

TEMPLATE

MONITORING REPORT

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VERSION **v. 1.1**

RELATED SUPPORT - **TEMPLATE GUIDE Monitoring Report v. 1.1**

This document contains the following Sections

Key Project Information

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KEY PROJECT INFORMATION

Programme of Activity Information

GS ID of Programme	GS11450
Title of Programme	MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India
Version of POA-DD applicable to this monitoring report	4.0
Name and GS ID of fully Validated VPA/VPAs (i.e. non compliance check)	NA

Key Project Information

GS ID (s) of Project (s)	GS11505, GS11478
Title of the project (s) covered by monitoring report	GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India – GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 6- GS11505 GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India - MicroEnergy Credits PoA – VPA 08- GS11478
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	VPA6- 5.0 VPA8- 5.0
Version number of the monitoring report	2
Completion date of the monitoring report	20-09-2023
Date of project design certification	18/11/2022
Date of Last Annual Report	NA
Monitoring period number	2
Duration of this monitoring period	01/01/2022 to 31/12/2022 (inclusive of both days) Monitoring period falls under crediting period (CP2): 20/03/2020 to 19/03/2025 for VPA-6 01/05/2020 to 30-04-2025 for VPA-8

Project Representative	Micro Energy Credits Corporation Private Limited
Host Country	India
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Methodology (ies) applied and version number	AMS-III.AR "Substituting fossil-based lighting with LED/CFL lighting systems (version 7) Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
13 Climate Action (mandatory)	Number of VERs (ICS)	VPA 6- 32,784 VPA 8- 33,322	tCO ₂ e VERs
13 Climate Action (mandatory)	Number of VERs (SLS)	VPA 6- 4,907 VPA 8- 2,552	tCO ₂ e VERs
13 Climate Action (mandatory)	Number of VERs (ICS+SLS)	VPA 6-37,691 VPA 8-35,874	tCO₂e VERs
7 Affordable and Clean Energy	Number of households having operational solar lighting system	VPA 6 – 64,524 VPA 8 – 9,306	Number
7 Affordable and Clean Energy	Number of households having operational stoves	VPA 6 – 10,310 VPA 8 -12,052	Number
8 Decent Work and Economic Growth	Quantitative Employment and income generation	VPA 6 – 93 VPA 8 - 30	Number

Table 2 – Product Vintages

		Amount Achieved		
Start Dates	End Dates	VERs		
01/01/2022	31/12/2022			
		Tech	VPA 6	VPA 8
		ICS	32784	33,322
		SLS	4,907	2,552
		Total	37,691	35,874

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

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The project activity is implemented in India. In the rural areas in India, the predominant means of cooking are traditional cook stoves that use woody biomass as fuel. The smoke and fumes from these traditional inefficient stoves contribute heavily to indoor air pollution, which overall claim approximately 400,000 lives per year in India¹. In rural areas of India, households are either not connected to the grid or in households even with grid connectivity, there are frequent power outages and low voltage so rural households use kerosene for indoor lighting, which also contributes to indoor air pollution and GHG emissions.

The project activity involves marketing, distributing, and financing improved cookstove and solar lighting systems, for low-income households and microentrepreneurs in India. Future sales of solar lighting systems may happen in any state but within the geographic boundary of the PoA i.e. the country of India. However, it will be ensured at all times that the threshold for SSC projects is not exceeded and the PoA eligibility criteria are met.

These products provide clean energy for cooking and renewable energy for lighting. The cookstoves distributed under the VPA replaces traditional cookstoves thereby reducing the amount of fuelwood used for cooking in the baseline by households and thus reducing GHG emissions corresponding to the fuelwood saving by the project activity. The solar lighting systems replace kerosene-based lamps in households, which would have resulted in GHG emissions due to burning of fossil fuel i.e., kerosene.

The program is a voluntary initiative coordinated by Micro Energy Credits Corporation Private Limited (MEC), the CME of the PoA, and implemented by MEC's Partner Organizations (PO). The improved cookstove are implemented by Shri Kshetra Dharmasthala Rural Development Project (SKDRDP)². Solar lighting system are implemented by Shree Kshetra Dharmasthala Rural Development Project (SKDRDP), Muthoot, Evangelical Social Action Forum (ESAF) and Sarala.

Under these VPAs, MEC works with project partners to develop a successful and diversified clean energy-lending program. The clean energy program addresses typical barriers for low-income clients including education, price, finance, and supply and aftersales service. MEC trains project partners to implement the clean energy lending

¹ <http://www.pciaonline.org/sierra-club>

² skdrdpindia.org

program, as well as a robust and transparent carbon credit monitoring and tracking system to quantify and record the volume of carbon emission reductions created through the clean energy program. The carbon finance is used to expand and sustain the clean energy program through:

1. Client education and marketing
2. Internal training and capacity building
3. On lending funds to local SMEs producing the clean energy products
4. Aftersales service and maintenance
5. Lowering the interest or principal cost to the client

The goal of the VPAs is to use carbon finance to enable installations of solar lanterns, and improved cook stoves in India.

A.2. Location of project

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VPA6-GS ID11505

- a. Host Party (ies) - India
- b. Region/State/Province – Karnataka (KA) State for improved cookstove. For solar lighting systems, several states Karnataka (KA), Assam (AS), Bihar (BH), Kerala (KL), Gujarat (GJ), Madhya Pradesh (MP), Odisha (OD), Tamil Nadu (TN), Uttar Pradesh (UP), Haryana (HR), Jharkhand (JK), Rajasthan (RJ) and West Bengal (WB) and many region within those states are included.
- c. City/Town/Community – Several Cities/Towns are included
- d. Physical/Geographic location – The exact location (address) of each CEP is captured in the Credit Tracker Platform and can be verified.

VPA8-GS ID11478

- a. Host Party (ies) - India
- b. Region/State/Province – Karnataka (KA) state for improved cookstove and solar home lighting systems.
- c. City/Town/Community – Several Cities/Towns are included
- d. Physical/Geographic location – The exact location (address) of each CEP is captured in the Credit Tracker Platform and can be verified.



Figure 1: Map of India

A.3. Reference of applied methodology

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Solar Lighting System: AMS-III.AR "Substituting fossil fuel-based lighting with LED/CFL lighting systems, version 7.0"

Improved Cookstove: "Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1"³

CDM Tool 30: Calculation of the fraction of non-renewable biomass v3.0

A.4. Crediting period of project

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³ [TPDDTEC version 3.1](#)

VPA Reference Number	Crediting Start Date	Crediting End Date (CP-1)	Crediting Start Date (CP-2)	GS4GG Crediting End Date	GS4GG Eligible Crediting End Date ⁴
GS11505	20/03/2015	19/03/2020	20/03/2020	19/03/2025	19/03/2030
GS11478	01/05/2015	30/04/2020	01/05/2020	30/04/2025	30/04/2030

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

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These are the 2 VPAs implemented in this Batch.

VPA6 - GS ID: GS11505

a. Purpose of the VPAs and the measures taken for GHG emission reductions or net GHG removals –

Purpose: Under the VPA, Micro Energy Credits works with PO – Shri Kshetra Dharmasthala Rural Development Project (SKDRDP), Evangelical Social Action Forum Microfinance (ESAF), Muthoot Microfin Ltd. (Muthoot), and Sarala Women Welfare Society (Sarala) to develop a successful and diversified clean energy lending program. The clean energy program addresses typical barriers for low income clients including education, price, finance, and supply and aftersales service. Micro Energy Credits trains the POs to implement the clean energy lending program, as well as a robust and transparent carbon credit monitoring and tracking system to quantify and record the volume of carbon emission reductions created through the clean energy program.

Measures taken: The VPA involves marketing, distributing, and financing solar lighting systems, and improved cook stoves for low income households and microentrepreneurs in different States of India including Karnataka (KA), Andhra Pradesh (AP), Assam (AS), Himachal Pradesh (HP), Jharkhand (JK), Odisha (OD), Rajasthan (RJ), Tamil Nadu (TN),

⁴ As these are CDM Transitioned projects, GS4GG allows a total crediting period of 15-years from the CDM crediting start date.

Uttar Pradesh (UP), Uttarakhand (UK), West Bengal (WB), Maharashtra (MH) and Madhya Pradesh (MP) for improved cookstove and Karnataka (KA), Assam (AS), Bihar (BH), Kerala (KL), Gujarat (GJ), Madhya Pradesh (MP), Odisha (OD), Tamil Nadu (TN), Uttar Pradesh (UP), Haryana (HR), Jharkhand (JK), Rajasthan (RJ) and West Bengal (WB) for solar lighting systems. These products provide clean, renewable power for lighting and efficient energy for cooking. The total number of units implemented under this VPA till date is:

Improved cookstoves – 19,963

Solar Lamps – 86,220 (i.e. 81,045 Solar Lighting Systems)

Year	Improved Cookstove	Solar Lamps
2014	19,963	-
2015	-	-
2016	-	3,894
2017	-	32,722
2018	-	49,604
Total	19,963	86,220

No further sales have been added under the current monitoring period (01/01/2022 to 31/12/2022).

b. Description of the installed technology, technical processes and equipment for the VPA–

Improved Cookstove:

The Improved Cookstove model implemented under this VPA is the Grameen Greenway Smart Stove (GSSV3). Technical specifications are as follows –

Stove Body Size: 9.8" x 7.6" x 11.7"

Net weight: 2.5 kg

Average Life span under standard use conditions: 5 years

The rated thermal efficiency is 25.19%

Solar Lighting System:

The solar lighting system models implemented under this VPA are listed below along with their specifications-

1. Selco Eco Home 4 HLS (Model Number – EH4HLS)

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/10W

Lighting Wattage – 3.6

Luminous flux output (Lumens): 324

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/15Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

2. Super Bright Home 2 HLS (Model Number – SB2HLS)

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/18W

Lighting Wattage – 12

Luminous flux output (Lumens): 1080

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/20Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

3. Smart Home 4 HLS (Model Number – SH4HLS)

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/10W

Lighting Wattage – 16.8

Luminous flux output (Lumens): 1512

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):4

Battery type/capacity-Lead Acid Battery/30Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

4. Super Bright Home 4 HLS (Model Number – SB4HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/40W
Lighting Wattage – 32
Luminous flux output (Lumens): 2880
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):
Battery type/capacity-Lead Acid Battery/60Ah, 12V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

5. Super Bright Home 8 HLS (Model Number – SB8HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/75W
Lighting Wattage – 32
Luminous flux output (Lumens): 2880
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):
Battery type/capacity-Lead Acid Battery/110Ah, 12V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

6. Selco Eco Home 2 HLS (Model Number – EH2HLS)

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/10W
Lighting Wattage – 3.6
Luminous flux output (Lumens): 324
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):2
Battery type/capacity-Lead Acid Battery/15Ah, 12V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

7. Super Bright Home 6 HLS (Model Number – SB6HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/60W
Lighting Wattage – 46
Luminous flux output (Lumens): 4140
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):6
Battery type/capacity-Lead Acid Battery/80Ah, 12V
Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

8. Bright Light Home 4 HLS (Model Number – BH4HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/40W

Lighting Wattage – 14

Luminous flux output (Lumens): 1260

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/60Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

9. Super Bright Home 9 HLS (Model Number – SB9HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/75W

Lighting Wattage – 37

Luminous flux output (Lumens): 2900

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps): 9

Battery type/capacity-Lead Acid Battery/110Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

10. Selco 10 HLS (Model Number - S10HLS)

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/100W

Lighting Wattage – 60

Luminous flux output (Lumens): 5400

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps): 8

Battery type/capacity-Lead Acid Battery/150Ah,12 V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

11. Super Bright Home 15 HLS (Model Number – S15HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/120W

Lighting Wattage – 91

Luminous flux output (Lumens): 4700
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 12
Battery type/capacity-Lead Acid Battery/120Ah, 12V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

12. RAL Duron Mitva – MS322A

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/1.7W
Lighting Wattage – 1
Luminous flux output (Lumens): 85
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-Lead Acid Battery/2.6Ah,3.7 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

13. RAL Duron Mitva – MS322B

Type and Solar Panel Wattage: Polycrystalline/2.5W
Lighting Wattage – 1
Luminous flux output (Lumens): 110
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-Lead Acid Battery/5.2Ah,3.7 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

14. RAL Duron Mitva – MS 16B

Type and Solar Panel Wattage: Polycrystalline/0.35W
Lighting Wattage – 0.5
Luminous flux output (Lumens): 50
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-Lead Acid Battery/0.5Ah,3.2 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

15. d.light M350+

Type and Solar Panel Wattage: monocrystalline/3.7W
Lighting Wattage – 3
Luminous flux output (Lumens): 130
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-Lithium Ion/1.5Ah,6 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

16. d.light S100

Type and Solar Panel Wattage: monocrystalline/1.5W
Lighting Wattage – 1
Luminous flux output (Lumens): 65
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-LFP/0.8Ah,3.2 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

17. d.light S320

Type and Solar Panel Wattage: monocrystalline/1.5W
Lighting Wattage – 3
Luminous flux output (Lumens): 120
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-LFP/1.8Ah,4.2 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

18. d.light S20

Type and Solar Panel Wattage: monocrystalline/0.3W
Lighting Wattage – 0.5
Luminous flux output (Lumens): 29
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 1
Battery type/capacity-LFP/0.4Ah,3.2 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

19. Greenlight Planet Pro2 (Sunking Pro2)

Type and Solar Panel Wattage: Polycrystalline/3W

Lighting Wattage –

Luminous flux output (Lumens): 150

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps): 1

Battery type/capacity-LFP/3Ah,3.3 V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

c. Relevant dates for the VPA –

1. Construction/Implementation date – The improved cookstoves under this VPA are implemented from 02/01/2013 to 12/01/2015 and solar lighting systems are implemented from 29/11/2016 to 30/11/2018.
2. Commissioning – 19,963 Improved cookstoves and 81,045 solar lighting system are distributed until the end of monitoring period under this VPA. The exact commissioning/installation dates for all the CEPs are mentioned in the Emission Reduction Calculation sheet for this VPA.
3. Continued operation periods – All of the functional products were continuously operational during the course of this monitoring period. Non-functional products are discounted in emission reduction calculation.

d. Total GHG emission reductions achieved in this monitoring period for the VPA, including information on how double counting is avoided –

The total GHG emission reduction achieved in this monitoring period for the VPA is 37,691 tCO₂e.

VPA8 - GS ID: GS11478

a. Purpose of the VPA(s) and the measures taken for GHG emission reductions or net anthropogenic GHG removals–

Purpose: Under the VPA, MicroEnergy Credits works with PO – Shri Kshethra Dharmasthala Rural Development Project (SKDRDP) to develop a successful and diversified clean energy lending program. The clean energy program addresses typical

barriers for low income clients including education, price, finance, and supply and aftersales service. MicroEnergy Credits trains the POs to implement the clean energy lending program, as well as a robust and transparent carbon credit monitoring and tracking system to quantify and record the volume of carbon emission reductions created through the clean energy program.

Measures taken: The VPA involves marketing, distributing, and financing solar lighting systems and improved cook stoves for low-income households and microentrepreneurs in Karnataka state of India. These products provide renewable energy for lighting and efficient energy for cooking. The total number of units implemented under this VPA till date is:

Improved cookstoves – 23,337

Solar Lamps – 35,349 (i.e., 11,671 Solar Lighting Systems)

Year	Improved Cookstove	Solar Lamps
2015	12,188	-
2016	9,597	-
2017	1,552	19,238
2018	-	16,111
Total	23,337	35,349

No further sales have been added under the current monitoring period (01/01/2022 to 31/12/2022).

b. Description of the installed technology, technical processes and equipment for the VPA –

Improved Cookstove:

The Improved Cookstove model implemented under this VPA are the Grameen Greenway Smart Stove (GSSV3). Technical specifications are as follows –

Grameen Greenway Smart Stove:

Stove Body Size: 9.8" x 7.6" x 11.7"

Net weight: 2.5 kg

Average Life span under standard use conditions: 5 years

The rate of thermal efficiency – 25.19%

Solar lighting system:

The solar lighting system models implemented under this VPA including their technical specifications is as follows –

1. Selco Eco Home 2 HLS (Model Number – EH2HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/10W

Lighting Wattage – 3.6

Luminous flux output (Lumens): 324

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/15Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

2. Selco Eco Home 4 HLS (Model Number – EH4HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/10W

Lighting Wattage – 3.6

Luminous flux output (Lumens): 324

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/15Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

3. Selco Smart Home 4 HLS (Model Number – SH4HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/10W

Lighting Wattage – 16.8

Luminous flux output (Lumens): 1512

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):4

Battery type/capacity-Lead Acid Battery/30Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

4. Bright Light Home 4 HLS (Model Number – BH4HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/40W

Lighting Wattage – 14

Luminous flux output (Lumens): 1260

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):2

Battery type/capacity-Lead Acid Battery/60Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

5. Super Bright Home 10 HLS (Model Number – S10HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/100W

Lighting Wattage – 60

Luminous flux output (Lumens): 5400

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):8

Battery type/capacity-Lead Acid Battery/150Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

6. Super Bright Home 14 HLS (Model Number – S14HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/120W

Lighting Wattage – 82

Luminous flux output (Lumens): 7380

Lumen maintenance (for 2,000 hours): 95.75%

Rated lamp life: greater than 10,000 hours

Lighting point (number of project lamps):10

Battery type/capacity-Lead Acid Battery/120Ah, 12V

Type of charge controller -PMW

Solar Run time(SRT): 4-5hours

Warranty – 1 year

7. Super Bright Home 15 HLS (Model Number – S15HLS):

The technical specifications of this product are –

Type and Solar Panel Wattage: Polycrystalline/**W

Lighting Wattage – 91

Luminous flux output (Lumens): 4700
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): **
Battery type/capacity-Lead Acid Battery/**Ah,** V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

8. Super Bright Home 2 HLS (Model Number – SB2HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/18W
Lighting Wattage – 12
Luminous flux output (Lumens): 1080
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):2
Battery type/capacity-Lead Acid Battery/20Ah, 12V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

9. Super Bright Home 6 HLS (Model Number – SB4HLS)

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/40W
Lighting Wattage – 32
Luminous flux output (Lumens): 2880
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 4
Battery type/capacity-Lead Acid Battery/60Ah,12 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

10.Super Bright Home 6 HLS (Model Number – SB6HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/60W
Lighting Wattage – 46
Luminous flux output (Lumens): 4140
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps):6
Battery type/capacity-Lead Acid Battery/80Ah, 12V

Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

11.Super Bright Home 8 HLS (Model Number – SB8HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/75W
Lighting Wattage – 32
Luminous flux output (Lumens): 2880
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 4
Battery type/capacity-Lead Acid Battery/110Ah,12 V
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

12.Super Bright Home 9 HLS (Model Number – SB9HLS):

The technical specifications of this product are –
Type and Solar Panel Wattage: Polycrystalline/W
Lighting Wattage – 37
Luminous flux output (Lumens): 2900
Lumen maintenance (for 2,000 hours): 95.75%
Rated lamp life: greater than 10,000 hours
Lighting point (number of project lamps): 9
Battery type/capacity-Lead Acid Battery
Type of charge controller -PMW
Solar Run time(SRT): 4-5hours
Warranty – 1 year

c. Relevant dates for the VPA –

- a. Construction/Implementation date – The stoves under this VPA are implemented from 09/01/2015 to 16/02/2017. The solar lighting systems under this VPA are implemented from 2/03/2015 to 25/05/2018.
- b. Commissioning –23,337 Improved cookstoves and 35,349 solar lamps (11,671 solar lighting systems) are distributed till date under this VPA. The exact commissioning/installation dates for all the CEP's are mentioned in the Emission Reduction Calculation sheet for this VPA.
- c. Continued operation periods – All of the functional products were continuously operational during the course of this monitoring period. Non-functional products are discounted in emission reduction calculation.

d. Total GHG emission reductions achieved in this monitoring period for the VPA, including information on how double counting is avoided -

The total GHG emission reductions achieved in this monitoring period for the VPA is 35,874 tCO₂e.

e. Avoiding double counting -

Each Clean Energy Product sold under each VPA has 2 unique identifier numbers - one that is attached to each household and one that is attached to each installation within that VPA to ensure no double-counting within the PoA.

The 2 unique identification numbers for CEPs sold by each product are as follows -

Partner	Unique Identification number for the households	Unique identification number for the CEP
SKDRDP	Group Identification number-Member ID	Branch ID-Loan account number
Sarala	Customer identification number	Transaction identification number
Muthoot	Customer identification number	Transaction identification number
ESAF	User account number	Branch ID-Loan account number

Unique identification number for the households is defined as "Group identification number-Member ID" and Unique identification number for the CEPs is defined as "BranchID-Loan Account number" in the emission reduction sheets.

Unique identification numbers match with the information displayed on each VPA Credit Tracker Platform, with a copy retained by the customer, thus identifying that each CEP with its unique identification number has been distributed under a PoA managed by the CME of this PoA.

At the time of including a new VPA, Micro Energy Credits ensured that the project activity is not part of CDM/GS project activity or another PoA by the following means:

- MEC signs contracts with each microfinance institution documenting that the emissions reductions in a specific project activity are included in that project and that project alone
- The partner PO explains the concept of carbon credits to the end user. The PO signs a contract with each end user recognizing the end user's title to the

emissions reductions and transferring it to the PO, which then transfers it to Micro Energy Credits via the contract signed between the PO and MEC

- Micro Energy Credits and partner PO consult with participating clean energy product suppliers to clarify that credits are not included in other projects and are included only in this PoA

The MEC Credit Tracker Platform maintains data on all installations, including each CEP unique identifier number, the date of installation and the VPA/PoA with which they are associated. The platform's use of locations for each installation will ensure that each clean energy product is only included in a single VPA under a single PoA. The credit tracker platform also allocates a system generated number call "sysnum" to each installation under the PoA. No two CEP installations can have the same "sysnum".

B.1.1 Forward Action Requests

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NA

B.2. Post-Design Certification changes

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B.2.1. Temporary deviations from the approved Monitoring & Reporting Plan, methodology or standardized baseline

>>

NA

B.2.2. Corrections

>>

NA

B.2.3. Changes to start date of crediting period

>>

NA

B.2.4. Permanent changes from the Design Certified monitoring plan, applied methodology or applied standardized baseline

>>

NA

B.2.5. Changes to project design of approved project

>>

NA

SECTION C. DESCRIPTION OF MONITORING SYSTEM APPLIED BY THE PROJECT

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Micro Energy Credit's Credit Tracker Platform is used to maintain records for each VPA. The MEC Credit Tracker Platform has been designed specifically for accelerating microfinance access to clean and efficient energy. The Credit Tracker Platform is used to collect and store the information related to the unique identification number, location, installation date, and usage status of each clean energy product (CEP) in each VPA, making it easy to identify, locate and verify all of the installations that pertain to a given VPA. The MEC Credit Tracker Platform is a hosted internet service, limiting the risk of loss of data.

Monitoring system and monitoring plan of VPAs – The Credit Tracker Platform enables Micro Energy Credits to maintain consistent data on all VPAs and product installations. The process for entering data into the Credit Tracker Platform will be consistent across all VPAs. At the time of installation, the PO creates a Booking Record (in paper or electronic format) that captures detailed data on the installation:

- Household name
- Location of household (address and/or GPS location)
- Product type installed
- Product model installed
- Date of installation
- Unique identifier number for CEP
- Respective VPA number

The Credit Tracker Platform includes a VPA Dashboard that provides a summary on the status of each VPA, and includes the fields:

- Name and unique identifier of each VPA
- List of CEPs included in each VPA
- Name of PO implementing each VPA
- Number of CEPs installed
- Aggregate emissions reductions per year for each VPA

The VPA Monitoring Record maintains monitoring and auditing data on each installation in a VPA:

- Unique identifier number for CEP
- Date of monitoring
- Usage status at time of monitoring

The monitoring activity provides a framework for project preparation and monitoring processes that has been undertaken at the VPA level for each VPA. This schedule takes into account the key parameters that are needed during the crediting periods of the project. All required monitoring and documentation have been implemented, reported, consolidated and managed by the CME. Monitored data has been stored in a suite of monitoring databases.

Summary:

1. Each PO keeps a record of all the CEPs it installs in the MEC Credit Tracker Platform. The record includes the name, date of installation, model of CEP and location of the product. All records are screened by the CME and cross-checked with the PO records to confirm the installation record is authentic and no double counting occurs.
2. The values of the emission reduction parameters required for ex-post ER calculation - project fuel consumption ($p_{p,y}$) or efficiency of ICS, number of ICS still operating ($U_{p,y}$), percentage of lamp operating ($OF_{y,i,j}$).
3. The records kept in the MEC Credit Tracker Platform relate to paper copies of title transfer agreements received from individual households.

Quality assurance

To increase the precision of the estimates during the survey, it is necessary to establish sampling mechanisms for avoiding non-sampling errors (bias) include good questionnaire design, well-tested questionnaires, possibly pilot testing the data collection. To remedy the incomplete questionnaires, additional households or schools will be drawn randomly until the required number is met at per the sample size determined. Then, well-trained personnel will scrutinize all the questionnaires. This will be a procedure to find outliers, and then outliers may be excluded and/or replaced. If the outliers are found according to the above analysis it will be examined further to correct for possible transcription and data entry errors, but it will be omitted from the analysis if no such administrative errors exist. All monitored data such as name, date and contact information of the end-user will be archived in the electronic database tool. Hard copies of all documents will be kept at the office of CME or an alternative place nominated by CME. All the data will be used to calculate the sample size for parameters and emission reductions. All data stored to be kept for at least two years after the crediting period or the last issuance of CERs for the project activity.

Generalities

The CME along with the PO coordinated all ex-post monitoring activities. The CME is ultimately responsible for implementing the monitoring plan, ensuring the quality of data obtained and the use of this data for emissions reduction calculations. However, the actual field measurements to be conducted during monitoring (e.g. project KPT) has been performed by enumerators trained by CME and PO field staff. Sampled households were visited for 4 days to collect the data on the fuel consumption for cooking. Fuelwood was not supplied separately but a small bundle from household stock was separated and provided to households to be used for the KPT. Each day enumerator or field staff would visit the household between 6-7 a.m. before the first meal is cooked. All enumerators would carry weighing scale and moisture meter to take the measurements. The data would be collected directly in the Microsoft excel.

CME has defined the project technology “use” versus “non-use” to determine who should be considered eligible for crediting. The criteria for defining the same has been listed below:

1. User is defined as someone who uses the stove daily. The same shall be captured in the survey questionnaire.
2. To define the use and non-use of project technology, CME has included questions in the survey questionnaire such as when was the stove last used, frequency of use, how many meals are prepared in a day.
3. Physical verification of the stove is conducted to check if the combustion chamber is intact and grate is available or not. Surveyor shall also observe physically that the stove feels warm and presence of ash in the stove.
4. Users will be asked questions on use of the baseline stove, how many meals prepared, presence or absence of the baseline stove.
5. CME shall refer to usage and project survey and Kitchen Performance Tests (KPTs) to determine if the stove was in use or not.

During sampling there may be non-response from the target population. Over-sampling by 20% have been used to avoid non-response, however, sampling may be cease once required confidence/precision is met.

Implementation - The survey for collecting the details of monitoring parameters was conducted annually at the end of the monitoring. The overall monitoring and the implementation of the sampling has been coordinated by the CME and the management staff. CME has ensured successful monitoring of the emission reductions of the proposed project during its crediting period. Furthermore, the survey of the representative sample for the parameters has been carried out by the distributor together with the CME. The survey method that used by CME include: (a) Online questionnaire (b) Face to face interview (c) Telephone Interview (cross check). Primary data was stored by the implementing entities/operators.

All efforts of sampling will be conducted by qualified personnel who have undergone training as part of the programme.

TECHNICAL FAILURE AND MAINTENANCE PROTOCOL

SKDRDP, Muthoot, ESAF and Sarala have a robust aftersales mechanism in place which ensures customer complaints are registered and resolved in a timely manner. The mechanism involves various steps:

- Step 1: Complain Registration
- Step 2: Logging complaint
- Step 3: Collection of product for repair
- Step 4: Resolution of the complaint
- Step 5: Feedback (optional)

Customers register complaint either through field staff of the PO who visit the customer on weekly or biweekly manner or directly call the customer support number provided to them during sale of the product. Most preferred mode of complaint registration is through field staff.

POs have in house complain logging systems (manual/automatic). Intimation is sent to supplier/manufacture local service team. As soon as service team receives the complaint, within 48-72 hours depending on the location of the customer household, service team will visit the households for examination of the product. In case of minor issues, resolution happens on the spot however, if the problem is major then product is collected and taken to the nearest workshop.

Service team of the supplier/manufacture is expected to resolve the issue within 30 days of receiving the complaint. Once the product is repaired, it is returned back to the customer. In case product is beyond repair then replacement product is provided to end user by the PO. Sample service request forms have been submitted.

For ICS, total repairs done were 788 for stoves VPA 6 and 354 for stoves in VPA 8. For SLS, total repairs done were 1,088 in VPA 6 and 137 in VPA 8. It can be confirmed through credit tracker output file where the data from the partner is stored. Sample tracker screenshots and sample service request forms have been submitted.

SECTION D. DATA AND PARAMETERS

D.1. Data and parameters fixed ex ante or at renewal of crediting period

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SDG 13

Improved Cookstoves:

Data/parameter	P _{b,y}
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Unit	kg/household-day		
Description	Quantity of fuel that is consumed in baseline scenario b during year y		
Source of data	Baseline FT or default baseline fuelwood consumption		
Value(s) applied	VPA Number	State	Values
	VPA 06	Karnataka	7.77
	VPA 08	Karnataka	7.11
Choice of data or Measurement methods and procedures	Baseline Study in section B.4 of the VPA-DD.		
Purpose of data	For baseline emission calculations		
Additional comment	-		

Data/parameter	EF_{b,i,CO_2}		
Unit	tCO_2/t_{fuel}		
Description	CO ₂ emission factor arising from use of fuel type <i>i</i> in baseline scenario		
Source of data	Wood: Methodology default		
Value(s) applied	Fuelwood / wood chips: 112 tCO ₂ /TJ		
Choice of data or Measurement methods and procedures	Default IPCC values have been applied		
Purpose of data	For baseline emission calculations		
Additional comment	-		

Data/parameter	$EF_{b,i,nonCO_2}$			
Unit	tCO_2/t_{fuel}			
Description	Non-CO ₂ emission factor arising from use of fuel type <i>i</i> in baseline scenario			
Source of data	IPCC default value as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 2, chapter 2 (Table 2.9)			
Value(s) applied	Wood: 37.25 tCO ₂ e/TJ			
Choice of data or Measurement methods and procedures	Methodology defaults have been applied for wood			
	Parameter	Value	Average	Units
	EF_wood_CH4	258 – 2190	1224	kgCO ₂ /TJ
	EF_wood_N2O	4 – 18.5	11.25	KgCO ₂ /TJ
	GWP CH4	28		tCO ₂ /TJ
				AR5

	<table><tr><td>GWP N2O</td><td>265</td><td></td><td>tCO2/TJ</td><td>AR5</td></tr><tr><td>EF_{b,fuel non-CO2}</td><td></td><td>37.25</td><td>tCO2/TJ</td><td></td></tr></table>	GWP N2O	265		tCO2/TJ	AR5	EF _{b,fuel non-CO2}		37.25	tCO2/TJ	
GWP N2O	265		tCO2/TJ	AR5							
EF _{b,fuel non-CO2}		37.25	tCO2/TJ								
Purpose of data	For baseline emission calculations										
Additional comment	-										

Data/parameter	EF _{p,i,CO2}
Unit	tCO ₂ /t _{fuel}
Description	CO ₂ emission factor arising from use of fuel type <i>i</i> in project scenario
Source of data	Wood: Methodology default
Value(s) applied	Fuelwood / wood chips: 112 tCO ₂ /TJ
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	For project emission calculations
Additional comment	-

Data/parameter	EF _{p,i,nonCO2}				
Unit	tCO ₂ /TJ				
Description	Non-CO ₂ emission factor arising from use of fuel type <i>i</i> used in project scenario				
Source of data	IPCC default value as per 2006 IPCC Guidelines for National Greenhouse Gas Inventories volume 2, chapter 2 (Table 2.9)				
Value(s) applied	37.25 tCO2e/TJ (AR5 GWP)				
Choice of data or Measurement methods and procedures	Default methodology values have been applied for wood				
	Parameter	Value	Average	Units	Source
	EF_wood_CH4	258 – 2190	1224	kgCO2/TJ	
	EF_wood_N2O	4 – 18.5	11.25	KgCO2/TJ	
	GWP CH4	28		tCO2/TJ	AR5
	GWP N2O	265		tCO2/TJ	AR5
	EF _{b,fuel non-CO2}		37.25	tCO2/TJ	
Purpose of data	For project emission calculations				
Additional comment	-				

Data/parameter	NCV _{b,i}
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Unit	TJ/tonne
Description	Net calorific value of the fuel type <i>i</i> used in the baseline
Source of data	Methodology default: Wood
Value(s) applied	Fuelwood / wood chips: 0.0156 TJ/tonnes
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	For baseline emission calculations
Additional comment	-

Data/parameter	NCV _{p,i}
Unit	TJ/tonne
Description	Net calorific value of the fuel type <i>i</i> used in the project scenario
Source of data	Wood: Methodology default
Value(s) applied	Fuelwood / wood chips: 0.0156 TJ/tonnes
Choice of data or Measurement methods and procedures	Default IPCC values for wood / wood waste are applied.
Purpose of data	For project emission calculations
Additional comment	-

Data/parameter	$f_{NRB,b,i,y}$											
Unit	Fractional non-renewability											
Description	Non-renewability status of woody biomass fuel type <i>i</i> that can be established as non-renewable during year <i>y</i>											
Source of data	Calculation as per CDM methodology Tool 30 version 3.0											
Value(s) applied	<table><tr><th>VPA Number</th><th>State</th><th>Value</th></tr><tr><td>VPA 06</td><td>Karnataka</td><td>0.86</td></tr><tr><td>VPA 08</td><td>Karnataka</td><td>0.86</td></tr></table>			VPA Number	State	Value	VPA 06	Karnataka	0.86	VPA 08	Karnataka	0.86
VPA Number	State	Value										
VPA 06	Karnataka	0.86										
VPA 08	Karnataka	0.86										
Choice of data or Measurement methods and procedures	N.A.											
Purpose of data	For emission reduction calculations											
Additional comment	-											

For Solar Lighting Systems

VPA6, 08 (AMS III A.R)

Data/parameter	DV
Unit	tCO ₂ e per project lamp
Description	Lamp Emission Factor
Source of data	Default value prescribed in AMS-III.AR (v7.0)
Value(s) applied	0.092 tCO ₂ e per project lamp
Choice of data or Measurement methods and procedures	Methodology default value applied
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

D.2 Data and parameters monitored

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Improved Cookstoves

SDG 13

Data / Parameter	P _{p,y}		
Unit	kg/household-day		
Description	Quantity of fuel that is consumed in project scenario p during year y		
Source of data	Project KPT		
Value(s) applied	VPA	Model/State	Values
	VPA6	Smart/KA	3.4
	VPA8	Smart/KA	3.4
Measurement methods and procedures	Project KPT has been conducted		
Monitoring frequency	Updated every two years		
QA/QC procedures	CME has provided guidance and training to enumerators/experts for conducting KPTs to meet specific requirement of the methodology. The equipment used for testing is externally calibrated or newly purchased at the time of use so measurements are done with the necessary guarantees. Calibration of the equipment is done annually.		
	Type – Digital Moisture Meter		

	Accuracy Class - +/- 1% Serial number - 201795, 218462, TM35104, 261471 Calibration frequency - Annual Date of calibration - 24/02/2023 Validity - Until 23/02/2024 Type - Weighing Scale Accuracy Class - +/- 0.5 grams Serial number - WS00150, WS00151, WS10020, WS00152 Calibration frequency - Annual Date of calibration - 18/02/2023 Validity - Until 17/02/2024
Purpose of data	To calculate baseline emissions
Additional comment	Project fuel consumption using KPT has been conducted in Jan-Feb 2023 to take into account seasonal variation in wood consumption.

Data / Parameter	U _{p,y}		
Unit	Fraction (or %)		
Description	Usage rate in project scenario p during year y		
Source of data	Annual usage survey (KS)		
Value(s) applied	VPA	Model/State	Values
	VPA 6	Smart/KA	53%
	VPA 8	Smart/KA	53%
Measurement methods and procedures	Sampling surveys (physical) has been conducted to record the continued operation of project devices.		
	The usage rate has been calculated for each age (simple random sampling has been applied as applicable)		
Monitoring frequency	Annual		
QA/QC procedures	CME has provided guidance and training to enumerators for conducting surveys to meet specific requirement of the methodology, if any. The value obtained has been tested to determine if the desired precision was met. The “Cookstove Usage Rate Guidelines” has been followed and CME has ensured that the value applied for this parameter is in line with the guidance provided for the Level applied. Out of the three levels to the Usage Monitoring Requirements, CME has ensured “Mandatory” and “Good Practice” level are complied with.		
Purpose of data	To calculate baseline emissions		

Additional comment	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.
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Data / Parameter	Policy for encouraging discontinuation of baseline stove
Unit	--
Description	Measures adopted to encourage use of project technology / discontinue baseline technology
Source of data	Internal records
Value(s) applied	-
Measurement methods and procedures	The end user training events were monitored to demonstrate that the users have been informed about use of project stoves and phase out of baseline stove. POs conduct regular training events for the end users and the information is captured in reports submitted to CME as part of contract between PO and CME.
Monitoring frequency	Updated every two years
QA/QC procedures	Transparent data analysis and reporting.
Purpose of data	To calculate baseline emissions
Additional comment	-

Data / Parameter	$N_{p,y}$				
Unit	Project technologies credited (Number)				
Description	Technologies in the project Database for project scenario p through year y				
Source of data	Total sales record				
Value(s) applied	VPA	Model/State	Installed active	Installed damaged	Days
	VPA6	Smart/KA	19,175	788	6998875
	VPA8	Smart/KA	22,983	354	8388795
Measurement methods and procedures	Number of stoves listed in the Monitoring Database				
Monitoring frequency	Continuous				
QA/QC procedures	Values can be cross checked by sales records.				
Purpose of data	To calculate baseline emissions				
Additional comment	For sampling and monitoring purposes, the end user database which is a subset of the number of installations reported in the QPR has been used. In addition to methodological requirement to calculate Usage Rate (which is used to discount the ERs), as part of				

	QA/QC defined in the PoA-DD and VPA-DD, Annual monitoring is carried out to determine the servicing requirement of all the stoves in the PoA. Based on the results of this annual monitoring survey, individual stove status is marked as installed_active and installed_damaged. The status "installed_damaged" could reflect minor stove damage which does not affect the operational capability of the stove, but to be conservative the VPA does not claim emission reductions for stoves marked "installed_damaged". The ERs are adjusted accordingly (by accounting ERs only for stoves that are "installed_active").
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Data / Parameter	LE _{p,y}		
Unit	tCO ₂ e per year		
Description	Leakage in project scenario p during year y		
Source of data	Monitoring surveys for Leakage assessment		
Value(s) applied	VPA	Model/State	Values
	VPA6	Smart/KA	0
	VPA8	Smart/KA	0
Measurement methods and procedures	Qualitative / quantitative assessment		
Monitoring frequency	Every two years		
QA/QC procedures	N.A.		
Purpose of data	For calculation of leakage emissions		
Additional comment	-		

Solar Lighting System

VPA 06-GS 11505

Data / Parameter	N _{i,j}								
Unit	Number								
Description	Number of project lamps distributed to end users of type i with charging method j								
Source of data	MEC tracker platform								
Value(s) applied	<table><tr><th>Year</th><th>State</th><th>Total Lamps</th></tr><tr><td>2016</td><td>Karnataka</td><td>3894</td></tr></table>	Year	State	Total Lamps	2016	Karnataka	3894		
Year	State	Total Lamps							
2016	Karnataka	3894							

	2017	<i>Assam</i>	180
		<i>Bihar</i>	273
		<i>Gujarat</i>	1,818
		<i>Karnataka</i>	6,321
		<i>Kerala</i>	11,706
		<i>Madhya Pradesh</i>	448
		<i>Odisha</i>	1,866
		<i>Tamil Nadu</i>	5,584
		<i>Uttar Pradesh</i>	1
		<i>West Bengal</i>	4,525
	2018	<i>Gujarat</i>	5,349
		<i>Haryana</i>	108
		<i>Jharkhand</i>	2
		<i>Karnataka</i>	5,830
		<i>Kerala</i>	12,882
		<i>Madhya Pradesh</i>	1,279
		<i>Odisha</i>	3,075
		<i>Rajasthan</i>	3
		<i>Tamil Nadu</i>	19,884
		<i>Uttar Pradesh</i>	92
		<i>West Bengal</i>	1,100
	<i>Total</i>		86220
Measurement methods and procedures	The data has been recorded in a web based tracker platform. The data consists of unique number, number of units sold, to whom and where		
Monitoring frequency	Annual		
QA/QC procedures	Each solar lighting system, and number of solar lamps in each system, has been recorded in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored.		
Purpose of data	Calculation of project emissions		
Additional comment	-		

Data/parameter	GF _y
Unit	Fraction
Description	Grid Factor in year y
Source of data	Default value prescribed in AMS-III.AR (v7.0)
Value(s) applied	1.0

Choice of data or Measurement methods and procedures	Methodology default value applied
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/parameter	DB _y
Unit	-
Description	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year y
Source of data	Default value prescribed in AMS-III.AR (v7.0)
Value(s) applied	1.0
Choice of data or Measurement methods and procedures	Methodology default value applied
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data / Parameter	OF _{y,i,j}																																				
Unit	Fraction																																				
Description	The percentage of project lamps distributed to end users that are operating and in service																																				
Source of data	-																																				
Value(s) applied	<table border="1"> <thead> <tr> <th>Installation year</th><th>State</th><th colspan="2">Crediting Period 2</th></tr> <tr> <th></th><th></th><th>Year 2</th><th>Year 3</th></tr> </thead> <tbody> <tr> <td>2016</td><td>Karnataka</td><td>83%</td><td>83%</td></tr> <tr> <td rowspan="7">2017</td><td>Assam</td><td>64%</td><td>64%</td></tr> <tr> <td>Bihar</td><td>84%</td><td>84%</td></tr> <tr> <td>Gujarat</td><td>80%</td><td>80%</td></tr> <tr> <td>Karnataka</td><td>83%</td><td>83%</td></tr> <tr> <td>Kerala</td><td>79%</td><td>79%</td></tr> <tr> <td>Madhya Pradesh</td><td>84%</td><td>84%</td></tr> <tr> <td>Odisha</td><td>90%</td><td>90%</td></tr> </tbody> </table>			Installation year	State	Crediting Period 2				Year 2	Year 3	2016	Karnataka	83%	83%	2017	Assam	64%	64%	Bihar	84%	84%	Gujarat	80%	80%	Karnataka	83%	83%	Kerala	79%	79%	Madhya Pradesh	84%	84%	Odisha	90%	90%
Installation year	State	Crediting Period 2																																			
		Year 2	Year 3																																		
2016	Karnataka	83%	83%																																		
2017	Assam	64%	64%																																		
	Bihar	84%	84%																																		
	Gujarat	80%	80%																																		
	Karnataka	83%	83%																																		
	Kerala	79%	79%																																		
	Madhya Pradesh	84%	84%																																		
	Odisha	90%	90%																																		

		Tamil Nadu	78%	78%
		Uttar Pradesh	100%	100%
		West Bengal	82%	82%
	2018	Gujarat	83%	83%
		Haryana	82%	82%
		Jharkhand	100%	100%
		Karnataka	82%	82%
		Kerala	78%	78%
		Madhya Pradesh	82%	82%
		Odisha	84%	84%
		Rajasthan	100%	100%
		Tamil Nadu	76%	76%
		Uttar Pradesh	87%	87%
		West Bengal	85%	85%
Measurement methods and procedures	Default value for the first three years of operation of a lamp as per the methodology. Post three years, for years 4-7, this value will be determined on the basis of sampling survey carried out in year 3.			
Monitoring frequency	Default value for three years. Determined on based of survey conducted in year 3 for years 4-7			
QA/QC procedures	-			
Purpose of data	Calculation of baseline emissions			
Additional comment	-			

VPA 08-GS 11478

SDG 13

Data / Parameter	N _{i,j}																	
Unit	Number																	
Description	Number of project lamps distributed to end users of type i with charging method j																	
Source of data	MEC tracker platform																	
Value(s) applied	<table><tr><td></td><td></td><td></td></tr><tr><td>Year</td><td>State</td><td>Total Lamps</td></tr><tr><td>2017</td><td>Karnataka</td><td>19,238</td></tr><tr><td>2018</td><td>Karnataka</td><td>16,111</td></tr><tr><td>Total</td><td></td><td>35,349</td></tr></table>						Year	State	Total Lamps	2017	Karnataka	19,238	2018	Karnataka	16,111	Total		35,349
Year	State	Total Lamps																
2017	Karnataka	19,238																
2018	Karnataka	16,111																
Total		35,349																
Measurement methods and procedures	The data has been recorded in a web based tracker platform. The data consists of unique number, number of units sold, to whom and where																	

Monitoring frequency	Annual
QA/QC procedures	Each solar lighting system, and number of solar lamps in each system, has been recorded in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored.
Purpose of data	Calculation of project emissions
Additional comment	-

Data/parameter	GF _y
Unit	Fraction
Description	Grid Factor in year y
Source of data	Default value prescribed in AMS-III.AR (v7.0)
Value(s) applied	1.0
Choice of data or Measurement methods and procedures	Methodology default value applied
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data/parameter	DB _y
Unit	-
Description	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year y
Source of data	Default value prescribed in AMS-III.AR (v7.0)
Value(s) applied	1.0
Choice of data or Measurement methods and procedures	Methodology default value applied
Purpose of data	Calculation of baseline emissions
Additional comment	N/A

Data / Parameter	OF _{y,i,j}
Unit	Fraction

Description	The percentage of project lamps distributed to end users that are operating and in service			
Source of data	-			
Value(s) applied	Installation year	State	Crediting Period 2	
			Operation Year 2	Operation Year 3
	2017	Karnataka	78%	78%
	2018	Karnataka	82%	82%
Measurement methods and procedures	Default value for the first three years of operation of a lamp as per the methodology. Post three years, for years 4-7, this value will be determined on the basis of sampling survey carried out in year 3.			
Monitoring frequency	Default value for three years. Determined on based of survey conducted in year 3 for years 4-7			
QA/QC procedures	-			
Purpose of data	Calculation of baseline emissions			
Additional comment	-			

SDG 7

Data / Parameter	ACS_{Project}		
Unit	Number		
Description	Number of households having operational clean energy technology		
Source of data	ICS/SLS distribution records		
Value(s) applied	VPA	ICS	SLS
	VPA 6	10310	64524
	VPA 8	12052	9306
Measurement methods and procedures	Monitor the number of ICS/SLS distributed under the project as an indicator of providing reliable, clean and modern technology (relative to baseline stoves).		
Monitoring frequency	Continuous		
QA/QC procedures	-		
Purpose of data	SDG 7 contribution		
Additional comment	-		

SDG 8

Data / Parameter	QE IG_{project}
Unit	Number

Description	Quantitative Employment and income generation	
Source of data	Employment records	
Value(s) applied	VPA	Value
	VPA 6	93
	VPA 8	30
Measurement methods and procedures	Recording the number of employees (male / female) in the project under administrative, sales, production and management positions	
Monitoring frequency	Annually	
QA/QC procedures	-	
Purpose of data	SDG 8 contribution	

D.3. Comparison of monitored parameters with last monitoring period

The monitoring period for the project is 01/01/2022-31/12/2022, which is the second monitoring period under GS4GG. Hence, parameter values for the previous and current monitoring period have been added below:

Data/Parameter	Value obtained in this monitoring period			Value obtained last monitoring period		
N _{p,y}	VPA6- 19,963 VPA8- 23,337			VPA 6- 19,963 VPA 8- 23,337		
U _{p,y}	VPA	Model/State	Up,y	VPA	Model/State	Up,y Y2
	VPA6	Smart KA	52%	VPA6	Smart KA	54%
	VPA8	Smart KA	52%	VPA8	Smart KA	61%
P _{p,y}	VPA6	Smart KA	0.0034	VPA6	Smart KA	0.0036
	VPA8	Smart KA	0.0034	VPA8	Smart KA	0.0035
N _{i,a} /N _{i,j}	VPA6	81,045		VPA6	81,045 solar lighting system	
	VPA8	11,671		VPA8	11,671 solar lighting system	
OF _{y,i,j}	Refer to Section D.2			-		
SDG 13	VPA6	37,691		VPA6	60,363	
	VPA8	35,874		VPA8	41,158	

SDG 7	VPA	SLS	ICS	VPA	SLS	ICS
	VPA 6	64,524	10,310	VPA 6	66,137	10,825
	VPA 8	9,306	12,052	VPA 8	9,421	14,228
SDG 8	VPA	Female	Male	VPA	Female	Male
	VPA 6	6	87	VPA 6	6	87
	VPA 8	1	29	VPA 8	1	29

D.4. Implementation of sampling plan

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List of VPAs to which the single sampling was applied

Sampling plan was applied to all the following VPAs included in this issuance request: *VPA06 and VPA08*.

Description of implemented sampling design

As per registered PoA-DD, CDM standard on "Sampling and surveys for CDM project activities and programme of activities" version 9.0 and TPDDTEC v3.1, the following sampling design was implemented for each VPA –

Solar Lighting System:

AMS III AR

The following steps were taken as part of the sampling procedure for VPA6 and VPA8 -

Parameter values has been estimated by sampling in accordance with the requirements in the applied methodology separately and independently for the VPAs. 90/10 confidence/precision has been used as the criteria for reliability of sampling efforts for small-scale project activities (according to EB 69 Annex 4).

Sampling Objective – The sampling objective for each parameter is to determine via survey with statistically significant value for the emission reduction calculations. This parameter is defined in the tables presented in section D.2.

During the current monitoring period, ex post monitoring has been conducted as per AMS III A.R. Monitored values has been used in the emission reduction calculations.

Sample method – Simple random sampling has been used.

Single stage simple random sampling has been applied per CDM EB Guidelines for sampling and surveys for CDM project activities and programme of activities, Version 4. To ensure a random sample selection, random number generators has been applied. Each CEP in the target population is uniquely identifiable by its number assigned in the credit tracker platform. Each CEP within a sampling frame has been allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of CEPs in the Credit Tracker Platform for that pre-defined sampling frame. Applying the random number generators, the CEP has been randomly chosen from the defined population up to the required sample size as calculated by the CME

For improved cookstoves:

As per registered VPA-DD and TPDDTEC v3.1, the following sampling design was implemented for the VPA-

Both VPAs are implemented in Karnataka (a state in India) which has a homogenous distribution of its population. Due to the homogeneity feature of these VPAs, single sampling method was applied (by grouping the VPAs' population). A simple random sample is a subset of a population (e.g. villages, individuals, buildings, pieces of equipment) chosen randomly, such that each element (or unit) of the population has the same probability of being selected. The sample-based estimate (mean or proportion) is an unbiased estimate of the population parameter. The sampling was based on 95/10 confidence/precision.

- **Usage Survey/Project Survey**

1. As per the requirement TPDDTEC v3.1, a minimum total sample size for Usage Survey is 100 with at least 30 samples for project technologies of each age being credited.
2. For this batch (VPA6 and 8), there is only one PO i.e., SKDRDP selling improved cookstoves in the state of Karnataka.

- **Project KPT**

For determining the sample size for project fuel consumption, Annex 4 of the TPDDTEC v3.1 was referenced. The COV value was determined based on pilot data. Additionally, simple random sampling was used to select the households from the entire population.

Considering both baseline and project KPT has been conducted, samples are selected based on INDEPENDENT sampling approach mentioned in Annex 4 of the TPDDTEC v3.1. Total of 90 samples had to be selected.

Table 2 : Sample sizes in cases of INDEPENDENT samples (households sampled in the project situation are different from households sampled in the baseline situation). This is the size required for each of the baseline and project samples.

COV	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2
90/30 precision	90	105	122	140	159	180	201	224	248

The monitoring frequency specified in the registered monitoring plan for different technologies within these VPAs is met as follows –

1. VPA6 GSID 11505

Parameter	Monitoring Frequency	CEPs added during this MP (01/01/2022 to 31/12/2022)	Previous monitoring dates	New Monitoring for this MP
Usage Survey	Annual	No	04/01/2022 to 20/02/2022	Yes
Project KPT	Annual	No	04/01/2022 to 20/02/2022	Yes
Solar Lighting System	Annual	No	4/07/2020 to 31/07/2020	Yes

Improved Cookstoves: Considering usage survey is done annually, monitoring usage surveys for various parameters in this monitoring period was conducted in 06/01/2023 to 10/02/2023. Project KPT was conducted in the month of January/February 2023. For next monitoring period, fresh usage survey and KPT will be conducted.

Solar lighting systems: Monitoring field surveys for various parameters in this monitoring period were conducted in 06/01/2022 to 16/02/2022 for solar lighting systems. Quarterly monitoring will be ongoing to determine the Lamp Failure Rate. For the next monitoring period fresh monitoring may be carried.

2. VPA8 GSID 11478

Parameter	Monitoring Frequency	CEPs added during this MP (01/01/2021 to 31/12/2021)	Previous monitoring dates	New Monitoring for this MP
Usage Survey	Annual	No	04/01/2022 to 7/01/2022	Yes
Project KPT	Annual	No	04/01/2022 to 7/01/2022	Yes
Solar Lighting System	Annual	No	5/01/2021 to 31/01/2021	Yes

Improved Cookstoves: Monitoring usage surveys for various parameters in this monitoring period was conducted in 06/01/2023 to 10/02/2023. Project KPT was conducted in the month of January 2023 (dry season). For next monitoring period, fresh usage survey and KPT will be conducted.

Solar lighting systems:

Monitoring field surveys for various parameters in this monitoring period were conducted in 06/01/2022 to 10/02/2022 for solar lighting systems. Quarterly monitoring will be ongoing to determine the Lamp Failure Rate. For the next monitoring period fresh monitoring may be carried.

The sampling approach followed, and the sample size obtained for these VPAs included in this monitoring report is summarized as follows –

Improved Cookstoves (SKDRDP)

VPA6 GSID 11505 and VPA8 GSID 11478

S.No	Parameter	Sampling approach	Sample size
1	Usage rate in project scenario p during year y ($U_{p,y}$)	Cross-VPA simple random sampling for proportion-based parameter	136

2	Quantity of fuel that is consumed in project scenario p during year y ($P_{p,y}$)	Carry out KPTs- Cross-VPA simple random sampling for mean based parameter	90
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Solar Lighting System (SKDRDP,ESAF, Muthoot, Sarala)

1. VPA6 GSID 11505

S. No.	Parameter	Sampling approach	Sample size	Comments
1	Total number of lamps checked for which a valid result was obtained	Simple random sampling for proportion-based parameter	For e.g.: As per sample size calculation, sample size requirement for: KL (2017)-115 UP (2018)-92 Actual monitored samples for: AS (2017)-115 UP (2018)-92	As per guidance given in section 6, 37 (a), page 14 of AMS III.AR version 7.0, The sampling size is determined by minimum 90 per cent confidence interval and the 10 per cent maximum error margin; the size of the sample shall be no less than 100; For e.g. if total sample size is less than 100, then minimum 100 samples are selected. For states, the total sale is less than 100, all units are sampled. Further, for some of the states UP (2018), the total sales is less than 100 therefore all units are monitored. Oversampling is done for monitoring to account for situation if the required

				precision does not pass/meets. Detailed sample size for all other states and calculation is provided in Emission reduction calculation sheet.
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2. VPA8 GSID 11478

S. No.	Parameter	Sampling approach	Sample size	Comments
1	Total number of lamps checked for which a valid result was obtained	Simple random sampling for proportion-based parameter	For e.g.: As per sample size calculation, sample size requirement for: KA (2017)-100 KA (2018)-100 Actual monitored samples for: KA (2017)-100 KA (2018)-100	As per guidance given in section 6, 37 (a), page 14 of AMS III.AR version 7.0, The sampling size is determined by minimum 90 per cent confidence interval and the 10 per cent maximum error margin; the size of the sample shall be no less than 100; For e.g. if total sample size is less than 100, then minimum 100 samples are selected. For states, the total sale is less than 100, all units are sampled. For KA (2017) and KA (2018) the sample size is 100 therefore the required sample size is monitored. Detailed sample size and

				calculation is provided in Emission reduction calculation sheet.
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Collected data/analysis of collected data and meeting required confidence/precision

The data collected after carrying out the monitoring surveys was further analysed to see if the required confidence/precision is met. The data collected from the surveys were compiled into the Excel spreadsheet. In order to achieve the 95/10 reliability level for cross-VPA simple random sampling few additional stoves were sampled from the database than that required to cover for non-responses, if any. The confidence/precision for solar lighting systems are met as per the CDM Standard for "Sampling and surveys for CDM project activities and programmes of activities Version 9.0" and AMS III.AR version 7.0. When the required confidence/precision is not met for any of the Improved cookstoves (ICS) monitored parameters, the upper or lower bound is conservatively applied to arrive at final values for the parameter as per TPDDTEC v3.1. This approach of calculating the precision and applying the upper/lower bound to the results is a conservative approach. These details are included in the emission reduction calculation sheets for the VPAs.

Demonstration of whether the selected samples are representative of the population and are randomly selected

The selected samples are representative of the population as they are selected using the guidance given in TPDDTEC v3.1 and CDM standard on "Sampling and surveys for CDM project activities and programme of activities version 9.0" using simple random sampling approaches.

Excel based randomization tool was used to randomly select samples from a population. This tool provides randomly generated numbers when the population size to be sampled and number of samples required are inputted.

SECTION E. CALCULATION OF SDG IMPACTS

E.1. Calculation of baseline value or estimation of baseline situation of each SDG Impact

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Calculations for Improved Cookstoves and Solar Lighting Systems

SDG 7: Affordable and Clean Energy

ACS_{Baseline} Access to affordable and clean energy (Number of operating ICS/SLS units under Baseline) = 0

SDG 8: Decent Work and Economic Growth

QE IG_{Baseline} Quantitative Employment and income generation (Number of person (male and female) hired under Baseline) = 0

SDG 13: Climate Action (Improved Cookstoves)

The project proponent must estimate emission reductions in the project documentation prior to validation using conservative assumptions for baseline and project scenario variables. The approach followed for ex-ante estimation (baseline estimate) is as follows:

$$BE_{b,y} = B_{b,y} * ((f_{NRB,y} * EF_{b,fuel, CO2}) + EF_{b,fuel, nonCO2}) * NCV_{b, fuel}$$

Where:

BE _{b,y}	Emissions for baseline scenario b during the year y in tCO ₂ e
B _{b,y}	Quantity of fuel consumed in baseline scenario b during year y, in tons, as per by-default factors (cases with project performance field test only)
f _{NRB, y}	Fraction of biomass used during year y for the considered scenario that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
NCV _{b,fuel}	Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)
EF _{b,fuel,CO2}	CO ₂ emission factor of the fuel that is substituted or reduced. 112 tCO ₂ /TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel
EF _{b,fuel,nonCO2}	Non-CO ₂ emission factor of the fuel that is substituted or reduced

EF can include a combination of emission factors from fuel production, transport, and use. CO₂ and non-CO₂ emissions factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal production ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

$$B_{b,y} = N_{p,y} * P_{b,y}$$

Where:

$N_{p,y}$ Project technology-days in the project database for project scenario p through year y

$P_{b,y}$ Specific fuel consumption for an individual technology in baseline scenario b during year y converted to tons/day

Baseline Estimate for improved cookstove is shown below:

$$BE_{b,y} = B_{b,y} * ((f_{NRB, y} * EF_{b,fuel, CO2}) + EF_{b,fuel, nonCO2}) * NCV_{b, fuel}$$

$$B_{b,y} = N_{p,y} * P_{b,y}$$

VPA Number	States	Total BE _y
VPA6	Karnataka	113,311
VPA8	Karnataka	124,249

13: Climate Action (Solar Lighting Systems)

AMS III.AR v7.0

The emissions reductions for solar lighting projects under AMS-III.AR are determined from equation (5) of the methodology, mentioned below:

$$ER_y = \sum_{i,j} N_{i,j} \times (BE_{y,i} - PE_{y,i,j}) \times (OF_{y,i,j})$$

Parameter	Unit	Value
ER_y	tCO ₂ e	Emission reductions in year y
$N_{i,j}$	Number of project lamps	Number of project lamps distributed to end users of type <i>i</i> with charging method <i>j</i>
$BE_{y,i}$	tCO ₂ e	Baseline emissions per project lamp in year y
$PE_{y,i}$	tCO ₂ e	Project emissions per project lamp in year y
$OF_{y,i,j}$	%	Percentage of project lamps distributed to end users that are operating and in service in year y, for each lamp type <i>i</i> and charging method <i>j</i> . Assumed to be equal to 100 per cent for years 1, 2 and 3, and equal to the value determined in

		paragraph 36, for years 4, 5, 6 and 7
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The baseline emissions per project lamp in year y are calculated using equation (3) of the methodology, mentioned below:

$$BE_y = DV \times GF_y \times DB_y$$

(Eq. 3)

Parameter	Unit	Value
BE_y	tCO ₂ e	Baseline emissions per project lamp in year y
DV	tCO ₂ e per project lamp	Lamp Emission Factor (default is 0.092 tCO ₂ e per project lamp)
GF_y	-	Grid Factor in year y , • Equal to 1.0 when charging option defined in paragraph 3(a) is used; • Equal to 1.0 if the project activity is for off-grid households/communities (defined as no grid access or less than 12 hours grid availability per day on an annual average basis); • Otherwise it is equal to 1.0 minus (the fraction of time grid is available to the target households and communities/users in the region of project activity)
DB_y	-	Dynamic Baseline Factor (change in baseline fuel, fuel use rate, and/or utilization during crediting period) in year y . Calculated as either: • Option 1: default of 1.0 in the absence of relevant information; • Option 2: value of 1.0+FFg where FFg is the documented national growth rate of kerosene fuel use in lighting from the preceding years (use the most recent available data for a three or five years average fraction)

Here, the Lamp Emission Factor is determined through the following equation (2) of the methodology, mentioned below:

$$DV = FUR \times O \times U \times EF \div 1000 \times LF \times n \times NTG$$

(Eq. 2)

Parameter	Unit	Value
DV	tCO ₂ e per project lamp	Lamp Emission Factor (default is 0.092 tCO ₂ e per project lamp)
FUR	liters/hour	Fuel use rate (0.03 liters/hour)
O	hours/day	Utilization rate (3.5 hours/day)
U	days/year	Annual utilization (365 days/year)
EF	kgCO ₂ /liter	Fuel emissions factor (2.4 kgCO ₂ /liter)
LF	-	Leakage factor (1.0)
n	-	Number of fuel-based lamps replaced per project lamp (1.0)
NTG	-	Net-to-gross adjustment factor (1.0)

The baseline estimates are as follows:

Total baseline estimates for solar lamps for VPA6: 4,907

Total baseline estimates for solar lamps for VPA8: 2,552

E.2. Calculation of project value or estimation of project situation of each SDG Impact

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13: Climate Action

For SLS:

The project estimate for SLS = 0

For ICS:

Project estimate/emission calculations are conducted as follows:

$$PE_{p,y} = B_{p,y} * ((f_{NRB,y} * EF_{p,fuel, CO2}) + EF_{p,fuel, nonCO2}) * NCV_{p, fuel}$$

$$B_{p,y} = N_{p,y} * ((P_{p,y} * U_{p,y}) + (P_{b,y} * (1 - U_{p,y})))$$

Where:

$PE_{p,y}$ Emissions for project scenario p during year y in tCO₂e

$B_{p,y}$ Quantity of fuel consumed in project scenario p during year y, in tons,

and as derived from the statistical analysis conducted on the data collected during the project performance field tests (cases when no baseline performance field test are performed, e.g. by-default baseline factors)

$U_{p,y}$	Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)
$f_{NRB, y}$	Fraction of biomass used during year y that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
$NCV_{p,fuel}$	Net calorific value of the project fuel (IPCC default for wood fuel, 0.015 TJ/ton). This is equal to the baseline fuel NCV in projects which use the same fuel.
$EF_{p,fuel,CO2}$	CO ₂ emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel, 112 tCO ₂ /TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel
$EF_{p,fuel,nonCO2}$	Non-CO ₂ emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel.

$$PE_{p,y} = B_{p,y} * ((f_{NRB, y} * EF_{p,fuel, CO2}) + EF_{p,fuel, nonCO2}) * NCV_{p, fuel}$$

$$B_{p,y} = N_{p,y} * ((P_{p,y} * U_{p,y}) + (P_{b,y} * (1 - U_{p,y})))$$

VPA Number	States	PE _y
VPA 6	Karnataka	80,526
VPA 8	Karnataka	90,926
Total		171,452

SDG 7: Affordable and Clean Energy

ACS_{Project} Access to affordable and clean energy (Number of operating ICS/SLS units under Project)

Net Benefit (SDG 7) = ACS_{Project} – ACS_{Baseline}

ICS

VPA Number	ACS _{Project}	ACS _{Baseline}	Net Benefit
VPA6	10,310	0	10,310
VPA8	12,052	0	12,052

SLS

VPA Number	ACS _{Project}	ACS _{Baseline}	Net Benefit
VPA6	64,524	0	64,524
VPA8	9,306	0	9,306

SDG 8: Decent Work and Economic Growth

QE IG_{Project} Quantitative Employment and income generation (Number of person (male and female) hired under Project)

Net Benefit (SDG 8) = QE IG_{Project} - QE IG_{Baseline}

VPA Number	QE IG _{Project}	QE IG _{Baseline}	Net Benefit
VPA6	93	0	93
VPA8	30	0	30

E.3. Calculation of leakage

>>

Leakage for all VPAs for this monitoring period = 0

E.4. Calculation of net benefits or direct calculation for each SDG Impact

SD G	SDG Impact			Baseline estimate	Project estimate	Net benefit
13	Amount of VERs (SLS)			VPA 6- 4,907 VPA 8- 2,552	0	VPA 6- 4,907 VPA 8- 2,552
13	Amount of VERs (ICS)			VPA 6- 113311 VPA8- 124249	VPA 6- 80526 VPA 8 – 90926	VPA 6- 32,784 VPA 8 –33,322
7	Number of beneficiaries (ICS)			VPA 6- 0 VPA 8 - 0	VPA 6-10,310 VPA 8-12,052	VPA 6-10,310 VPA 8-12,052
7	Number of beneficiaries (SLS)			VPA 6 – 0 VPA 8 - 0	VPA 6-64,524 VPA 8-9,306	VPA 6-64,524 VPA 8-9,306
8	Quantitative Employment and income generation			VPA 6 – 0 VPA 8 - 0	VPA 6- 93 VPA 8- 30	VPA 6- 93 VPA 8- 30

E.5. Comparison of actual SDG Impacts with estimates in approved PDD

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values ⁵ achieved during this monitoring period
13 (SLS)	VPA 6- 7,932 tCO ₂ e VPA 8- 3,252 tCO ₂ e	VPA 6- 4,907 tCO ₂ e VPA 8- 2,552 tCO ₂ e
13 (ICS)	VPA 6- 64,024 tCO ₂ e VPA 8- 68,488 tCO ₂ e	VPA 6- 32,784 tCO ₂ e VPA 8- 33,322 tCO ₂ e
7 (ICS)	VPA 6- 17,967 VPA 8- 21,003	VPA 6- 10,310 VPA 8- 12,052
7 (SLS)	VPA 6- 81,045 VPA 8- 11,671	VPA 6- 64,524 VPA 8- 9,306
8	VPA 6- 20 VPA 8- 20	VPA 6- 93 VPA 8- 30

E.5.1. Explanation of calculation of value estimated ex ante calculation of approved PDD for this monitoring period

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"Amount estimated ex ante for this monitoring period in the VPA-DD (tCO₂e)" is calculated from the Total emission reduction estimated for year of operation of the VPAs and number of crediting days in the current monitoring period.

To achieve a comparable value of estimates for this monitoring period for VPA6, these are the factors/values considered:

- Since both the technologies (Improved cookstoves and solar lighting systems) in these VPAs are implemented total value of ex ante emission reduction is used for estimation. Total ex ante estimated value for Year-2 (20/03/2021 to

⁵ Whenever emission reductions are capped, both the original and capped values used for calculations must be transparently reported. Use brackets to denote original values.

19/03/2022) and Year-3 (20/03/2022 to 19/03/2023) of operation of the VPAs from start date of crediting period is considered. Current monitoring period (01/01/2022 to 31/12/2022) falls between Year-2 and Year-3 of the crediting period-2.

- The estimation of ex ante value is made for 78 days (Year 2 i.e., 01/01/2022 to 19/03/2022) and 287 days (Year 3 i.e., 20/03/2022 to 31/12/2022) totaling to 365 days (which is crediting days for this monitoring period⁶).

To achieve a comparable value of estimates for this monitoring period for VPA8, these are the factors/values considered:

- Since both the technologies (Improved cookstoves and solar lighting systems) in these VPAs are implemented total value of ex ante emission reduction is used for estimation. Total ex ante estimated value for Year-2 (01/05/2021 to 30/04/2022) and Year-3 (01/05/2022 to 30/04/2023) of CP-2 of operation of the VPAs from start date of crediting period is considered. Current monitoring period (01/01/2022 to 31/12/2022) falls between Year-2 and Year-3 of the crediting period-2.
-
- The estimation of ex ante value is made for 120 days (Year 2 i.e. 01/01/2022 to 30/04/2022) and 245 days (Year 3 i.e 01/05/2022 to 31/12/2022) totaling to 365 days (which is crediting days for this monitoring period⁷).

E.6. Remarks on increase in achieved SDG Impacts from estimated value in approved PDD

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The SDG impact achieved for SGD 8 is more than the estimated value of 20. After the project implementation there was increased need on the ground for energy officers for sales, marketing, end user awareness, demonstration, monitoring, after sales services etc.

⁶ For detailed calculation of "Amount estimated ex ante for this monitoring period in the VPA-DD (t CO₂e)" of this VPA, please refer to the emission reduction calculation sheet.

⁷ For detailed calculation of "Amount estimated ex ante for this monitoring period in the VPA-DD (t CO₂e)" of this VPA, please refer to the emission reduction calculation sheet.

SECTION F. SAFEGUARDS REPORTING

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>>Data / Parameter	Principle 6.1. Labour Rights
Unit	-
Description	Project Developer shall ensure that all employment is in compliance with national labour occupational health and safety laws and with the principles and standards embodied in the ILO fundamental conventions.
Source of data	Employment Contracts
Value(s) applied	The CME had made sure that all employment complies with regional labour laws and regulations for SKDRDP, Muthoot , ESAF and Sarala. . The VPA does not entail any forced labour. All employees are confirmed to be minimum 18 years of age. The information is found confirmed and recorded in the monitoring report. Sample employment contracts of SKDRDP, Muthoot , ESAF and Sarala have been submitted to VVB.
Measurement methods and procedures	The employment contract is checked to ensure compliance with Principle 6.1
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	For Safeguarding Principle 6.1
Additional comment	-

Data / Parameter	Principle 9.4 Release of pollutants
Unit	-
Description	Could the Project potentially result in the release of pollutants to the environment?
Source of data	PO interviews and scarp collection receipts
Value(s) applied	It was checked during monitoring through interviews of SKDRDP and ESAF staffs, if any waste scrap disposal happened in the current monitoring. For the current monitoring period, SKDRDP and ESAF received requests for waste scrap collection from the end users. Sample receipts have been submitted to VVB.
Measurement methods and procedures	Check the scrap disposal receipts and interview the PO staff to ensure compliance with Principle 9.4
Monitoring frequency	Annual
QA/QC procedures	-

Purpose of data	For Safeguarding Principle 9.4
Additional comment	-

SECTION G. STAKEHOLDER INPUTS AND LEGAL DISPUTES

G.1. List all Inputs and Grievances which have been received via the Continuous Input and Grievance Mechanism together with their respective responses/mitigations.

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The grievance mechanism is in place as per the table shown below. No negative comments that would require adjustments of the PoA/VPA were identified. Partner organization has feedback book at local offices for feedback collection. This was found to be the most effective input/grievance mechanism. However, during the current monitoring period, no grievance was received.

Method	Include all details of Chosen Method (s) so that they may be understood and, where relevant, used by readers.
Continuous Input / Grievance Expression Process Book (mandatory)	Continuous input / Grievance Expression process book is available at the office at local partner offices. By maintaining feedback book at the local office, it is ensured that stakeholders that don't have access to electronic media for expressing concerns / grievances are also able to share their concerns / feedback. Additionally, the end users always have an option to contact the partner organization (representative of MFI/ manufacturers etc.) in case of any feedback / complaints with the product post distribution.
GS Contact (mandatory)	help@goldstandard.org
Other	Email: skdrdp@skdrdpindia.org ; info@cedarretail.in ; info@muthoot.com

G.2. Report on any stakeholder mitigations that were agreed to be monitored.

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There was no mitigation that was agreed to be monitored with any stakeholder during the monitoring period.

G.3. Provide details of any legal contest that has arisen with the project during the monitoring period

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There was no legal contest arises due to the project or against the project during the monitoring period. Project is in compliance with the Host Country's legal, environmental, ecological, and social regulation. Additionally, no dispute has arisen with any other party and has not reported any challenges related to the same in the current monitoring period.

Revision History

Version	Date	Remarks
1.1	14 October 2020	Hyperlinked section summary to enable quick access to key sections Improved clarity on Key Project Information Section for POA monitoring Forward action request section Improved Clarity on SDG contribution/SDG Impact term used throughout Clarity on safeguard reporting Clarity on design changes Leakage section added for VER/CER projects Addition of Comparison of monitored parameters with last monitoring period Provision of an accompanying Guide to help the user understand detailed rules and requirements
1.0	10 July 2017	Initial adoption