenance of the proposed project activity. The project has resulted in increasing business opportunities for local contractors and suppliers during the various phases. Project contributes towards following sustainable development goals achievement during the current monitoring period which are outlined below:

SDG - 7 : Ensure access to affordable, reliable, sustainable, and modern energy for all.SDG - 8: Promote sustained, inclusive, and sustainable economic growth, full and productive employment, Equal pay, and decent work for all and protect labour rights and promote safe working environment.

SDG - 13: Climate Action: Take urgent action to combat climate change and its impacts.

Row number	SDG Target	SDG Indicator	Net Impact on SDG Indicator	Current Project Contributions	Contributions Over Project Lifetime
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Sequential row number	SDG Target number	Number and text of SDG indicator or, if no official SDG indicator is applicable, user-defined indicator	Indicate the project's contribution to the SDG Indicator (implemented activities to increase or decrease)	Brief description of the quantifiable impact of the project's activities related to the SDG indicator, during the monitoring period.	Brief description of the cumulative quantifiable impact of the project's activities related to the SDG indicator, over the project lifetime.
1	7.2	7.2.1 Renewable energy share in the total final energy consumption	Implemented activities to increase	About 14447MWh/year renewable electricity is supplied to the grid that helps in the increase renewable energy share in the energy mix.	The project activity is expected to generate 14447 MWh/Year. So for total crediting period 1,01,129 MWh of renewable energy will be generated. Thus, the project is contributing towards SDG 7.2.1 by increasing the renewable energy share.
2	8.5	8.5.2 Unemployment rate, by sex, age and persons with disabilities	Implemented activities to increase	The Project activity provides employment to people.	The Project activity has given employment to 10 people, thus the project is contributing towards SDG 8.5.2 by increasing the employment opportunities to the local people.
3	13.2	13.2.2. Total greenhouse gas emissions per year	Implemented activities to decrease	By supplying 14447 MWh/year clean electricity to Indian grid, the project avoided the release of 13511 tCO ₂ e/year into the atmosphere during the reporting period.	The Project Activity is expected to reduce 13,735 tCO ₂ e/year during the whole crediting period. Thus, the project is contributing towards SDG 13.2.2 by decreasing the CO ₂ emissions.

1.19 Additional Information Relevant to the Project

1.19.1 Leakage Management

Since the project activity is renewable energy projects based on solar technology, no leakage emissions are considered - in line with paragraph 29 of the small-scale methodology AMS.I. F (version 5.0).

Thus, leakage management plan and implementation of leakage and risk mitigation measures are not applicable for this project activity.

1.19.2 Commercially Sensitive Information

Not applicable. No commercially sensitive information has been excluded from the public version of the project description. There is no commercially sensitive information

2 SAFEGUARDS AND STAKEHOLDER ENGAGEMENT

2.1 Stakeholder Engagement and Consultation

2.1.1 Stakeholder Identification

Stakeholder Identification	Following stakeholders have been identified for this project activity by analyzing the beneficiaries /people who are directly affected in daily life by the project activity, impact of local/regional/provincial/national government policies in implementation and operation of the project activity, other groups having social/political influences in the project location. 1. Local community members 2. Company Representatives. 3. Technology Providers. 4. Safety and Electricity Board Authorities.
Legal or customary tenure/access rights	Local community members have access to the project site if they want to share any feedback/grievance about the project activity.
Stakeholder diversity and changes over time	Stakeholders identified for this project activity are diverse in nature –in terms of socio-economic status, age and gender wise and the diversity is unlikely to change over time.
Expected changes in well-being	Expected changes. 1. Economic well-being the project activity is likely to provide employments to the locality thus economic well beings are expected 2. Environmental well-being as this project activity cuts down GHG emissions in the atmosphere generating electricity using solar energy based solar PV technology; thus, it will bring environmental well-being in the locality

Location of stakeholders	Attur,Salem Rajapalyam,Virudhunagar, Mulanur,Tiruppur Avinashipalayam,Tiruppur
Location of resources	Not Applicable

2.1.2 Stakeholder Consultation and Ongoing Communication

Date of stakeholder consultation	<table border="1"> <tr> <td>Ascen Tex Private Limited</td><td>19/11/2021</td></tr> <tr> <td>Sri Jayajothi Power Management Company private limited</td><td>31/03/2022</td></tr> <tr> <td>Shri Harikrishna Cotton Mills Private Limited</td><td>18/07/2022</td></tr> <tr> <td>KM Knitwear Private Limited</td><td>25/05/2022</td></tr> </table>	Ascen Tex Private Limited	19/11/2021	Sri Jayajothi Power Management Company private limited	31/03/2022	Shri Harikrishna Cotton Mills Private Limited	18/07/2022	KM Knitwear Private Limited	25/05/2022
Ascen Tex Private Limited	19/11/2021								
Sri Jayajothi Power Management Company private limited	31/03/2022								
Shri Harikrishna Cotton Mills Private Limited	18/07/2022								
KM Knitwear Private Limited	25/05/2022								
Stakeholder engagement process	1.Identified stakeholders were local community members i.e., local villagers/ 2.Stakeholders were invited through public notice. 3. Language used in invitation to stakeholders is Tamil (Local Language).								
Consultation outcome	The meeting was outlined towards making aware local stakeholders about the project activity that involves electricity generation using solar energy through solar PV technology with the primary objective of reducing emissions of GHGs in compared to pre project or baseline scenario. The feedback/comments received from stakeholders were quite positive and no negative comments were received.								
Ongoing communication	Stakeholders' consultation is a continuous process and hence a feedback register is kept at the project site office where any stakeholder can come and share his/her feedback.								
Stakeholder input	The feedbacks/comments received from stakeholders were quite positive and no negative comments were received.								

2.1.3 Free Prior and Informed Consent

Obtaining consent	Consent for implementing project activity was received from Safety and Electricity Board authorities.
Outcome of FPIC	The project has not encroached on land, relocated people without consent, and forced physical or economic displacement.

2.1.4 Grievance Redress Procedure

Development process	Feedback register is kept at project site office where any stakeholder can come and register his/her feedback.
Grievance redress procedure	Stakeholders' feedback are monitored daily and any grievance if found, resolved immediately.

2.1.5 Public Comments

As per section 3.18.6 of the VCS Standard, Version 4.5, all projects are subject to a 30-day public comment period. The date on which the project is listed on the project pipeline marks the beginning of the project's 30-day public comment period. The project was open for comment from 17/05/2023 to 16/06/2023 and there was no comments received during the period.

Comments received	Actions taken
No comments received	Not Applicable

2.2 Risks to Stakeholders and the Environment

	Risks identified	Mitigation or preventative measure taken
Natural and human-induced risks to stakeholders' wellbeing	No natural and human induced risks to stakeholder is anticipated.	No mitigation or preventive measure is required as no risk has been identified
Risks to stakeholder participation	No risk to stakeholder participation is anticipated.	No mitigation or preventive measure is required as no risk has been identified
Working conditions	No risk identified.	PP has taken all measures to ensure proper working condition by implementing EHS policy

Safety of women and girls	No risk identified	PP ensures safety of women and girls in the project site and abide by the relevant national laws
Safety of minority and marginalized groups, including children	No risk identified	PP ensures safety of minority and marginalized groups, including children in the project site as per the local laws
Pollutants (air, noise, discharges to water, generation of waste, and release of hazardous materials and chemical pesticides and fertilizers)	No risk identified	There is negligible pollution in air, noise, water due to implementation and operation of the project activity.

2.3 Respect for Human Rights and Equity

2.3.1 Labor and Work

Discrimination and sexual harassment	PP shall oblige to create a workplace free of sexual harassment and no discrimination as per local law and same will be demonstrated during validation assessment process.
Management experience	
Gender equity in labor and work	PP has assured that it does not discriminate in workers with respect to gender in providing jobs and there is no discrimination in respect to wages between genders.
Human trafficking, forced labor, and child labor	PP has assured that project activity does not and will not use victims of human trafficking, forced labor, and child labor.

2.3.2 Human Rights

PP has assured that there will be no human rights violation of any kind to any of the stakeholders during construction and operation of the project activity.

2.3.3 Indigenous Peoples and Cultural Heritage

PP is committed to protecting regional as well as national cultural heritage.

2.3.4 Property Rights

Rights to territories and resources	Not Applicable
Respect for property rights	Not Applicable

2.3.5 Benefit Sharing

Process used to design the benefit sharing plan	Not Applicable
Summary of the benefit sharing plan	Not Applicable
Approval and dissemination of benefit sharing plan	Not Applicable

2.4 Ecosystem Health

	Risks identified	Mitigation or preventative measure taken
Impacts on biodiversity and ecosystems	No risk identified	No impact on biodiversity is likely to be caused
Soil degradation and soil erosion	No risk identified	No soil erosion and degradation are likely to be caused
Water consumption and stress	No risk identified	Water consumption will be of moderate level and hence stress is likely to be caused
Usage of fertilizers	No risk identified	No fertilized is used

2.4.1 Rare, Threatened, and Endangered species

Is the project located in or adjacent to habitats for rare, threatened, or endangered species?

☐ Yes

☒ No

2.4.2 Introduction of species

Not Applicable

2.4.3 Ecosystem conversion

Not Applicable.

3 APPLICATION OF METHODOLOGY

3.1 Title and Reference of Methodology

Type (methodology, tool or module).	Reference ID, if applicable	Title	Version
Methodology	AMS-I.F.	Renewable Electricity Generation for captive use and Mini grid ⁶	5.0
Tool	07	Tool to calculate the emission factor for an electricity system ⁷	07.0
Tool	21 ⁸	Demonstration of additionality of small-scale project activities	13.1

⁶ <https://cdm.unfccc.int/UserManagement/FileStorage/I1P3XEBCJ0625DUALGSNO79R8FWY4V>

⁷ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf>

⁸ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf>

3.2 Applicability of Methodology

Applicability conditions - AMS I.F., Version 5.0

Methodology ID	Applicability condition	Justification of compliance
AMS-I.F. Renewable Electricity Generation for captive use and Mini-grid	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 one or more sources listed below: (a) A national or a regional grid (grid hereafter); (b) A fossil fuel fired captive power plant; (c) A carbon intensive mini-grid.	The project activity comprises of renewable electricity generation using solar energy units which supply power to grid, to the users through grid network and/or in house captive consumption. The solar plant unit is located at the respective rooftop of the mentioned site at section 1. The project activity will displace electricity from INDAN Grid, which is supplied by predominantly fossil fuel plants. The project activity would replace equivalent quantum of fossil fuel dominated grid power that's being used prior to the project activity. Hence, the project activity justifies this applicability conditions
...	This methodology is applicable for project activities that: (a) Install a new power plant at a site where there was no renewable energy power plant operating prior	The project activity is installation of greenfield power plants. Hence the condition (a) justifies by the project activity

	to the implementation of the project activity (Greenfield plant); (b) Involve a capacity addition (c) Involve a retrofit of (an) existing plant(s); or (d) Involve a replacement of (an) existing plant(s)	
	In the case of project activities that involve the capacity addition of renewable energy generation units at an existing renewable power generation facility, the added capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	Project Activity is not capacity addition, and it is green field installation. Hence this condition is not applicable.
	In the case of retrofit or replacement, to qualify as a small-scale project, the total output of the retrofitted or replacement unit shall not exceed the limit of 15 MW.	This Project activity is not a retrofit or replacement of existing project activity. Hence this condition is not applicable.
	If the unit added 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 unit added co-fires fossil fuel the capacity of	The project activity does not have a non-renewable component. Hence this condition is not applicable.

	the entire unit shall not exceed the limit of 15 MW.	
	Combined heat and power (co-generation) systems are not eligible under this category	The project activity does not involve with co-generation. Hence this condition is not applicable.
	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 an existing reservoir with no change in the volume of reservoir; (b)The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity, 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	Project activity does not include hydro power generation. Hence this condition is not applicable.
	If electricity and/or steam/heat produced by the project activity is delivered to a third party, i.e. another facility or facilities within the project boundary, a contract between the supplier and	The Project generate electricity primarily to deliver to captive consumers and excess electricity is to be supplied to the grid therefore no double counting in emission

	consumer(s) of the energy will have to be entered that ensures that there is no double counting of emission reductions	reductions. Hence this condition is not applicable.
	In the case the project activities utilizes biomass, the “TOOL16: Project and leakage emissions from biomass” shall be applied to determine the relevant project emissions from the cultivation of biomass and the utilization of biomass or biomass residues.	The project activity does not involve with biomass usage. Hence this condition is not applicable.

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 below.

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 ⁹ 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	√		

Applicability conditions -Tool 7

⁹ The sum of installed capacities of all generators connected to the mini-grid is equal to or less than 15 MW.

Tool ID	Applicability condition	Justification of compliance
Tool 07- Tool to calculate the emission factor for an electricity system- Version 07.0	This tool may be applied to estimate the OM, BM and/or CM when calculating baseline emissions for a project activity that substitutes grid electricity that is where a project activity supplies electricity to a grid or a project activity that results in savings of electricity that would have been provided by the grid (e.g. demand-side energy efficiency projects).	The project is a grid connected Greenfield solar power project and thus the tool is applicable
...	Under this tool, the emission factor for the project electricity system can be calculated either for grid power plants only or, as an option, can include off-grid power plants. In the latter case, two sub-options under the step 2 of the tool are available to the project participants, i.e. option IIa and option IIb. If option IIa is chosen, the conditions specified in "Appendix 1: Procedures related to off-grid power generation" should be met. Namely, the total capacity of off-grid power plants (in MW) should be at least 10 per cent of the total capacity of grid power plants in the electricity system; or the	Since the project activity is off grid, this condition is applicable and the emission factor has been calculated accordingly.

	total electricity generation by off-grid power plants (in MWh) should be at least 10 per cent of the total electricity generation by grid power plants in the electricity system; and that factors which negatively affect the reliability and stability of the grid are primarily due to constraints in generation and not to other aspects such as transmission capacity.	
	In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country	Project activity is in INDIA ,a non-Annex I country and hence the tool is applicable
	Under this tool, the value applied to the CO2 emission factor of biofuels is zero	The project activity is a solar project and there is no involvement of biofuels. Hence this condition is not applicable.

Applicability conditions -Tool 21

Tool ID	Applicability condition	Justification of compliance
Demonstration of additionality of small scale project activities Version 13.1	The use of the methodological tool “Demonstration of additionality of small-scale project activities” is not mandatory for project participants when proposing new methodologies. Project participants and	This condition is applicable. The project participants not proposing new methodology.

	coordinating/managing entities may propose alternative methods to demonstrate additionality for consideration by the Executive Board	
...	Project participants and coordinating/managing entities may also apply "Tool for Demonstration of additionality of microscale project" as applicable.	This condition is not applicable as project is not a microscale project activity.

3.3 Project Boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Grid connected electricity generation	CO2	Yes	Main emission source
		CH4	NO	Minor emission source
		N2O	NO	Minor emission source
Project	Greenfield Solar Power Project activity	CO2	NO	No CO2 emissions are emitted from the project
		CH4	NO	Project activity does not emit CH4
		N2O	NO	Project activity does not emit N2O

The solar power plant will be rooftop, and main purpose is captive.

The pictorial depiction of the project boundary is given

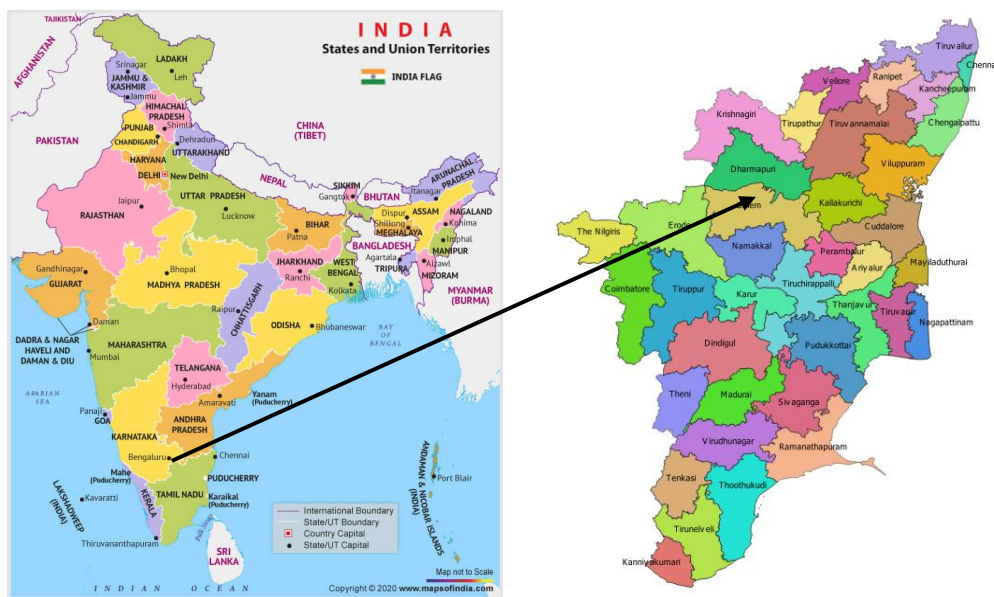
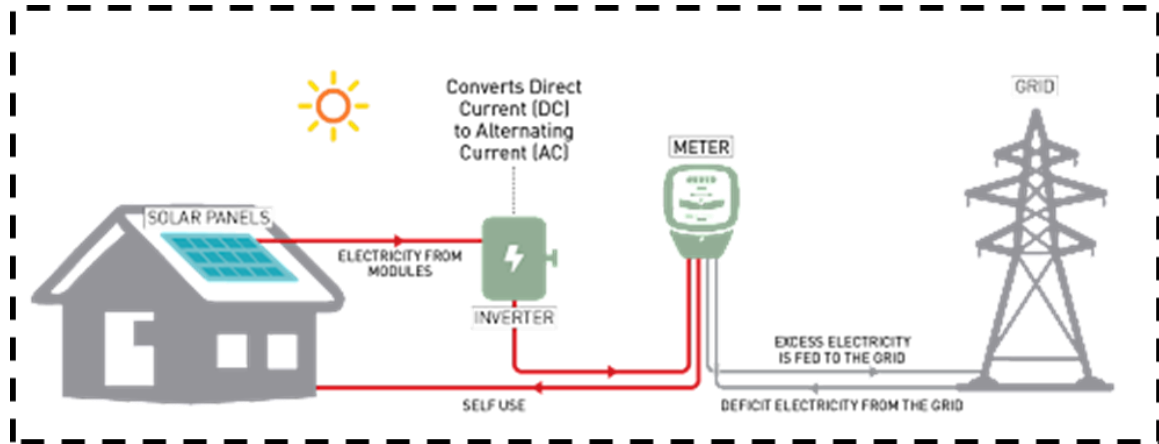


Figure 1 - INDIA MAP AND TAMILNADU DISTRICT MAP



Figure 2- Google Earth Image of Shri Harikrishna Cotton Mills Private limited



Figure 3- Google Earth Image of KM SPINNING DIVISION



Figure 4- Google Earth Image of KM Unit 14



Figure 5 -Google Earth Image of Sri Jayajothi Power Management Company Private Limited UNIT I & PC UNIT



Figure 6- Google Earth Image of Sri Jayajothi Power Management Company Private Limited UNIT II



Figure 7- Google Earth Image of Sri Jayajothi Power Management Company Private Limited OE UNIT



Figure 8- Google Earth Image of Ascen Tex Private Limited

3.4 Baseline Scenario

As per the applicable methodology, a Greenfield power plant is defined as “a new renewable energy power plant that is constructed and operated at a site where no renewable energy powerplant was operated prior to the implementation of the project activity”.

As per para 21 of AMS I.F Version 5.0; “For project activities that displace grid electricity and fossil fuel fired on-site captive electricity, the baseline emission factor should reflect the emissions intensity of the grid and the captive power plant in the baseline scenario i.e., the weighted average emission factor for the displaced electricity is calculated using values based on the historical, prior three-year ratios of electricity from captive plants and the grid. For new facilities, the most conservative (lowest) of the emission factor for the two power sources should be used.

The combined margin of the INDIAN National Grid used for the project activity is as follows:¹⁰

Parameter	Value	Nomenclature	Source
-----------	-------	--------------	--------

¹⁰ https://cea.nic.in/wp-content/uploads/baseline/2023/01/Approved_report_emission_2021_22.pdf

EF _{grid,CM,y}	0.9352 tCO ₂ /MWh	Combined margin CO ₂ emission factor for the project electricity system in year y	Calculated as the weighted average of the operating margin (0.75) & build margin (0.25) values, sourced from Baseline CO ₂ Emission Database, Version 19.0 November 2023, published by Central Electricity Authority (CEA), Government of India. ¹¹
EF _{grid,OM,y}	0.9580 tCO ₂ /MWh	Operating margin CO ₂ emission factor for the project electricity system in year y	Calculated as the last 3 years (2020-21,2021-22,2022 -23) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 19.0 November 2023, published by Central Electricity Authority (CEA), Government of India. ¹²
EF _{grid,BM,y}	0.8670 tCO ₂ /MWh	Build margin CO ₂ emission factor for the project electricity system in year y	Baseline Version 19.0 November 2023, published by Central Electricity Authority (CEA), Government of India. ¹³

Hence, the baseline for the project activity is the equivalent amount of power from the INDIAN grid. The combined margin (EFCO₂, y) is the result of a weighted average of two emission factor pertaining to the electricity system: the operating margin (OM) (having weightage 75%) and buildmargin (BM) (having weightage 25%). Calculations for this combined margin must be based on data from an official source of CEA database (where available) and made publicly available.

3.5 Additionality

¹¹ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

¹² <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

¹³ <https://cea.nic.in/cdm-co2-baseline-database/?lang=en>

The additionality of the Project shall be demonstrated by applying the following approach, consisting of two components:

- (i) A Legal Requirement Test; and
- (ii) An Additionality Test either based on a Positive List test or a projects-specific additionality test.

a) Legal Requirement Test

The project is not enforced by law. The project passes the legal requirement test since there are no enforced laws, statutes, regulations, court orders, environmental-mitigation agreements, permitting conditions of other legally binding mandates requiring its implementation. Since voluntary commitments/agreements within a sector or by an entity do not constitute the legal requirement, the outcome of the legal requirement test is concluded as positive.

b) Additionality Test

Additionality Assessment

As per the Para 11 of TOOL21- Demonstration of additionality of smallscale project activities Version 12.0 ,Documentation of barriers is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW).

The project activity is set up to generate solar electricity for meeting the captive requirement of the industrial premises and surplus electricity, in case of any exigency scenarios will be exported to the grid through a net metering arrangement with the State Electricity Board. The capacity of the solar rooftop installation is limited to contracted load at the industrial premises and the electricity generated is primarily used for captive use. VVB can verify the actual electricity exported to the grid during every monitoring period which shall be less than 50% of the total electricity generated.

We acknowledge that Table 1 of the VCS Standard v4.5 excludes grid-connected electricity generation activities using solar PV from the scope of the VCS program. However, we emphasize that our project's primary objective of solar generation is to meet captive use and net metering is done only for allowing us to supply surplus energy in case of any exigency scenarios.

According to the VCS Program Definitions, v4.5, Grid-Connected Electricity Generation is "The generation of electricity primarily for delivery to a national or regional grid where at least 50% of annual electricity generation (by quantity of energy, not capacity) is planned to be delivered to such a grid. Generation of electricity for on-site self-consumption, delivery to a micro-grid, distributed mini-grid, or off grid consumption is not included in this

definition". Our project activity conforms that actual electricity exported to the grid only in exigency situations shall be less than 50% of the total electricity generated. Thus, our project does not fall under the definition of Grid connected Electricity Generation project.

The project activity does not fall under the definition of 'grid connected' project, as the solar electricity generated from rooftop installation shall be primarily used for captive purpose and the connection to the grid is for exporting electricity to grid during unforeseen scenario, TOOL 21 PARA 11(A) is applicable to prove additionality.

Since project activity is installation of solar photovoltaic units at various locations with capacity equals to 8.0216 MW which is less than 15 MW, it can be concluded that the project activity is automatically additional and does not require demonstration of barriers. Thus, it is well established that the proposed project activity is additional.

3.5.1 Regulatory Surplus

Is the project located in an UNFCCC Annex 1 or Non-Annex 1 country?

☐ Annex 1 country ☒ Non-Annex 1 country

Are the project activities mandated by any law, statute, or other regulatory framework?

☐ Yes ☒ No

If the project is located inside a Non-Annex 1 country and the project activities are mandated by a law, statute, or other regulatory framework, are such laws, statutes, or regulatory frameworks systematically enforced?

☐ Yes ☒ No

3.5.2 Additionality Methods

As per the Para 11 of TOOL21- Demonstration of additionality of smallscale project activities Version 12.0 Documentation of barriers is not required for the positive list of technologies and project activity types that are defined as automatically additional for project sizes up to and including the small-scale CDM thresholds (e.g. installed capacity up to 15 MW)

The project activity is set up to generate solar electricity for meeting the captive requirement of the industrial premises and surplus electricity, in case of any exigency scenarios will be exported to the grid through a net metering arrangement with the State Electricity Board. The capacity of the solar rooftop installation is limited to contracted load at the industrial premises and the electricity generated is primarily used for captive use. VVB can verify the

actual electricity exported to the grid during every monitoring period which shall be less than 50% of the total electricity generated.

We acknowledge that Table 1 of the VCS Standard v4.5 excludes grid-connected electricity generation activities using solar PV from the scope of the VCS program. However, we emphasize that our project's primary objective of solar generation is to meet captive use and net metering is done only for allowing us to supply surplus energy in case of any exigency scenarios.

According to the VCS Program Definitions, v4.5, Grid-Connected Electricity Generation is "The generation of electricity primarily for delivery to a national or regional grid where at least 50% of annual electricity generation (by quantity of energy, not capacity) is planned to be delivered to such a grid. Generation of electricity for on-site self-consumption, delivery to a micro-grid, distributed mini-grid, or off grid consumption is not included in this definition". Our project activity conforms that actual electricity exported to the grid only in exigency situations shall be less than 50% of the total electricity generated.

The project activity does not fall under the definition of 'grid connected' project, as the solar electricity generated from rooftop installation shall be primarily used for captive purpose and the connection to the grid is for exporting electricity to grid during unforeseen scenario, TOOL 21 para 11(A) is applicable to prove additionality.

Since project activity is installation of solar photovoltaic units at various locations with capacity is 8.0216 MW which is less than 15 MW, it can be concluded that the project activity is automatically additional and does not require demonstration of barriers. Thus, it is well established that the proposed project activity is additional.

3.6 Methodology Deviations

Not Applicable

4 QUANTIFICATION OF ESTIMATED GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

For Solar grid connected systems:

As per para 20 of AMS-I.F. version 5.0, the Baseline emissions for other systems are the product of amount electricity displaced with the electricity produced by the renewable generating unit and an emission factor.

$$BE_y = E_{GBL, y} \times EF_{CO_2, y}$$

Where:

BE_y = Baseline emissions in year y (tCO₂/yr)

$E_{GBL, y}$ = Quantity of net electricity generation that is produced and fed into the grid because of the implementation of the CDM project activity in year y (MWh/yr)

$EF_{CO_2, y}$ = Emission factor (tCO₂/MWh)

Emission factor of a grid shall be calculated as per the procedures provided in AMS-I. F .

The spatial extent of the project boundary includes industrial, commercial facilities consuming energy generated by the system. In the case of electricity generated and supplied to distributed users (e.g., residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of renewable generating units. The boundary also extends to the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to.

- Emission factor for captive electricity generation shall be calculated as per the procedures described in the latest version of the “Tool to calculate baseline, project and/or leakage emissions from electricity consumption”

As per methodology, combined grid emission factor as per the “Tool to calculate the emission factor for an electricity system” version 07 is calculated as below.

CO₂ Baseline Database for the Indian Power Sector, Version 19, November 2023 published by Central Electricity Authority (CEA), Government of India has been used for the calculation of emission reduction.¹⁴

As per Methodological tool: Tool to calculate the emission factor for an electricity system (Version 7.0, EB 100, Annex 4), following six steps have been followed:

- Step 1:** Identify the relevant electricity systems.
- Step 2:** Choose whether to include off-grid power plants in the project electricity system (optional);
- Step 3:** Select a method to determine the operating margin (OM);
- Step 4:** Calculate the operating margin emission factor according to the selected method.
- Step 5:** Calculate the build margin (BM) emission factor.
- Step 6:** Calculate the combined margin (CM) emission factor

¹⁴ [CO₂ DatabaseVersion 19 2022 23.xlsx \(live.com\)](#)

Step 1: Identify the relevant electricity systems

As described in tool “For determining the electricity emission factors, identify the relevant project electricity system. Similarly, identify any connected electricity systems”. It also states that “If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used”. Keeping this into consideration, the Central Electricity Authority (CEA), Government of India have Indian grid.

However, since August 2006, however, all regional grids except the Southern Grid had been integrated and were operating in synchronous mode, i.e., at same frequency. Consequently, the Northern, Eastern, Western and North-Eastern grids were treated as a single grid named as NEWNE grid from FY 2007-08 onwards for the purpose of this CO2 Baseline Database. As of 31 December 2013, the Southern grid has also been synchronized with the NEWNE grid, hence forming one unified Indian Grid. Since the project supplies electricity to the Indian grid, emissions generated due to the electricity generated by the Indian grid as per CM calculations will serve as the baseline for this project.

Table: Geographical Scope of Indian Electricity Grid

Northern	Eastern	Western	Northeastern	Southern
Chandigarh	Bihar	Chhattisgarh	Arunachal Pradesh	Andhra Pradesh
Delhi	Jharkhand	Gujarat	Assam	Karnataka
Haryana	Orissa	Daman & Diu	Manipur	Kerala
Himachal Pradesh	West Bengal	Dadar & Nagar Haveli	Meghalaya	Tamil Nadu
Jammu & Kashmir	Sikkim	Madhya Pradesh	Mizoram	Telangana
Punjab	Andaman & Nicobar	Maharashtra	Nagaland	Puducherry
Rajasthan		Goa	Tripura	Lakshadweep
Uttar Pradesh				
Uttarakhand				

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

The project owner may choose between the following two options to calculate the operating margin and build margin emission factor:

Option I: Only grid power plants are included in the calculation.

Option II: Both grid power plants and off-grid power plants are included in the calculation. The project owner has chosen only grid power plants in the calculation.

Step 3: Select a method to determine the operating margin (OM)

The calculation of the operating margin emission factor (EF_{grid, OM,y}) is based on one of the following methods, which are described under Step 4:

- (a) Simple OM; or
- (b) Simple adjusted OM; or
- (c) Dispatch data analysis OM; or
- (d) Average OM.

The data required to calculate Simple adjusted OM and Dispatch data analysis OM is not possible due to lack of availability of data to project developers. The choice of other two options for calculating operating margin emission factor depends on generation of electricity from low-cost/ must-run sources. In the context of the methodology low cost/must run resources typically include hydro, geothermal, solar, low-cost biomass, nuclear and solar generation.

Share of Must-Run (Hydro/Nuclear) (% of Net Generation)

	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
India	14.6%	14.3%	14.5%	17.0%	16.5%	15.8%	15.33%

Data Source: Central Electricity Authority (CEA) database Version 19, November 2023

The above data clearly shows that the percentage of total grid generation by low-cost/ must-run plants (based on average of five most recent years) for the Indian grid is less than 50 % of the total generation. Thus, the Average OM method cannot be applied, as low cost/must run resources constitute less than 50% of total grid generation.

The simple OM emission factor is calculated as the generation-weighted average CO₂ emissions per unit net electricity generation (tCO₂/MWh) of all generating power plants serving the system, not including low-cost/must-run power plants/units.

For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the two following data vintages:

Ex-ante option: if the ex-ante option is chosen, the emission factor is determined once at the validation stage, thus no monitoring and recalculation of the emissions factor during the crediting period is required.

Ex-post option: if the ex-post option is chosen, the emission factor is determined for the year in which the project activity displaces grid electricity, requiring the emissions factor to be updated annually during monitoring.

Project Owner has chosen ex-ante option for calculation of Simple OM emission factor using a 3-year generation-weighted average, based on the most recent data available at the time of submission of the PD to the VVB for validation.

OM determined at validation stage will be the same throughout the crediting period. There will be no requirement to monitor & recalculate the emission factor during the crediting period.

Step 4: Calculate the operating margin emission factor (EF_{grid,OMSimple,y})

The operating margin emission factor has been calculated using a 3-year data vintage

The operating margin emission factor has been calculated using a 3-year data vintage¹⁵

Net Generation in Operating Margin (GWH) (incl. Imports)	2020-21	2021-22	2022-23
INDIAN Grid	958,218	10,35,672	11,17,845.66
Simple Operating Margin (tCO ₂ /MWh) (incl. Imports)	2020-21	2021-22	2022-23
INDIAN Grid	0.9402	0.9605	0.971

Weighted Generation Operating Margin	
INDIAN Grid	0.9580

Step 5: Calculate the build margin (BM) emission factor (EF_{grid,BM,y})

As per Methodological tool: "Tool to calculate the emission factor for an electricity system" (Version 7.0, EB 100, Annex 4) para 72:

In terms of vintage of data, the project owner can choose between one of the following two options:

(a) **Option 1** - for the first crediting period, calculate the build margin emission factor ex ante based on the most recent information available on units already built for sample group m at the time of PD submission to the VVB for validation. For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the VVB. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used. This option

¹⁵ CO2 DatabaseVersion 19 2022 23.xlsx (live.com)

does not require monitoring the emission factor during the crediting period.

(b) **Option 2** - For the first crediting period, the build margin emission factor shall be updated annually, ex post, including those units built up to the year of registration of the project activity or, if information up to the year of registration is not yet available, including those units built up to the latest year for which information is available. For the second crediting period, the build margin emissions factor shall be calculated ex ante, as described in Option 1 above. For the third crediting period, the build margin emission factor calculated for the second crediting period should be used.

Option 1 as described above is chosen by Project Owner to calculate the build margin emission factor for the project activity. BM is calculated ex-ante based on the most recent information available at the time of submission of PD and is fixed for the entire crediting period.

Build Margin (tCO ₂ /MWh) (not adjusted for imports)	
2022-23	
INDIAN Grid	0.8670

Step 6: Calculate the combined margin (CM) emission factor (EF_{grid,CM,y})

As per Methodological tool: “Tool to calculate the emission factor for an electricity system” (Version 7.0, EB 100, Annex 4) para 81:

The calculation of the combined margin (CM) emission factor (EF_{grid, CM,y}) is based on one of the following methods:

(a) Weighted average CM; or

(b) Simplified CM.

Project Owner has chosen option (a) i.e weighted average CM to calculate the combined margin emission factor for the project activity.

The combined margin emissions factor is calculated as follows:

$$EF_{grid, CM,y} = EF_{grid, OM,y} * W_{OM} + EF_{grid, BM,y} * W_{BM}$$

Where:

EF_{grid, BM,y} = Build margin CO₂ emission factor in year y (tCO₂/MWh)

EF_{grid, OM,y} = Operating margin CO₂ emission factor in year y (t CO₂/MWh)

W_{OM} = Weighting of operating margin emissions factor (per cent)

W_{BM} = Weighting of build margin emissions factor (per cent)

The following default values should be used for W_{OM} and W_{BM} :

For solar project activities: $W_{OM} = 0.75$ and $W_{BM} = 0.25$ (owing to their intermittent and non-dispatchable nature) for the second crediting period and for subsequent crediting periods. Since project activity is of power generation by using solar, the above weightage has been considered for OM and BM.

Therefore, $EF_{grid, CM, y} = 0.867 * 0.25 + 0.9580 * 0.75$

$$= 0.9352 \text{ tCO}_2 \text{ e/MWh}$$

Therefore, referring to para 21 AMS I.F. Version 5.0, the $EF_{CO_2, y}$ for grid connected and mini grid project would be $EF_{grid, CM, y}$ i.e. $0.9352 \text{ tCO}_2 \text{ e/MWh}$. The baseline emission factor is ex-ante parameter and will remain constant throughout the crediting period.

$$BE_y = 14447 \times 0.9352 = 13511 \text{ tCO}_2 \text{ e (first year of operation)}$$

4.2 Project Emissions

As per the approved consolidated Methodology AMS I.F. Version 5.0 para 26 "For most renewable energy power generation project activities, $PE_y = 0$. However, some project activities may involve project emissions that can be significant. These emissions shall be accounted for as project emissions by using the following equation:

$$PE_y = PE_{FF, y} + PEGP_{, y} + PE_{HP, y}$$

Where:

PE_y = Project emissions in year y (t $\text{CO}_2 \text{ e/yr}$)

$PE_{FF, y}$ = Project emissions from fossil fuel consumption in year y (t $\text{CO}_2 \text{ e/yr}$)

$PE_{GP, y}$ = Project emissions from the operation of dry, flash steam or binary geothermal powerplants in year y (t $\text{CO}_2 \text{ e/yr}$)

$PE_{HP, y}$ = Project emissions from water reservoirs of hydro power plants in year y (t $\text{CO}_2 \text{ e/yr}$)

4.3 Leakage Emissions

Since the project activity is renewable energy projects based on solar PV technology, no leakage emissions are considered - in line with paragraph 29 of the small-scale methodology AMS.I. F Version 5.

4.4 Estimated GHG Emission Reductions and Carbon Dioxide Removals

As per the para 30 of AMS-I.F. version 5.0, the formula to calculate the

emissionreduction is $ER_y = BE_y - PE_y - LE_y$

As the project activity is a solar project, there is not any leakage emission from the projectactivity.

Hence, $LE_y = 0$, therefore, Emission Reductions for this project activity are calculated as follows: $ER_y = BE_y - PE_y$

Where:

ER_y = Emission reductions in year y (t CO₂e/yr)
 BE_y = Baseline emissions in year y (t CO₂/yr)
 PE_y = Project emissions in year y (t CO₂e/yr)

Vintage period	Estimated baseline emissions (tCO ₂ e)	Estimated project emissions (tCO ₂ e)	Estimated leakage emissions (tCO ₂ e)	Estimated reduction VCU (tCO ₂ e)	Estimated removal VCU (tCO ₂ e)	Estimated total VCUs (tCO ₂ e)
(05/01/2023 to 31/12/2023)	13363	0	0	13363	0	13363
(01/01/2024 to 31/12/2024)	13511	0	0	13511	0	13511
(01/01/2025 to 31/12/2025)	13511	0	0	13511	0	13511
(01/01/2026 to 31/12/2026)	13511	0	0	13511	0	13511
(01/01/2027 to 31/12/2027)	13511	0	0	13511	0	13511
(01/01/2028 to 31/12/2028)	13511	0	0	13511	0	13511
(01/01/2029 to 31/12/2029)	13511	0	0	13511	0	13511
01/01/2030 to 04/01/2030	148	0	0	148	0	148
Total	94577	0	0	94577	0	94577

5 MONITORING

5.1 Data and Parameters Available at Validation

Data / Parameter	EF _{grid, OM, y}
Data unit	tCO ₂ e/MWh
Description	Operating Margin CO ₂ emission factor in year y
Source of data	CO ₂ Emission Database, Version 19.0 November 2023, published by Central Electricity Authority (CEA), Government of India ¹⁶ . ¹⁷
Value applied:	0.9580
Justification of choice of data or description of measurement methods and procedures applied	Calculated as the last 3-year (2020-21,2021-22,2022 -23) generation-weighted average, sourced from Baseline CO ₂ Emission Database, Version 19.0 ¹⁸ , November 2023 published by Central Electricity Authority (CEA), Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	

Data / Parameter	EF _{grid, BM, y}
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¹⁶ [CO2_DatabaseVersion_19_2022_23.xlsx \(live.com\)](#)

¹⁷ [CO2_DatabaseVersion_19_2022_23.xlsx \(live.com\)](#)

¹⁸ [CO2_DatabaseVersion_19_2022_23.xlsx \(live.com\)](#)

Data unit	tCO ₂ e/MWh
Description	Build Margin CO ₂ emission factor in year y
Source of data	CO ₂ Emission Database Version 19.0 November 2023 ¹⁹ , published by Central Electricity Authority (CEA), Government of India.
Value applied:	0.8670
Justification of choice of data or description of measurement methods and procedures applied	Calculated as the last year (2022-23) build margin, sourced from Baseline CO ₂ Emission Database Version 19.0 November 2023, published by Central Electricity Authority (CEA), Government of India.
Purpose of Data	For the calculation of the Baseline Emission
Comments	-

Data / Parameter	EF _{grid, CM, y}
Data unit	tCO ₂ e/MWh
Description	Combined Margin CO ₂ emission factor in year y
Source of data	CO ₂ Emission Database, Version 19.0 November 2023 published by Central Electricity Authority (CEA), Government of India ²⁰
Value applied:	0.9352

¹⁹ [CO2_DatabaseVersion_19_2022_23.xlsx \(live.com\)](#)

²⁰ [CO2_DatabaseVersion_19_2022_23.xlsx \(live.com\)](#)

Justification of choice of data or description of measurement methods and procedures applied

The combined margin emissions factor is calculated as follows:

$$EF_{grid, CM, y} = EF_{grid, OM, y} \cdot W_{OM} + EF_{grid, BM, y} \cdot W_{BM}$$

$$= (0.75 \cdot 0.9580) + (0.25 \cdot 0.8670) = 0.9352$$

5.2 Data and Parameters Monitored

Data / Parameter	EG _{grid final}
Data unit	MWh
Description	Quantity of net electricity exported by the project activity to the grid
Source of data	HT Metering Slip/Metering Card/HT Monthly bill
Description of measurement methods and procedures to be applied	The quantity of electricity exported to the grid is recorded monthly in HT reading card and the same can be cross checked in Monthly bill.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value applied	Will be less than 50% of the total electricity generated
Monitoring equipment	The detail of the bidirectional meters is included in section 5.3.
QA/QC procedures to be applied	The calibration of meters is in accordance with national standards.
Purpose of data	To ensure that only less than 50% of the total electricity generated is exported to the grid.
Calculation method	The Monthly Electricity exported to the grid will be taken from HT Metering slip/Measurement card. HT consumption bills will

	be considered for cross verifying the same.
Comments	-----

KM Knitwear Private limited and Ascen Tex Private Limited has installed a Reverse protection relay to avoid export of electricity to the grid. Sri Jayajothi Private Limited and Shri Harikrishna Cotton Mills Private have bidirectional meter ,to monitor parameter $EG_{grid\ final}$.

Data / Parameter	$EG_{PJ, y}$
Data unit	MWh/y
Description	Quantity of net electricity generated by the project activity in year y (MWh)
Source of data	A) HT Metering Slip/Metering Card. (Method A) B) Net Electricity Reading as per Inverter Data. (Method B)
Description of measurement methods and procedures to be applied	For installations at Sri Jayajothi Private Limited, Ascen Tex private limited and Shri Harikrishna Cotton Mills Private Limited, data will be monitored as per Method A mentioned above. For Installations at KM Knitwear Private Limited, data will be monitored as per Method B mentioned above. The metering testing & installation at the above sites is under process and it shall be completed in due course of time.
Frequency of monitoring/recording	Continuous measurement & monthly recording
Value applied	14447
Monitoring equipment	The details of the meter is included in section 5.3.
QA/QC procedures to be applied	The calibration of meters is in accordance with national standards.

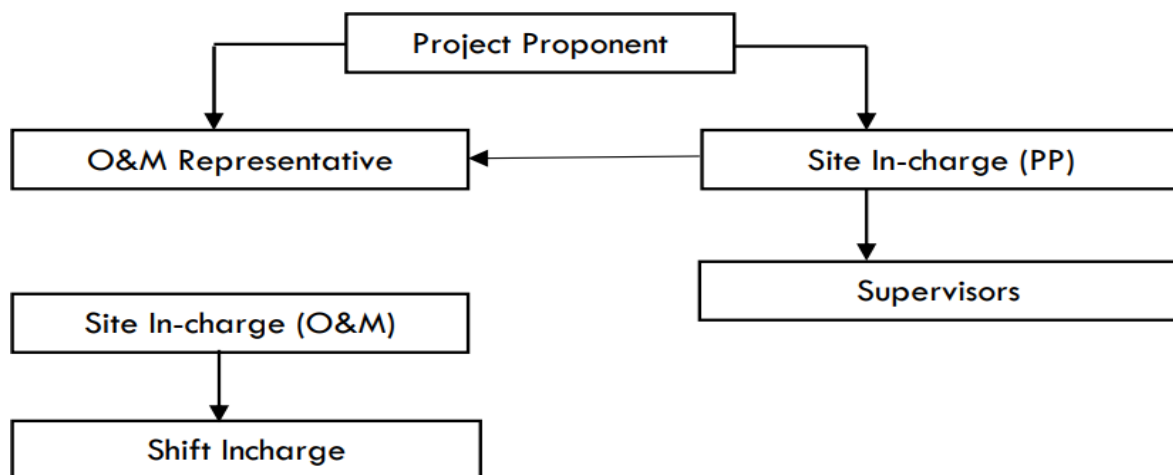
Purpose of data	Calculation of baseline emissions
Calculation method	The Monthly Electricity generation will be taken from HT Metering slip/Measurement card/ Character Engineer signed Inverter Generation Data. Also bills of net metering will be considered for cross verifying of net electricity generated by project activity.
Comments	-----

5.3 Monitoring Plan

The monitoring plan is developed in accordance with the modalities and procedures for CDM project activities. The monitoring plan, which will be implemented by the project participant describes about the monitoring organization, parameters to be monitored, monitoring practices, quality assurance, quality control procedures, data storage and archiving.

Organizational structure and responsibilities:

The authority and responsibility for registration, monitoring, measurement, reporting and reviewing of the data rests with the project participant. PP proposed the following structure for data monitoring, collection, data archiving and calibration of equipment for this project activity. The team comprises of the following members:



Responsibilities of Site In charge (PP): Overall functioning and maintenance of the project activity, the Site in charge shall coordinate with the O&M operator as well as the site supervisors.

Responsibilities of O&M Representative: Co-ordination between Site in charge of the O&M operator as well as the project participant and further report to PP head office.

Responsibilities of Site In-charge (O&M Operator): Responsibility for maintaining the data records, ensures completeness of data, and reliability of data (calibration of equipment) as well as data recording for all the parameters.

Responsibilities of Shift In-charge: Responsibility for day-to-day data collection and maintains day to day monitored data.

SOLAR LT CT METER DETAILS

Sri Jayajothi Power Management Company							
S.N O	Details of Meter	UNIT I		UNIT II		PC UNIT	
		Main Meter	Check Meter	Main Meter	Check Meter	Main Meter	Check Meter
1	Serial number	X224344 1	X2243442	X224343 9	X2243440	X224344 3	X2243444
2	Manufacture	Secure	Secure	Secure	Secure	Secure	Secure
3	Model	E3T055	E3T055	E3T055	E3T055	E3T055	E3T055
4	Accuracy class	0.5s	0.5s	0.5s	0.5s	0.5s	0.5s

S.NO	Details of Meter	OE UNIT LOACTION 1		OE UNIT LOACTION 2	
		Main Meter	Check Meter	Main Meter	Check Meter
1	Serial number	X2308815	X2308816	X2308817	X2308818
2	Manufacture	Secure	Secure	Secure	Secure
3	Model	E3T055	E3T055	E3T055	E3T055
4	Accuracy class	0.5s	0.5s	0.5s	0.5s

Shri Harikrishna Cotton Mills Private Limited		
S.NO	Details of Meter	LT CT Meter
1	Serial number	04013103
2	Manufacture	Inesh Smart Energy Private Limited
3	Name	3 Phase 4 wire AC Operated Smart Energy Meter
5	Accuracy class	0.5s

Ascen Tex Private Limited					
S. NO	Details of Meter	Meter 1	Meter 2	Meter 3	Meter 4
1	Serial number	22055741	22055742	22055735	22055738
2	Manufact ure	L&T	L&T	L&T	L&T
3	Model	ER300P	ER300P	ER300P	ER300P

4	Name	Trivector 3 Phase 4 wire Meter	Trivector 3 Phase 4 wire Meter	Trivector 3 Phase 4 wire Meter	Trivector 3 Phase 4 wire Meter
5	Accuracy class	0.5s	0.5s	0.5s	0.5s

KM Knitwear Private Limited				
S. NO	Details of Meter	Meter 1	Meter 2	Meter 3
1	Serial number	04016991	04016992	04016993
2	Manufature	Inesh	Inesh	Inesh
3	Name	AC Static 3 Phase 4 wire Operated Smart Energy Meter	AC Static 3 Phase 4 wire Operated Smart Energy Meter	AC Static 3 Phase 4 wire Operated Smart Energy Meter
4	Accura cy class	0.5s	0.5s	0.5s

Bidirectional Meter details

Sri Jayajothi Power Management Company					
S.NO	Details of Meter	UNIT I	UNIT 2	OE UNIT	PC UNIT
1	Make	HPL	HPL	HPL	HPL
2	SL.No	5205415	5205419	5205420	5205418
3	Class	0.2s	0.2s	0.2s	0.2s
4	Rating	3*63.5V,-/5A	3*63.5V,-/5A	3*63.5V,-/5A	3*63.5V,-/5A
5	Type	CT PT 5.24	CT PT 5.24	CT PT 5.24	CT PT 5.24

Shri Harikrishna Cotton Mills Private Limited			
S.NO	Details of Meter	Check meter	Main Meter
1	Serial number	6129491	6129489
2	Manufacture	Genus Power Infrastructure Ltd	Genus Power Infrastructure Ltd
3	Model	Trienergy	Trienergy
4	Name	3 Phase 4 wire AC static Meter	3 Phase 4 wire AC static Meter
5	Accuracy class	0.2s	0.2s

The calibration of all the meters will be undertaken at required intervals (at least once in five years) as per CEA Regulations on Installation & Operations of Meter ²¹ and faulty meters will be duly replaced immediately.

Data Measurement

The export and import energy or net electricity displaced by project will be measured continuously using above mentioned energy meter located after inverters. Readings of meters shall be taken on monthly basis by authorized officer of developer in the presence of PP or representative of PP. In the event of failure of generation meter, the user energy meter or inverter generation value will be used in monitoring the electricity generation data.

Data collection and archiving

Readings from meters will be collected in the presence of the plant in-charge. Export and import net electricity displaced by project would be recorded and stored in logs as well as in electronic form daily. The records are checked periodically by the Plant Manager and discussed thoroughly with the plant supervisor. The period of storage of the monitored data will be 2 years after the end of crediting period or till the last issuance of VERs for the project activity whichever occurs later.

Emergency preparedness

The project activity will not result in any unidentified activity that can result in substantial emissions from the project activity. No need for emergency preparedness in data monitoring is visualized. The Renewable Energy Generation Meter (Main Meter) shall be maintained by the Distribution License. The check meter of 2S/5S class has also been installed in case of the any identified non-conformities of Main Meter Readings.

²¹ https://cea.nic.in/wp-content/uploads/2020/02/meter_reg.pdf

QA/QC Procedure Their energy meters are installed at the respective project site. The calibration of all the meters will be undertaken at required intervals (once is five years as per CEA notification) and faulty meters will be duly replaced immediately. Records of calibration certificates will be maintained for verification purposes. Hence, a reliable method will be ensured with monitoring of the parameters. The invoice records will be used and kept for cross checking the consistency of the recorded data.

Sampling Procedure
Not Applicable

Personnel training To ensure a proper functioning of the project activity and a properly monitoring of emission reductions, the staff will be trained. The plant helpers will be trained in equipment operation, data recording, reports writing, operation and maintenance and emergency procedures in compliance with the monitoring plan

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