Gold Standard for the Global Goals

TEMPLATE

MONITORING REPORT

PUBLICATION DATE **14.10.2020**

VERSION **v. 1.1**

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

This document contains the following Sections

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 CPA/VPAs (i.e. non compliance check)	NA

Key Project Information

GS ID (s) of Project (s)	GS11897, GS11898
Title of the project (s) covered by monitoring report	GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – MicroEnergy Credits PoA – CPA 38 – GS11897 GS11450 - MicroEnergy Credits – Microfinance for Clean Energy Product Lines – MicroEnergy Credits PoA – CPA 39 – GS11898
Version number of the PDD/VPA-DD (s) applicable to this monitoring report	VPA38 – 3.0 VPA39 - 3.0
Version number of the monitoring report	2.0
Completion date of the monitoring report	27/06/2023
Date of project design certification	xx/xx/2023
Date of Last Annual Report	NA
Monitoring period number	1st
Duration of this monitoring period	01/01/2021 to 31/12/2022 (including both days) The monitoring period falls under crediting period CP 1: 21/12/2019 to 20/12/2024
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-I.A "Electricity generation by the user" (Version 14) Emission Reductions from Safe Drinking Water Supply v1.0
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A

Table 1 - Sustainable Development Contributions Achieved
Year: 2021

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
13 Climate Action (mandatory)	Number of VERs (SLS)	VPA38- 7,583 VPA39- 3,635	tCO_2e VERs
13 Climate Action (mandatory)	Number of VERs (WPS)	VPA38- 674 VPA39- 0	tCO_2e VERs
13 Climate Action (mandatory)	**Number of VERs (SLS+WPS)**	**VPA38- 8,257 VPA39- 3,635**	**tCO_2e VERs**
1 No Poverty	Proportion of population living in households with access to basic services (only for water)	VPA38- 94.44% VPA39- 0	Percentage
6. Clean Water and Sanitation	Number of households served with safely managed water services	VPA38- 288 VPA39- 0	Number

7 Affordable and Clean Energy	Number of households having operational WPS	VPA38- 319 VPA39- 0	Number
7 Affordable and Clean Energy	Number of households having operational SLS	VPA38- 54,570 VPA39- 21,257	Number
8 Decent Work and Economic Growth	Quantitative Employment and income generation	VPA38- 125 VPA39- 48	Number

Year: 2022

Sustainable Development Goals Targeted	SDG Impact	Amount Achieved	Units/ Products
13 Climate Action (mandatory)	Number of VERs (SLS)	VPA38- 31,131 VPA39- 7,624	tCO_2e VERs
13 Climate Action (mandatory)	Number of VERs (WPS)	VPA38- 2,052 VPA39- 0	tCO_2e VERs
13 Climate Action (mandatory)	**Number of VERs (SLS+WPS)**	**VPA38- 33,183 VPA39- 7,624**	**tCO_2e VERs**
1 No Poverty	Proportion of population living in households with access to basic services (only for water)	VPA38- 91.61% VPA39- 0	Percentage
6. Clean Water and Sanitation	Number of households served with safely managed water services	VPA38- 1,236 VPA39- 0	Number
7 Affordable and Clean Energy	Number of households having operational WPS	VPA38- 1,418 VPA39- 0	Number
7 Affordable and Clean Energy	Number of households having operational SLS	VPA38- 103,078 VPA39- 21,373	Number
8 Decent Work and Economic Growth	Quantitative Employment and income generation	VPA38- 125 VPA39- 48	Number

Table 2 – Product Vintages

<table>
<tr><th></th><th></th><th colspan="3">Amount Achieved</th></tr>
<tr><th>Start Dates</th><th>End Dates</th><th colspan="3">VERs</th></tr>
<tr><td>01/01/2021</td><td>31/12/2021</td><td colspan="3"><table>
<tr><td>Tech</td><td>VPA38</td><td>VPA39</td></tr>
<tr><td>SLS</td><td>7,583</td><td>3,635</td></tr>
<tr><td>WPS</td><td>674</td><td>0</td></tr>
<tr><td>Total</td><td>8,257</td><td>3,635</td></tr>
</table></td></tr>
<tr><td>01/01/2022</td><td>31/12/2022</td><td colspan="3"><table>
<tr><td>Tech</td><td>VPA38</td><td>VPA39</td></tr>
<tr><td>SLS</td><td>31,131</td><td>7,624</td></tr>
<tr><td>WPS</td><td>2,052</td><td>0</td></tr>
<tr><td>Total</td><td>33,183</td><td>7,624</td></tr>
</table></td></tr>
<tr><td colspan="2">Total</td><td colspan="3"><table>
<tr><td>Tech</td><td>VPA38</td><td>VPA39</td></tr>
<tr><td>Total</td><td>41,440</td><td>11,259</td></tr>
</table></td></tr>
</table>

SECTION A. DESCRIPTION OF PROJECT

A.1. General description of project

>>

In the rural areas of India, the predominant means of drinking water is by boiling using traditional cookstoves that use woody biomass as fuel. The smoke and fumes from these stoves contribute heavily to indoor air pollution. 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 must use kerosene for indoor lighting, which also contributes to indoor air pollution and GHG emissions.

The VPA involves marketing, education, distributing, and financing solar lighting systems, and water purification devices for low-income households and microentrepreneurs in India. Micro Energy Credits Corporation Private Limited is the Coordinating and Managing Entity of this PoA and coordinates efforts of VPA implementers to distribute Clean Energy Products in India.

These products provide clean drinking water and renewable energy for lighting. The water purification devices distributed under the proposed VPA replace traditional cookstoves thereby eliminating the use of fuelwood for boiling raw water in the baseline by households and thus reducing GHG emissions corresponding to the fuelwood saving by the project activity.

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 water purification devices included in the VPAs are as of now implemented by PO – Midland and Asirvad and the solar lighting systems are implemented by Midland, Satin, Arohan, SKDRDP, Arman.

Under this VPA, 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 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 VPA is to use carbon finance to enable installations of solar lanterns and water purification system in India.

A.2. Location of project

>>

VPA38- GS11897

a. Host Party (ies) - India

b. Region/State/Province – State of Bihar (BH), Haryana (HR), Karnataka (KA), Punjab (PJ), Uttar Pradesh (UP) and West Bengal (WB) are the states for water purifiers and several regions within this State. For solar lighting systems, several states, Assam (AS), Bihar (BH), Chhattisgarh (CG), Gujarat (GJ), Jharkhand (JK), Karnataka (KA), Madhya Pradesh (MP), Maharashtra (MH), Odisha (OD), Rajasthan (RJ), Uttar Pradesh (UP), West Bengal (WB), and many regions 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.

VPA39- GS11898

a. Host Party (ies) - India

b. Region/State/Province – No implementation of water purification system. For solar lighting systems, several states, Bihar (BH), Chhattisgarh (CG), Gujarat (GJ), Haryana (HR), Jammu and Kashmir (J&K), Jharkhand (JK), Karnataka (KA), Madhya Pradesh (MP), Odisha (OD), Punjab (PJ), Rajasthan (RJ), Uttar Pradesh (UP), and many regions 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.

The location of each clean energy installation as per a GPS location or verified address will be recorded in Micro Energy Credit's Credit Tracker Platform, which has been designed specifically for accelerating microfinance access to clean and efficient energy. These locations will define the more precise boundary of the project activities.

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 in the VPAs, making it easy to identify, locate and verify any or all of the installations that pertain to the VPAs. The MEC Credit Tracker Platform is a hosted internet service, limiting the risk of loss of data.

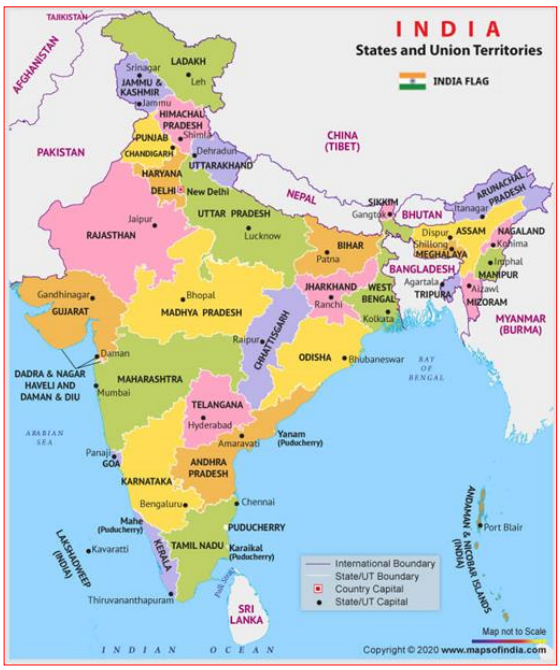

Figure 1: Map of India

A.3. Reference of applied methodology

>>

Solar Lighting System: AMS-I.A "Electricity generation by the user, version 14[1]

Water Purification System: Methodology for Emission Reductions from Safe Drinking Water Supply (Version 1.0)[2]

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

A.4. Crediting period of project

>>

VPA Reference Number	Crediting Start Date	GS4GG Crediting End Date (CP1)	GS4GG Eligible Crediting End Date[3]
GS11897	21/12/2019	20/12/2024	21/12/2019- 20/12/2034
GS11898	21/12/2019	20/12/2024	21/12/2019- 20/12/2034

[1] AMS I.A version 14.0

[2] Safe Water Meth v1.0

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

SECTION B. IMPLEMENTATION OF PROJECT

B.1. Description of implemented project

>>

VPA38 - GS ID: GS11897

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

Purpose: Under the VPA, Micro Energy Credits works with PO –Midland Microfin Limited (Midland), Asirvad Microfinance Limited (Asirvad), Shri Kshetra Dharmasthala Rural Development Project (SKDRDP), Arohan Financial Services Pvt. Ltd. (Arohan), Arman Financial Services Limited (Arman) and Satin Creditcare Network Ltd. (Satin) 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 water purifiers for low-income households and microentrepreneurs within the geographical boundary of India. These products provide clean, renewable power for lighting and clean water for drinking. The total number of units implemented under this VPA till date is:

Solar Lighting systems – 103,078

Water purification systems – 1,444

Year	Water Purifiers	Solar Lighting System
2021	321	54,570
2022	1,123	48,508
Total	**1,444**	**103,078**

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

Water Purifier:

The Water Purifier model implemented under this and their technical specifications are as follows –

1. HUL Pureit Classic 23L

This is a large size purifier with a 23-litre capacity. It includes an activated carbon trap that removes harmful pesticides and undesirable odor. It also has an auto shut-off

feature that ensures water purity. In the absence of the project activity, the households would have continued to boil water for drinking purposes. The technical specifications[4] of the water purifier are as follows –

Size – 61 cm X 29 cm X 21 cm
Net weight: 4.1 kg
Flow Rate: 9 l/h
Warranty: 2 years

Life span under standard use conditions: The life span of the germ kill kit used by the purifier has a capacity of 1500 l after which it must be replaced. The life of the kit therefore depends on how much water is purified by the user every day[5].

2. Eureka Forbes - Aquasure Nakshatra

The Eureka Forbes Limited (EFL)-Aquasure Nakshatra is a medium size purifier with a 16-litre capacity (Top-8.5-litre, Bottom- 7.5-litre). AquaSure Nakshatra Storage Water Purifier is a gravity-based purifier and made of food grade material. Halopure disinfection technology used in it

It contains Multi stages Purification process which are physical filtration, carbon block and active disinfectant.
Physical Filtration:- Removes suspended impurities
Carbon block:- Removes organic and chemical impurities and bad taste of water
Active disinfectant: - Destroy bacteria
In the absence of the project activity, the households would have continued to boil water for drinking purposes. The technical specifications of the water purifier are as follows –

Size – 51 cm X 26 cm X 26 cm
Net weight: 2.38 kg
Flow Rate: 10L/h
Warranty: 2 years

Life span under standard use conditions: The life span of the cartridge used by the purifier has a capacity of 4000 l after which it must be replaced. This product comes

[4] Manufacturer's certificate on specifications

[5] The partner organizations' have ensured that the users get access to GKK and cartridges easily. Written notices and flipcharts are pasted in the display board of branches telling users how to get these replacement cartridges and GKKs. The same is communicated to customers during weekly and monthly group meetings as well. There is a well-designed complaint registration system developed by POs – Muthoot and ESAF which essentially assist them in systematically tracking and resolving the customer complaints in timely manner.

with one additional cartridge of 4000 l capacity. The life of the kit therefore depends on how much water is purified by the user every day[6].

Solar Lighting Systems:

The solar lighting system model implemented under this VPA including their technical specifications is as follows:

1. d.light S100
Luminosity – 65
Lighting Wattage – 1
Average Lifetime of product – 5 years

2. d.light S500
Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

3. d.light ST100
Luminosity – 220
Lighting Wattage – 1
Average Lifetime of product – 5 years

4. d.light S550
Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

5. d.light D333
Luminosity – 520
Lighting Wattage – 6.6
Average Lifetime of product – 5 years

6. Jugnu Lightbox L2005
Luminosity – 200
Lighting Wattage – 3
Average Lifetime of product – 5 years

7. Jugnu SLT

[6] The partner organizations' have ensured that the users get access to GKK and cartridges easily. Written notices and flipcharts are pasted in the display board of branches telling users how to get these replacement cartridges and GKKs. The same is communicated to customers during weekly and monthly group meetings as well. There is a well-designed complaint registration system developed by POs – Muthoot and ESAF which essentially assist them in systematically tracking and resolving the customer complaints in timely manner.

Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

8. Jugnu TWP29006
Luminosity – 200
Lighting Wattage – 2
Average Lifetime of product – 5 years

9. Sunking Boom
Luminosity – 160
Lighting Wattage – 3
Average Lifetime of product – 5 years

10. CL1LT1F1HLS
Luminosity – 650 lumens
Lighting Wattage – 7 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

11. CL1LT1HLS
Luminosity – 650 lumens
Lighting Wattage – 7 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

12. CL1LT2HLS
Luminosity – 1100 lumens
Lighting Wattage – 12 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

13. CL2HLS
Luminosity – 400 lumens
Lighting Wattage – 4 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

14. CL2LT2HLS

Luminosity – 1650 lumens
Lighting Wattage – 19 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

15. CL2LT2HLS2
Luminosity – 1650 lumens
Lighting Wattage – 19 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

16. CL3LT1HLS2
Luminosity – 1050 lumens
Lighting Wattage – 11 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

17. CLT1HLS
Luminosity – 450 lumens
Lighting Wattage – 5 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

18. CLT2HLS
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

19. CLT2F1HLS
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

20. EH4HLS
Luminosity – 1050 lumens
Lighting Wattage – 9.6 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

21. NCL1LT1HLS
Luminosity – 650 lumens
Lighting Wattage – 7 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

22. NCL1LT2HLS
Luminosity – 1100 lumens
Lighting Wattage – 12 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

23. NCL2HLS
Luminosity – 400 lumens
Lighting Wattage – 4 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

24. NCL2LT1HLS
Luminosity – 770 lumens
Lighting Wattage – 9 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

25. NCL2LT2HLS
Luminosity – 1650 lumens
Lighting Wattage – 19 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years

Electronics – 5 years

26. NCLT2F1HLS
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

27. NCLT2HLS
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

28. NPL1LT3F1HLS
Luminosity – 2150 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

29. NPL1LT3F2HLS
Luminosity – 1900 lumens
Lighting Wattage – 22 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

30. NPL1LT4HLS
Luminosity – 2430 lumens
Lighting Wattage – 27 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

31. NPL2LT4HLS
Luminosity – 2570 lumens
Lighting Wattage – 29 Watt
Average Lifetime of product (in years) –
Module – 15 years

Battery – 8 years
Electronics – 5 years
32. NPL2LT6F1HLS
Luminosity – 4750 lumens
Lighting Wattage – 57 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

33. NPL2LT8F2HLS
Luminosity – 6950 lumens
Lighting Wattage – 85 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

34. NPLT3F1HLS
Luminosity – 1700 lumens
Lighting Wattage – 20 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

35. NPLT4F1HLS
Luminosity – 2250 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

36. NPLT4HLS
Luminosity – 1700 lumens
Lighting Wattage – 33 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

37. PL1LT3F1HLS2
Luminosity – 3750 lumens
Lighting Wattage – 45 Watt
Average Lifetime of product (in years) –
Module – 15 years

Battery – 8 years
Electronics – 5 years
38. PL1LT3F2HLS
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

39. PL1LT4HLS
Luminosity – 2350 lumens
Lighting Wattage – 27 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

40. PL1LT5HLS
Luminosity – 1900 lumens
Lighting Wattage – 22 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

41. PL2LT4HLS
Luminosity – 2550 lumens
Lighting Wattage – 29 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

42. PL2LT6F1HLS
Luminosity – 4750 lumens
Lighting Wattage – 57 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

43. PL2LT8F2HLS
Luminosity – 6950 lumens
Lighting Wattage – 85 Watt
Average Lifetime of product (in years) –
Module – 15 years

Battery – 8 years
Electronics – 5 years
44. PLT3F1HLS
Luminosity – 3400 lumens
Lighting Wattage – 40 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

45. PLT4F1HLS
Luminosity – 2150 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

46. PLT4HLS
Luminosity – 1700 lumens
Lighting Wattage – 20 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

47. NCLT2HLS2
Luminosity – 1250 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

48. NCLT3HLS
Luminosity – 1350 lumens
Lighting Wattage – 15 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

49. NCLT4HLS
Luminosity – 2230 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years

Battery – 8 years
Electronics – 5 years
50. NPLT10F2HLS
Luminosity – 4650 lumens
Lighting Wattage – 55 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

51. NPLT4F2HLS
Luminosity – 2150 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

52. NPLT5HLS
Luminosity – 2600 lumens
Lighting Wattage – 30 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

53. NPLT6HLS
Luminosity – 2150 lumens
Lighting Wattage – 25 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

54. NPLT8F1HLS
Luminosity – 4010 lumens
Lighting Wattage – 45 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

55. SB2HLS
Luminosity – 1050 lumens
Lighting Wattage – 12 Watt
Average Lifetime of product (in years) –
Module – 15 years

Battery – 8 years
Electronics – 5 years

56. SB4HLS
Luminosity – 2350 lumens
Lighting Wattage – 30 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

57. SB6HLS
Luminosity – 2500 lumens
Lighting Wattage – 28 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

58. SB8HLS
Luminosity – 2500 lumens
Lighting Wattage – 32 Watt
Average Lifetime of product (in years) –
Module – 15 years
Battery – 8 years
Electronics – 5 years

The luminosity (in Lumens) of the systems given above is as per the manufacturer's specifications. However, a cap of 140.538 Lumens is applied for the purpose of calculating emission reductions. For solar lighting system models with luminosity higher than 140.538, the cap of 140.538 Lumens is used to calculate emission reductions. For solar lighting system, models with luminosity less than the cap of 140.538 Lumens, the actual (lesser) value is used to calculate the emission reductions.

c. Relevant dates for the VPA –

1. Construction/Implementation date – The water purifiers under this VPA are implemented from 04/01/2021 to 28/12/2022. The solar lighting systems are implemented from 01/01/2021 to 31/12/2022.
2. Commissioning – 1,444 water purifiers are distributed till date under this VPA. 103,078 solar lighting systems are distributed till 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. Details of the Usage rates are mentioned in the Section D.2

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 41,440 tCO_2e.

VPA39 - GS ID: GS11898

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

Purpose: Under the VPA, Micro Energy Credits works with PO – Midland Microfin Limited (Midland) and Satin Creditcare Network Ltd. (Satin) 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 water purifiers for low-income households and microentrepreneurs within the geographical boundary of India. These products provide clean, renewable power for lighting and clean water for drinking. The total number of units implemented under this VPA till date is:

Solar Lighting systems –21,394

Water purification systems – 0

Year	Solar Lighting System
2021	21,266
2022	128
Total	**21,394**

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

Water Purifier:

No implementation until end of monitoring period.

Solar Lighting Systems:

The solar lighting system model implemented under this VPA including their technical specifications is as follows:

1. d.light S500
Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

3. d.light ST100
Luminosity – 220
Lighting Wattage – 1
Average Lifetime of product – 5 years

4. d.light S550
Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

5. d.light D333
Luminosity – 520
Lighting Wattage – 6.6
Average Lifetime of product – 5 years

6. Jugnu Lightbox L2005
Luminosity – 200
Lighting Wattage – 3
Average Lifetime of product – 5 years

7. Jugnu SLT
Luminosity – 240
Lighting Wattage – 3
Average Lifetime of product – 5 years

8. Jugnu TWP29006
Luminosity – 200
Lighting Wattage – 2
Average Lifetime of product – 5 years

9. Sunking Boom
Luminosity – 160
Lighting Wattage – 3
Average Lifetime of product – 5 years

10. Jugnu 2 Tubelight
Luminosity – 440
Lighting Wattage – 3
Average Lifetime of product – 5 years

11. Jugnu Lightbox L1406
Luminosity – 140
Lighting Wattage – 3
Average Lifetime of product – 5 years

12. Sunking Pro-200
Luminosity – 200
Lighting Wattage – 1.25
Average Lifetime of product – 5 years

13. Sunking Torch
Luminosity – 300
Lighting Wattage – 1.8
Average Lifetime of product – 5 years

14. RAL Duron Mitva MST952A
Luminosity – 400
Lighting Wattage – 2
Average Lifetime of product – 5 years

The luminosity (in Lumens) of the systems given above is as per the manufacturer's specifications. However, a cap of 140.538 Lumens is applied for the purpose of calculating emission reductions. For solar lighting system models with luminosity higher than 140.538, the cap of 140.538 Lumens is used to calculate emission reductions. For solar lighting system, models with luminosity less than the cap of 140.538 Lumens, the actual (lesser) value is used to calculate the emission reductions.

c. Relevant dates for the VPA –

1. Construction/Implementation date – The solar lighting systems are implemented from 01/01/2021 to 31/12/2022.
2. Commissioning – No water purifiers have been distributed till date under this VPA. 21,394 solar lighting systems are distributed till 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. Details of the Usage rates are mentioned in the Section D.2

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 11,259 tCO_2e.
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	User account number	Branch ID- Loan account number
Satin	User Identification number	Loan identification number
Arohan	Customer identification number	Transaction identification number
Arman	Customer identification number	Transaction identification number
Midland	Customer identification number	Transaction identification number
Asirvad	Customer identification number	Transaction identification number

Unique identification number for the households is defined as "User Account identification number" and Unique identification number for the CEPs is defined as "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

>>

NA

B.2. Post-Design Certification changes

>>

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

>>

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. Therecord 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 - usage rate of the water purifiers ($U_{p,y}$), usage time ($t_{p,y}$), household size ($HN_{p,y}$), volume of water consumed (QPW_p), number of devices in the premises ($DN_{p,y}$), proportion of end users that boil safe water in the project year ($X_{cleanboil,y}$), water quality (M_q), number of not operational SLS ($LFR_{i,v}$), average operating hours (h), average number of operational days of lamps ($d_{i,a,v}$)are found from sampling of CEP installations.

3. The records kept in the MEC Credit Tracker Platform relate to paper copies of title transferagreements 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. water consumption test or water quality test) 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 water consumption for drinking and other purposes. Each day enumerator or field staff would visit the household between 6-7 a.m. and filled the water purifier to its

full capacity. All enumerators would carry volumetric jar to take the measurements. The data would be collected directly in the Microsoft excel.

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.

Usage survey shall be designed in line with the requirement of Usage Survey Guidelines outlined in Annex-1 of the applied methodology.

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

Technical Failure and Maintenance Protocol

POs 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/manufacturer 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/manufacturer 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 WPS under VPA38, total repairs done were 2. For SLS, no repairs were required for VPA38. Total repairs done for VPA39 were 5. It can be confirmed though credit tracker output file where the data from the partner is stored. Sample tracker screenshots and sample service request forms have been submitted

CME has put in place a system for annual and quarterly monitoring for solar lighting system and water purifiers respectively.

- Solar Lighting Systems

CME/PO have tracked the usage status of all solar lighting systems from each quarter of the year with results recorded in Credit Tracker.

At the end of each quarter of the calendar year, PO tracks and reports back to CME on whether the household is using their solar device and also whether they have purchased any other solar lighting product. This quarterly monitoring is conducted in March, June, September, and December months of every year. In cases where the end of the monitoring period does not coincide with the end month of a calendar year quarter, field staff from POs also conducts the quarterly monitoring in the same month as the end of the monitoring period.

POs conduct quarterly monitoring during the course of their regular interactions with Self-Help Groups (SHGs), which hold weekly meetings with MFI Field Officers. At the end of each quarterly monitoring period, MFI Field Officers survey clients as to the product usage status and information on presence of any other solar product.

This data is reported to MEC through and recorded in the Credit Tracker platform. Any solar lighting systems that are non-operational (due to failure or disuse by owner) are recorded as "failed" or "installed_damaged" lamps. For such solar lighting systems emission reduction are not claimed. CME doesn't remove the damaged products from the database due to two reasons:

1. Products which are damaged in one quarter or one monitoring period might get repaired or replaced which means there is chance those might be working during subsequent monitoring.
2. Removing products from database especially where no new sales are getting added means change in the design of the programme. Therefore, CME retains the product in the database but donot claim credits for the same.

- Water Purification System

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 WPS in the PoA. Based on the results of this annual monitoring survey, individual WPS status is marked as installed_active and installed_damaged. The status ïnstalled_damaged" could reflect minor damage which does not affect the operational capability of the WPS, but to be conservative the VPA does not claim emission reductions for WPS marked "installed_damaged". The ERs are adjusted accordingly (by accounting ERs only for WPS that are "installed_active"). CME doesn't remove the damaged products from the database due to two reasons:

1. Products which are damaged in one monitoring period might get repaired or replaced which means there is chance those might be working during subsequent monitoring.
2. Removing products from database especially where no new sales are getting added means change in the design of the programme. Therefore, CME retains the product in the database but do not claim credits for the same.

SECTION D. DATA AND PARAMETERS

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

>>

SDG 13

Water Purification System

Parameter ID	SDWS 2
Data/parameter	Project Technology Description
Unit	N/A
Description	The following is the detailed description of the planned project technology: HWT and IWT: Manufacturer- The Eureka Forbes Limited (EFL) and Hindustan Unilever Limited (HUL) Technology type- gravity-based purifier Product name- HUL Pureit, EFL Nakshatra and EFL Sampoorna
Source of data	Manufacturer's specifications
Value(s) applied	Please refer to Section B.1
Choice of data or Measurement methods and procedures	-
Purpose of data	-
Additional comment	This parameter is fixed ex-ante & shall be updated at CP renewal

Parameter ID	SDWS 4
Data/parameter	Regulatory Framework for safe water supply
Unit	N/A
Description	Regulatory Framework for safe water supply
Source of data	BIS Standards for Drinking Water
Value(s) applied	The VPA contributes to: National Water Policy (2012) The policy states in paragraph 1.2 (v) that access to safe water for drinking still continues to be a problem and 1.3 (vi) that safe water for drinking and sanitation should be considered as pre-emptive needs followed by other needs. In addition, the importance of community sensitization and utilization of water as per local availability of waters before providing water through long distance transfer is highlighted (paragraph 3.6.). Jal Jeevan Mission JJM (2019-2024) The vision of the JJM is that every household has drinking water supply in adequate quantity of prescribed quality on regular and long-term basis at affordable service delivery charges leading to improvement in living standards of rural communities. JJM further stresses the importance of awareness raising and involvement of stakeholders (paragraph 3.3 viii.) and highlight the contribution of technological interventions for removal of contaminants where water quality is an issue (paragraph 3.4 ii.). The VPA contributes to three core aspects mentioned in the National Water Policy (2012) and the Jal Jeevan Mission (2019-2024): 1. Supply of rural communities with safe drinking water (point-of-use treatment) 2. Awareness raising on WASH aspects 3. Stakeholder participation in project activities. The water quality of the treated water is in line with the national drinking water standard of India: 0 CFU E.Coli/100ml (IS 10500 : 2012)
Choice of data or Measurement methods and procedures	The test reports from national accredited labs confirms that the filtered water from the purifier is in compliance with the above values.

Purpose of data	-
Additional comment	This parameter is fixed Ex-ante & shall be updated at CP renewal.

Parameter ID	SDWS 5
Data/parameter	Water sources in the project boundary
Unit	N/A
Description	The water sources in the project boundary are identified and if classified to be used for drinking water, then further classified as improved and unimproved water source.
Source of data	Baseline study /Credible published literature for project region/ Studies by academia, NGOs or multilateral institutions/ or Official government publications or statistics
Value(s) applied	Refer to Section B.4 of the VPA-DD.
Choice of data or Measurement methods and procedures	Baseline Study
Purpose of data	-
Additional comment	This parameter is fixed Ex-ante & shall be updated at CP renewal.

Parameter ID	SDWS 6
Data/parameter	Stove technologies used in the project boundary
Unit	N/A
Description	The stove type/technology used in premises in the geographical area of the project is mainly traditional three stone fired cookstoves having an efficiency of 10%.
Source of data	Baseline survey and studies by academia, NGOs or multilateral institutions
Value(s) applied	

VPA	State	Three-stone fired	Gas Stove
VPA 38	Bihar	95%	5%
	Haryana	93%	7%
	Karnataka	94%	6%
	Madhya Pradesh	90%	10%
	Punjab	90%	10%
	Uttar Pradesh	89%	11%

		West Bengal	92%	8%
	VPA39	Punjab	96%	4%
		Madhya Pradesh	94%	6%
Choice of data or Measurement methods and procedures	Baseline survey and studies by academia, NGOs or multilateral institutions.			
Purpose of data	Calculation of baseline emissions			
Additional comment	This parameter is fixed Ex-ante & shall be updated at CP renewal.			

Parameter ID	SDWS 7
Data/parameter	Expected technical life of project technology
Unit	Volume or Years
Description	The expected technical life of an individual project technology is defined in section A.3 of the VPA-DD. The details include the life of different product types used.
Source of data	Manufacturer specifications
Value(s) applied	4000 litres (EFL Nakshatra and Sampoorna) 1500 litre (HUL Pureit)
Choice of data or Measurement methods and procedures	Manufacture specification
Purpose of data	Calculation of baseline emissions
Additional comment	The technical specification of the water purification systems, provided by the manufacturer, does not specify the life span of the water purification system unit/console rather it mentions only the life span (in terms of litres of purified water) of the Germ Kill Kit (GKK) and cartridges which is clearly specified in the VPA-DD. In cases where the life span of the water purifier technologies is shorter than the crediting period of the PoA, the project proponent shall ensure that the units are replaced in order to continue claiming emission reductions. There shall be measures in place to ensure that end users have access to replacement purification systems of comparable quality. The technology/equipment will be replaced prior to the life span so that end users can access the same level of water purification. If no replacement or retrofitting is provided, emission reduction claims are limited to the expected technical life.

Parameter ID	SDWS 8
Data/parameter	x_f
Unit	Percentage of fuel f use in target population
Description	The proportion of each different cooking fuel f used in the project boundary by end-users: - % among the target population if single fuel is used for water boiling. If the project covers different types of end-user premises (e.g. households, schools), then the fuels used in the geographical area of the project by the same types of end-users are to be determined for each end-user premises type.
Source of data	Baseline survey cross checked with credible published literature for project region/studies by academia/NGOs or multilateral institutions, or Official government publications or statistics
Value(s) applied	
Choice of data or Measurement methods and procedures	Baseline survey and studies by academia, NGOs or multilateral institutions.
Purpose of data	Calculation of baseline emissions
Additional comment	This parameter is fixed Ex-ante & shall be updated at CP renewal.

VPA	State	Three-stone fired	Gas Stove
VPA 38	Bihar	95%	5%
	Haryana	93%	7%
	Karnataka	94%	6%
	Madhya Pradesh	90%	10%
	Punjab	90%	10%
	Uttar Pradesh	89%	11%
	West Bengal	92%	8%
VPA39	Punjab	96%	4%
	Madhya Pradesh	94%	6%

Parameter ID	SDWS 9
Data/parameter	$EF_{b,f,CO2}$
Unit	tCO_2/TJ
Description	CO_2 emission factor arising from use of fuels in baseline Scenario
Source of data	IPCC default CO_2 emission factor for wood and LPG
Value(s) applied	Firewood – 112 LPG – 63.1

Choice of data or Measurement methods and procedures	Default IPCC value for fuelwood/LPG is applied
Purpose of data	Calculation of baseline emissions
Additional comment	-

Parameter ID	SDWS 10
Data/parameter	$EF_{b,f,non\text{-}CO2}$
Unit	tCO_{2e}/TJ
Description	Non-CO_2 emission factor from use of fuels, in case the baseline fuel is biomass or charcoal
Source of data	IPCC defaults for wood
Value(s) applied	Wood: 9.46
Choice of data or Measurement methods and procedures	Default IPCC value for fuelwood is applied
Purpose of data	Calculation of baseline emissions
Additional comment	-

Parameter ID	SDWS 11
Data/parameter	ηwb
Unit	%
Description	Weighted average efficiency of the baseline water boiling devices. Calculate the weighted average of the water boiling efficiency in the project boundary using the proportion of different stove types used and the stove efficiencies.
Source of data	As per methodology Emission Reductions from Safe drinking water supply version 1.0, the following default values may be applied to calculate the weighted average of the water boiling efficiency in the project boundary: - Three-stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system, that is without either a grate or a chimney: default efficiency 10%. – Other conventional systems using woody biomass: default efficiency 20%. - Improved cookstoves: manufacturer specification, or if not available, default efficiency 30%. For Gas Stove (LPG based) – Literature review

Value(s) applied	Three-stone fired - 10% Gas Stove – 57%
Choice of data or Measurement methods and procedures	Default defined in "Methodology for Emission Reductions from Safe Drinking Water Supply" v1.0 for traditional stove. Literature review for gas stove efficiency.
Purpose of data	Calculation of Baseline emissions
Additional comment	-

Parameter ID	SDWS 12
Data/parameter	C_b
Unit	Percentage
Description	Proportion of project end-users who in the baseline were already using safe water, either from an improved water source, or from a water treatment method other than boiling
Source of data	Baseline survey/Published literature for project region
Value(s) applied	**VPA** / **State** / **C_b** VPA 38 / Bihar / 5.06% Haryana / 9.47% Karnataka / 5.23% Madhya Pradesh / 5.32% Punjab / 6.99% Uttar Pradesh / 7.70% West Bengal / 4.47% VPA39 / Punjab / 5.68% Madhya Pradesh / 5.83%
Choice of data or Measurement methods and procedures	Baseline Study and Official government publications or statistics.
Purpose of data	Calculation of baseline emissions
Additional comment	The safe water sources and percentages shall be consistent with the information reported for parameter Water sources in the project boundary (SWDS 5). Users who have access to a source of safe water in the baseline (either from an improved water source, or from a water treatment method other than boiling) may not be credited under the project, unless project demonstrates that the baseline source of water does not meet safe water quality criteria, by conducting water quality tests over a

	representative period of time of 6 months or by referring to credible published literature or other sources. This parameter is fixed Ex-ante & shall be updated at CP renewal.

Parameter ID	SDWS 13
Data/parameter	q_i
Unit	Litres per hour
Description	Capacity of the household or institutional water treatment technology
Source of data	Manufacturer specifications/ Design specifications
Value(s) applied	EFL Nakshatra and Sampoorna – 10l/h HUL Pureit – 9l/h
Choice of data or Measurement methods and procedures	Manufacture specification
Purpose of data	Calculation of baseline emissions
Additional comment	This depends on water filtration device model and fixed for each model introduced. The capacity of the water treatment technology will help in calculating the amount of water treated. This parameter is fixed Ex-ante & shall be updated at CP renewal.

Parameter ID	SDWS 21
Data/parameter	$f_{NRB,b,i,y}$
Unit	Fractional non-renewability
Description	Fractional non-renewability status of woody biomass fuel during year y, in case the baseline fuel is biomass
Source of data	Assessment based on CDM Methodological tool 30: Calculation of the fraction of non-renewable biomass, Version 03.0
Value(s) applied	

VPA	**State**	**f_{NRB}**
VPA38	Punjab	0.939
VPA38	Bihar	0.97
VPA38	Haryana	0.935
VPA38	Karnataka	0.675
VPA38	Madhya Pradesh	0.842
VPA38	Uttar Pradesh	0.954
VPA38	West Bengal	0.95
VPA39	Punjab	0.939

	VPA39	Madhya Pradesh	0.842
Choice of data or Measurement methods and procedures	A preliminary study has been conducted in accordance with the CDM Methodological tool 30: Calculation of the fraction of non-renewable biomass, Version 03.0		
Purpose of data	Calculation of baseline emissions		
Additional comment	The f_{NRB} value will remain fixed during the crediting period.		

For Solar Lighting Systems

Data/parameter	LE_{ker}
Unit	Lumen/W
Description	The specific luminous efficiency of kerosene when burnt in a kerosene lantern
Source of data	Jean-Paul Louineau, Modibo Dicko, Peter Fraenkel, Roy Barlow and Varis Bokalders; Rural Lighting: A Guide for Development Workers, Intermediate Technology (IT) Publications in association with The Stockholm Environment Institute 1994
Value(s) applied	0.13
Choice of data or Measurement methods and procedures	Louineau et al (1994) state an efficiency range of 0.05 to 0.21 lumens/W for hurricane kerosene lanterns. Another study by the World Bank states an efficiency of 0.1 lumen/W for hurricane lanterns. Values for the widely used homemade wick lamps are scarcely available as designs vary. Anyway, these lamps have much lower efficiencies than hurricane lanterns. It is assumed that the kerosene lamp model in the baseline is a hurricane lamp. This is conservative since the vast majority of households use self-made kerosene lanterns without a glass cover, which are less efficient due to wind disturbance and very basic design. The average efficiency value of 0.13 lumen/watt for hurricane lamps from Louineau et al (1994) is chosen, being conservative with respect to the lower value of 0.1 lumen/W provided by the World Bank.
Purpose of data	Calculation of baseline emissions
Additional comment	The parameter is fixed for the entire crediting period.

Data/parameter	EF_{ker}
Unit	tCO_2/GJ
Description	The specific CO_2 emissions of kerosene
Source of data	2006 IPCC guidelines for National Greenhouse Gas inventories

Value(s) applied	0.0719
Choice of data or Measurement methods and procedures	The default value of other kerosene in 2006 IPCC guidelines for National Greenhouse Gas Inventories is 71.900 tCO2/TJ.
Purpose of data	Calculation of baseline emissions
Additional comment	The parameter is fixed for the entire crediting period.

Data/parameter	z
Unit	n/a
Description	Standard normal for a confidence interval of 90%
Source of data	Köhler, Schachtel, Voleske, 2002; Biostatistik, Springer Verlag Berlin Heidelberg; Tafel 2, p. 279
Value(s) applied	1.29
Choice of data or Measurement methods and procedures	The statistical standard value for standard normal for a confidence level of 90% for one-sided test which is 1.290 as the parametric values are appropriate for a one-sided test.
Purpose of data	Calculation of baseline emissions
Additional comment	-

D.2 Data and parameters monitored

>>

VPA38: GS11897

SDG 13

Data / Parameter	Ln
Unit	Lumens
Description	Lumen output of each solar lamp n deployed as part of the project activity
Source of data	Refer to table 5 section B.4 in VPA-DD
Value(s) applied	1. d.light S100- 65 (Manufacturer's specification gives lumen output of 65 Lumens, however, the lumen value is lesser than capped at 140.538 and hence 65 is applied to calculate emission reductions) 2. d.light S500 - 140.538 (Manufacturer's specification gives lumen output of 240 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

	3. d.light ST100- 140.538 (Manufacturer's specification gives lumen output of 220 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 4. d.light S550 - 140.538 (Manufacturer's specification gives lumen output of 240 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 5. d.light D333 - 140.538 (Manufacturer's specification gives lumen output of 520 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 6. Jugnu Lightbox L2005 - 140.538 (Manufacturer's specification gives lumen output of 200 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 7. Jugnu SLT- 140.538 (Manufacturer's specification gives lumen output of 240 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 8. Jugnu TWP29006- 140.538 (Manufacturer's specification gives lumen output of 200 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 9. Sunking Boom- 140.538 (Manufacturer's specification gives lumen output of 160 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 10. CL1LT1F1HLS- 140.538 (Manufacturer's specification gives lumen output of 650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 11. CL1LT1HLS - 140.538 (Manufacturer's specification gives lumen output of 650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

12. CL1LT2HLS- 140.538 (Manufacturer's specification gives lumen output of 1100 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

13. CL2HLS - 140.538 (Manufacturer's specification gives lumen output of 400 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

14. CL2LT2HLS - 140.538 (Manufacturer's specification gives lumen output of 1650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

15. CL2LT2HLS2- 140.538 (Manufacturer's specification gives lumen output of 1650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

16. CL3LT1HLS2 - 140.538 (Manufacturer's specification gives lumen output of 1050 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

17. CLT1HLS - 140.538 (Manufacturer's specification gives lumen output of 450 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

18. CLT2HLS - 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

19. CLT2F1HLS - 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

20. EH4HLS - 140.538 (Manufacturer's specification gives lumen output of 1050 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

	21. NCL1LT1HLS - 140.538 (Manufacturer's specification gives lumen output of 650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 22. NCL1LT2HLS - 140.538 (Manufacturer's specification gives lumen output of 1100 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 23. NCL2HLS - 140.538 (Manufacturer's specification gives lumen output of 400 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 24. NCL2LT1HLS- 140.538 (Manufacturer's specification gives lumen output of 770 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 25. NCL2LT2HLS - 140.538 (Manufacturer's specification gives lumen output of 1650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 26. NCLT2F1HLS- 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 27. NCLT2HLS- 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 28. NPL1LT3F1HLS- 140.538 (Manufacturer's specification gives lumen output of 2150 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 29. NPL1LT3F2HLS- 140.538 (Manufacturer's specification gives lumen output of 1900 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

30. NPL1LT4HLS- 140.538 (Manufacturer's specification gives lumen output of 2430 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

31. NPL2LT4HLS- 140.538 (Manufacturer's specification gives lumen output of 2570 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

32. NPL2LT6F1HLS- 140.538 (Manufacturer's specification gives lumen output of 4750 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

33. NPL2LT8F2HLS- 140.538 (Manufacturer's specification gives lumen output of 6950 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

34. NPLT3F1HLS- 140.538 (Manufacturer's specification gives lumen output of 1700 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

35. NPLT4F1HLS- 140.538 (Manufacturer's specification gives lumen output of 2250 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

36. NPLT4HLS- 140.538 (Manufacturer's specification gives lumen output of 1700 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

37. PL1LT3F1HLS2- 140.538 (Manufacturer's specification gives lumen output of 3750 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)

38. PL1LT3F2HLS- 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen

	value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 39. PL1LT4HLS- 140.538 (Manufacturer's specification gives lumen output of 2350 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 40. PL1LT5HLS- 140.538 (Manufacturer's specification gives lumen output of 1900 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 41. PL2LT4HLS- 140.538 (Manufacturer's specification gives lumen output of 2550 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 42. PL2LT6F1HLS- 140.538 (Manufacturer's specification gives lumen output of 4750 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 43. PL2LT8F2HLS- 140.538 (Manufacturer's specification gives lumen output of 6950 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 44. PLT3F1HLS- 140.538 (Manufacturer's specification gives lumen output of 3400 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 45. PLT4F1HLS - 140.538 (Manufacturer's specification gives lumen output of 2150 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 46. PLT4HLS - 140.538 (Manufacturer's specification gives lumen output of 1700 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 47. NCLT2HLS2 - 140.538 (Manufacturer's specification gives lumen output of 1250 Lumens, however, the lumen

	value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 48. NCLT3HLS - 140.538 (Manufacturer's specification gives lumen output of 1350 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 49. NCLT4HLS - 140.538 (Manufacturer's specification gives lumen output of 2230 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 50. NPLT10F2HLS - 140.538 (Manufacturer's specification gives lumen output of 4650 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 51. NPLT4F2HLS - 140.538 (Manufacturer's specification gives lumen output of 2150 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 52. NPLT5HLS - 140.538 (Manufacturer's specification gives lumen output of 2600 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 53. NPLT6HLS - 140.538 (Manufacturer's specification gives lumen output of 2150 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 54. NPLT8F1HLS - 140.538 (Manufacturer's specification gives lumen output of 4010 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 55. SB2HLS - 140.538 (Manufacturer's specification gives lumen output of 1050 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 56. SB4HLS - 140.538 (Manufacturer's specification gives lumen output of 2350 Lumens, however, the lumen value

	is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 57. SB6HLS - 140.538 (Manufacturer's specification gives lumen output of 2500 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions) 58. SB8HLS - 140.538 (Manufacturer's specification gives lumen output of 2500 Lumens, however, the lumen value is capped at 140.538 and hence 140.538 is applied to calculate emission reductions)
Measurement methods and procedures	Will be recorded at time of sale/installation in MEC Credit Tracker system
Monitoring frequency	Annual
QA/QC procedures	Each light installation has been geocoded (GPS coordinate or other specific location data) or provide address/location of household in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored on a regular basis.
Purpose of data	Calculation of baseline emissions
Additional comment	The lumen value for this model is recorded once and used for emission reduction calculations. The lumen value for the lamp setting with least luminosity is used for conservativeness. In line with the information given in the eligibility criteria section in this VPA-DD, the lumen value for solar lighting systems in this VPA has been capped at 140.54 Lumen for individual households (based on Table 5 for the year 2021). If the Lumen value of solar lighting systems in an individual household is greater than 140.54 Lumen, value of 140.54 Lumen is used to calculate emission reductions. If the Lumen value of solar lighting systems in an individual household is less than 140.54 Lumen, actual (lesser) lumen value is used to calculate emission reductions. Additionally, each household in the database only receives one solar lighting system and if any of the households are found to have another solar lighting system installed during quarterly monitoring, then no ERs are claimed for that household. Further, a consolidated database of sales is submitted to the verifying VVB to cross check the same

Data / Parameter	$N_{i,a}$
Unit	Lamps
Description	Total number of solar lamps of type *i* that have been deployed in period *a*
Source of data	Primary data collected by PO/VPA implementer and recorded in Credit Tracker
Value(s) applied	

Model	Total Sales (2021)	Total Sales 2022
Arohan		
d.light S100 (CG)	39	39
d.light S100 (OD)	1	1
d.light S100 (WB)	36	36
d.light S500 (AS)	11	11
d.light ST100 (BH)	5,194	5,269
d.light ST100 (CG)	23	23
d.light ST100 (JK)	2,963	2,968
d.light ST100 (MP)	2	2
d.light ST100 (OD)	3	3
d.light ST100 (WB)	3	3
SKDRDP		
CL1LT1F1HLS	72	72
CL1LT1HLS	3,674	3,674
CL1LT2HLS	6,892	6,892
CL2HLS	552	552
CL2LT2HLS	194	194
CL2LT2HLS2	3,619	3,619
CL3LT1HLS2	387	387
CLT1HLS	120	120
CLT2HLS	1,114	1,114
CLT2F1HLS	654	654
EH4HLS	1	24
NCL1LT1HLS	283	2,384
NCL1LT2HLS	1,299	7,091

NCL2HLS	210	759
NCL2LT1HLS	174	571
NCL2LT2HLS	971	4,859
NCLT2F1HLS	147	1,720
NCLT2HLS	323	2,767
NPL1LT3F1HLS	3	26
NPL1LT3F2HLS	15	82
NPL1LT4HLS	74	279
NPL2LT4HLS	56	271
NPL2LT6F1HLS	2	8
NPL2LT8F2HLS	2	10
NPLT3F1HLS	51	246
NPLT4F1HLS	103	708
NPLT4HLS	27	214
PL1LT3F1HLS2	98	98
PL1LT3F2HLS	78	78
PL1LT4HLS	318	318
PL1LT5HLS	48	48
PL2LT4HLS	171	171
PL2LT6F1HLS	7	7
PL2LT8F2HLS	8	8
PLT3F1HLS	305	305
PLT4F1HLS	259	259
PLT4HLS	102	102
NCLT2HLS2	-	961
NCLT3HLS	-	3,402
NCLT4HLS	-	2,381
NPLT10F2HLS	-	7
NPLT4F2HLS	-	66
NPLT5HLS	-	171
NPLT6HLS	-	113
NPLT8F1HLS	-	5
SB2HLS	-	25
SB4HLS	-	17

	SB6HLS	-	2
	SB8HLS	-	2
	Satin		
	d.light D333 (BH)	-	1
	d.light D333 (UP)	19	19
	d.light S550 (BH)	-	6,509
	d.light S550 (UP)	6,509	43
	d.light ST100 (BH)	-	19,043
	d.light ST100 (UP)	5,888	5,888
	Jugnu Lightbox L2005 (BH)	-	3,900
	Jugnu Lightbox L2005 (UP)	1	1
	Jugnu SLT (BH)	-	1
	Jugnu SLT (UP)	7,524	7,524
	JugnuTWP29006 (BH)	-	10
	Midland		
	d.light S550 (UP)	325	325
	d.light ST100 (UP)	2,435	2,435
	Sunking Boom (UP)	10	10
	Arman		
	d.light ST100 (RJ)	178	178
	Sunking Boom (GJ)	837	837
	Sunking Boom (MP)	52	52
	Sunking Boom (MH)	98	98
	Sunking Boom (RJ)	6	6
	Total Sales	**54,570**	**103,078**
Measurement methods and procedures	N.A.		
Monitoring frequency	Annual		
QA/QC procedures	Each light installation has been geocoded (GPS coordinates or other specific location identifiers) in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored on a regular basis. The data in MEC tracker system can be crosschecked with the MIS system of the		

	PO.
Purpose of data	Calculation of baseline emissions
Additional comment	29 model for SKDRDP, 6 models for Satin, 3 models for Midland, 3 models for Arohan and 2 models for Arman are distributed under this VPA.

Data / Parameter	$d_{i,a,v}$
Unit	Days
Description	Average number of days lamps of type *i* that have been deployed in period a were operating in period v
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	

Model	days (2021)	days 2022
Arohan		
d.light S100 (CG)	329	365
d.light S100 (OD)	234	365
d.light S100 (WB)	273	365
d.light S500 (AS)	307	365
d.light ST100 (BH)	228	364
d.light ST100 (CG)	128	365
d.light ST100 (JK)	232	365
d.light ST100 (MP)	294	365
d.light ST100 (OD)	276	365
d.light ST100 (WB)	231	365
SKDRDP		
CL1LT1F1HLS	274	365
CL1LT1HLS	203	365
CL1LT2HLS	196	365
CL2HLS	230	365
CL2LT2HLS	207	365
CL2LT2HLS2	196	365
CL3LT1HLS2	215	365
CLT1HLS	194	365
CLT2HLS	196	365
CLT2F1HLS	202	365

EH4HLS	138	170
NCL1LT1HLS	30	237
NCL1LT2HLS	28	249
NCL2HLS	30	264
NCL2LT1HLS	33	271
NCL2LT2HLS	29	254
NCLT2F1HLS	32	183
NCLT2HLS	32	185
NPL1LT3F1HLS	13	240
NPL1LT3F2HLS	36	260
NPL1LT4HLS	24	268
NPL2LT4HLS	30	257
NPL2LT6F1HLS	39	259
NPL2LT8F2HLS	24	306
NPLT3F1HLS	30	212
NPLT4F1HLS	28	198
NPLT4HLS	24	208
PL1LT3F1HLS2	217	365
PL1LT3F2HLS	210	365
PL1LT4HLS	207	365
PL1LT5HLS	251	365
PL2LT4HLS	179	365
PL2LT6F1HLS	295	365
PL2LT8F2HLS	196	365
PLT3F1HLS	196	365
PLT4F1HLS	217	365
PLT4HLS	112	365
NCLT2HLS2	-	83
NCLT3HLS	-	83
NCLT4HLS	-	86
NPLT10F2HLS	-	100
NPLT4F2HLS	-	74
NPLT5HLS	-	90
NPLT6HLS	-	88

NPLT8F1HLS	-	46
SB2HLS	-	172
SB4HLS	-	168
SB6HLS	-	173
SB8HLS	-	172
Satin		
d.light D333 (BH)	-	294
d.light D333 (UP)	78	365
d.light S550 (BH)	-	337
d.light S550 (UP)	69	365
d.light ST100 (BH)	-	323
d.light ST100 (UP)	81	365
Jugnu Lightbox L2005 (BH)	-	324
Jugnu Lightbox L2005 (UP)	22	365
Jugnu SLT (BH)	-	342
Jugnu SLT (UP)	34	365
JugnuTWP29006 (BH)	-	303
Midland		
d.light S550 (UP)	297	365
d.light ST100 (UP)	171	365
Sunking Boom (UP)	304	365
Arman		
d.light ST100 (RJ)	314	365
Sunking Boom (GJ)	262	365
Sunking Boom (MP)	317	365
Sunking Boom (MH)	300	365
Sunking Boom (RJ)	293	365

Measurement methods and procedures	Exact date of sale (in the case of solar lights) and installation (in the case of solar lighting systems) for all clean energy products is tracked by monitoring partners and recorded in Credit Tracker. For products newly sold/installed in period *v*, the date of sale or installation will be used to calculate total days of operation in period

	v. For products sold/installed prior to period v, $d_{i,a,v}$ will be equal to the total number of days in period v.
Monitoring frequency	Annual
QA/QC procedures	The data in MEC tracker system can be cross checked with the MIS system of the PO –Satin, Midland, Arohan, Arman, SKDRDP.
Purpose of data	Calculation of baseline emissions
Additional comment	Individual number of days solar lighting systems have operated during the monitoring period is calculated and the average value is used for calculating the emission reductions.

Data / Parameter	H
Unit	Hours/day
Description	Average operating hours of kerosene lamps in the baseline
Source of data	Methodology Default
Value(s) applied	3.5
Measurement methods and procedures	N.A as default value is used.
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$LFR_{i,v}$
Unit	%
Description	Lamp failure rate: Share of lamps of lamp type i in checked sample group $g_{i,v}$ not operational in period v
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	

Model	**LFR (2021)**	**LFR 2022**
Arohan		
d.light S100 (CG)	0%	0%
d.light S100 (OD)	0%	0%
d.light S100 (WB)	0%	0%
d.light S500 (AS)	0%	0%

d.light ST100 (BH)	0%	0%
d.light ST100 (CG)	0%	0%
d.light ST100 (JK)	0%	0%
d.light ST100 (MP)	0%	0%
d.light ST100 (OD)	0%	0%
d.light ST100 (WB)	0%	0%
SKDRDP		
CL1LT1F1HLS	0%	0%
CL1LT1HLS	0%	0%
CL1LT2HLS	0%	0%
CL2HLS	0%	0%
CL2LT2HLS	0%	0%
CL2LT2HLS2	0%	0%
CL3LT1HLS2	0%	0%
CLT1HLS	0%	0%
CLT2HLS	0%	0%
CLT2F1HLS	0%	0%
EH4HLS	0%	0%
NCL1LT1HLS	0%	0%
NCL1LT2HLS	0%	0%
NCL2HLS	0%	0%
NCL2LT1HLS	0%	0%
NCL2LT2HLS	0%	0%
NCLT2F1HLS	0%	0%
NCLT2HLS	0%	0%
NPL1LT3F1HLS	0%	0%
NPL1LT3F2HLS	0%	0%
NPL1LT4HLS	0%	0%
NPL2LT4HLS	0%	0%
NPL2LT6F1HLS	0%	0%
NPL2LT8F2HLS	0%	0%
NPLT3F1HLS	0%	0%
NPLT4F1HLS	0%	0%
NPLT4HLS	0%	0%

PL1LT3F1HLS2	0%	0%
PL1LT3F2HLS	0%	0%
PL1LT4HLS	0%	0%
PL1LT5HLS	0%	0%
PL2LT4HLS	0%	0%
PL2LT6F1HLS	0%	0%
PL2LT8F2HLS	0%	0%
PLT3F1HLS	0%	0%
PLT4F1HLS	0%	0%
PLT4HLS	0%	0%
NCLT2HLS2	-	0%
NCLT3HLS	-	0%
NCLT4HLS	-	0%
NPLT10F2HLS	-	0%
NPLT4F2HLS	-	0%
NPLT5HLS	-	0%
NPLT6HLS	-	0%
NPLT8F1HLS	-	0%
SB2HLS	-	0%
SB4HLS	-	0%
SB6HLS	-	0%
SB8HLS	-	0%
Satin		
d.light D333 (BH)	-	0%
d.light D333 (UP)	0%	0%
d.light S550 (BH)	-	0%
d.light S550 (UP)	0%	0%
d.light ST100 (BH)	-	0%
d.light ST100 (UP)	0%	0%
Jugnu Lightbox L2005 (BH)	-	0%
Jugnu Lightbox L2005 (UP)	0%	0%
Jugnu SLT (BH)	-	0%

	Jugnu SLT (UP)	0%	0%
	JugnuTWP29006 (BH)	-	0%
	Midland		
	d.light S550 (UP)	0%	0%
	d.light ST100 (UP)	0%	0%
	Sunking Boom (UP)	0%	0%
	Arman		
	d.light ST100 (RJ)	0%	0%
	Sunking Boom (GJ)	0%	0%
	Sunking Boom (MP)	0%	0%
	Sunking Boom (MH)	0%	0%
	Sunking Boom (RJ)	0%	0%

Measurement methods and procedures	CME/PO have tracked the usage status of all solar lighting systems from each quarter of the year with results recorded in Credit Tracker. At the end of each quarter of the calendar year, PO tracks and reports back to CME on whether the household is using their solar device and also whether they have purchased any other solar lighting product. This quarterly monitoring is conducted in March, June, September, and December months of every year. In cases where the end of the monitoring period does not coincide with the end month of a calendar year quarter, field staff from POs also conducts the quarterly monitoring in the same month as the end of the monitoring period. POs conduct quarterly monitoring during the course of their regular interactions with Self-Help Groups (SHGs), which hold weekly meetings with MFI Field Officers. At the end of each quarterly monitoring period, MFI Field Officers survey clients as to the product usage status and information on presence of any other solar product. This data is reported to MEC through and recorded in the Credit Tracker platform. Any solar lighting systems that are non-operational (due to failure or disuse by owner) are recorded as "failed" lamps. For such solar lighting systems emission reduction are not claimed. This data is stored in Credit Tracker and output in a report format.
Monitoring frequency	Annual

QA/QC procedures	CME/PO has tracked the usage status of all solar lighting systems from each quarter of the year with results recorded in Credit Tracker.
Purpose of data	Calculation of baseline emissions
Additional comment	Quarterly monitoring also checks if the households have any other solar product in the household. If the users report having additional solar product then no ERs are claimed for that household.

Data / Parameter	$CF_{i,v,LFR}$
Unit	%
Description	This factor corrects the total number of lamps of type i by the share of these lamps that were found to be non-operational according to the sampling in period v. The statistical error is included in this parameter (confidence level 90%) when 90/10 precision is not met. Otherwise, the mean value of LFR will be used.
Source of data	$LFR_{i,v}$
Value(s) applied	

Model	**$CF_{i,v,LFR}$ (2021)**	**$CF_{i,v,LFR}$ (2022)**
Arohan		
d.light S100 (CG)	100%	100%
d.light S100 (OD)	100%	100%
d.light S100 (WB)	100%	100%
d.light S500 (AS)	100%	100%
d.light ST100 (BH)	100%	100%
d.light ST100 (CG)	100%	100%
d.light ST100 (JK)	100%	100%
d.light ST100 (MP)	100%	100%
d.light ST100 (OD)	100%	100%
d.light ST100 (WB)	100%	100%
SKDRDP		
CL1LT1F1HLS	100%	100%
CL1LT1HLS	100%	100%
CL1LT2HLS	100%	100%
CL2HLS	100%	100%
CL2LT2HLS	100%	100%

CL2LT2HLS2	100%	100%
CL3LT1HLS2	100%	100%
CLT1HLS	100%	100%
CLT2HLS	100%	100%
CLT2F1HLS	100%	100%
EH4HLS	100%	100%
NCL1LT1HLS	100%	100%
NCL1LT2HLS	100%	100%
NCL2HLS	100%	100%
NCL2LT1HLS	100%	100%
NCL2LT2HLS	100%	100%
NCLT2F1HLS	100%	100%
NCLT2HLS	100%	100%
NPL1LT3F1HLS	100%	100%
NPL1LT3F2HLS	100%	100%
NPL1LT4HLS	100%	100%
NPL2LT4HLS	100%	100%
NPL2LT6F1HLS	100%	100%
NPL2LT8F2HLS	100%	100%
NPLT3F1HLS	100%	100%
NPLT4F1HLS	100%	100%
NPLT4HLS	100%	100%
PL1LT3F1HLS2	100%	100%
PL1LT3F2HLS	100%	100%
PL1LT4HLS	100%	100%
PL1LT5HLS	100%	100%
PL2LT4HLS	100%	100%
PL2LT6F1HLS	100%	100%
PL2LT8F2HLS	100%	100%
PLT3F1HLS	100%	100%
PLT4F1HLS	100%	100%
PLT4HLS	100%	100%
NCLT2HLS2	-	100%
NCLT3HLS	-	100%

NCLT4HLS	-	100%
NPLT10F2HLS	-	100%
NPLT4F2HLS	-	100%
NPLT5HLS	-	100%
NPLT6HLS	-	100%
NPLT8F1HLS	-	100%
SB2HLS	-	100%
SB4HLS	-	100%
SB6HLS	-	100%
SB8HLS	-	100%
Satin		
d.light D333 (BH)	-	100%
d.light D333 (UP)	100%	100%
d.light S550 (BH)	-	100%
d.light S550 (UP)	100%	100%
d.light ST100 (BH)	-	100%
d.light ST100 (UP)	100%	100%
Jugnu Lightbox L2005 (BH)	-	100%
Jugnu Lightbox L2005 (UP)	100%	100%
Jugnu SLT (BH)	-	100%
Jugnu SLT (UP)	100%	100%
JugnuTWP29006 (BH)	-	100%
Midland		
d.light S550 (UP)	100%	100%
d.light ST100 (UP)	100%	100%
Sunking Boom (UP)	100%	100%
Arman		
d.light ST100 (RJ)	100%	100%
Sunking Boom (GJ)	100%	100%
Sunking Boom (MP)	100%	100%
Sunking Boom (MH)	100%	100%
Sunking Boom (RJ)	100%	100%

Measurement methods and procedures	The value is calculated using the recorded value for $LFR_{i,v}$ – $$CF_{i,v,LFR} = 1 - \left(LFR_{i,v} + z * \sqrt{\frac{LFR_{i,v} * (1 - LFR_{i,v})}{n_{i,v,total}}} \right)$$
Monitoring frequency	Annual
QA/QC procedures	The statistical error is included in this parameter (confidence level 90%) when 90/10 precision is not met. But in this monitoring period, 90/10 precision is met.
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$n_{,i,v,total}$
Unit	Lamps
Description	Total number of lamps checked for which a valid result was obtained.
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	

Model	$n_{i,v,total}$ (2021)	$n_{i,v,total}$ (2022)
Arohan		
d.light S100 (CG)	30	30
d.light S100 (OD)	1	1
d.light S100 (WB)	30	30
d.light S500 (AS)	11	11
d.light ST100 (BH)	30	30
d.light ST100 (CG)	23	23
d.light ST100 (JK)	30	30
d.light ST100 (MP)	2	2
d.light ST100 (OD)	3	3
d.light ST100 (WB)	3	3
SKDRDP		
CL1LT1F1HLS	30	30
CL1LT1HLS	30	30
CL1LT2HLS	30	30
CL2HLS	30	30

CL2LT2HLS	30	30
CL2LT2HLS2	30	30
CL3LT1HLS2	30	30
CLT1HLS	30	30
CLT2HLS	30	30
CLT2F1HLS	30	30
EH4HLS	1	24
NCL1LT1HLS	30	30
NCL1LT2HLS	30	30
NCL2HLS	30	30
NCL2LT1HLS	30	30
NCL2LT2HLS	30	30
NCLT2F1HLS	30	30
NCLT2HLS	30	30
NPL1LT3F1HLS	3	26
NPL1LT3F2HLS	15	30
NPL1LT4HLS	30	30
NPL2LT4HLS	30	30
NPL2LT6F1HLS	2	8
NPL2LT8F2HLS	2	10
NPLT3F1HLS	30	30
NPLT4F1HLS	30	30
NPLT4HLS	27	30
PL1LT3F1HLS2	30	30
PL1LT3F2HLS	30	30
PL1LT4HLS	30	30
PL1LT5HLS	30	30
PL2LT4HLS	30	30
PL2LT6F1HLS	7	7
PL2LT8F2HLS	8	8
PLT3F1HLS	30	30
PLT4F1HLS	30	30
PLT4HLS	30	30
NCLT2HLS2	-	30

NCLT3HLS	-	30
NCLT4HLS	-	30
NPLT10F2HLS	-	7
NPLT4F2HLS	-	30
NPLT5HLS	-	30
NPLT6HLS	-	30
NPLT8F1HLS	-	5
SB2HLS	-	25
SB4HLS	-	17
SB6HLS	-	2
SB8HLS	-	2
Satin		
d.light D333 (BH)	-	1
d.light D333 (UP)	19	19
d.light S550 (BH)	-	30
d.light S550 (UP)	30	30
d.light ST100 (BH)	-	30
d.light ST100 (UP)	30	30
Jugnu Lightbox L2005 (BH)	-	30
Jugnu Lightbox L2005 (UP)	1	1
Jugnu SLT (BH)	-	1
Jugnu SLT (UP)	30	30
JugnuTWP29006 (BH)	-	10
Midland		
d.light S550 (UP)	30	30
d.light ST100 (UP)	30	30
Sunking Boom (UP)	10	10
Arman		
d.light ST100 (RJ)	30	30
Sunking Boom (GJ)	30	30
Sunking Boom (MP)	30	30
Sunking Boom (MH)	30	30

	Sunking Boom (RJ)	6	6
Measurement methods and procedures	The solar lighting systems are monitored based on a survey with sample size calculated in line with the CDM standard for Sampling and surveys for CDM project activities and programme of activities version 9.0 and guideline for Sampling and surveys for CDM project activities and programme of activities version 4.0. The total number of solar lighting systems which are found to be operational are noted down and used for this parameter.		
Monitoring frequency	Annual		
QA/QC procedures	CME/PO randomly and representatively tracked households contacted and reached for monitoring lamp usage status for each lamp type i in the monitoring period, p. This data is recorded in Credit Tracker. Survey methods are used.		
Purpose of data	Calculation of baseline emissions		
Additional comment	For some of the solar lighting systems distributed under this VPA, this monitoring parameter has been conservatively calculated by assuming that any solar lighting system with "installed_damaged" status as a result of the annual usage status monitoring is not working and that for these "installed_damaged" products it is assumed that usage is 0. This has been done despite providing evidence to VVB that the products with this status had minor repairs that did not impact its functionality.		

Data / Parameter	Kerosene Usage in the Baseline
Unit	n/a
Description	Determination of whether or not the end user used kerosene for lighting prior to the project activity
Source of data	Primary data collected by PO/CME/monitoring partner and recorded in Credit Tracker
Value(s) applied	100%
Measurement methods and procedures	At the time of loan application for the solar lighting system, the household is asked about the fuel they use for lighting. A baseline document is used for this purpose that is part of the loan application form filled out by the customer while applying for a loan to buy the product. The results are recorded. Any solar lighting system with a different baseline is removed from crediting.

Monitoring frequency	Annual
QA/QC procedures	The recorded information is stored on credit tracker platform.
Purpose of data	Calculation of baseline emissions
Additional comment	The emission reduction calculation sheet accounts for this parameter by removing any solar lighting system from crediting that does not have kerosene as the baseline for lighting. All solar lighting systems distributed under this VPA used kerosene for lighting purposes in the baseline.

VPA39: GS11898

SDG 13

Data / Parameter	Ln
Unit	Lumens
Description	Lumen output of each solar lamp n deployed as part of the project activity
Source of data	Refer to table 5 section B.4 in VPA-DD
Value(s) applied	1. d.light S500 – 140.538 (Manufacturer's specification is 240 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 2. d.light ST100 – 140.538 (Manufacturer's specification is 220 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 3. d.light S550 – 140.538 (Manufacturer's specification is 240 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 4. d.light D333 – 140.538 (Manufacturer's specification is 520 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 5. Jugnu Lightbox L2005 – 140.538 (Manufacturer's specification is 200 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 6. Jugnu SLT – 140.538 (Manufacturer's specification is 240 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered)

	7. Jugnu TWP29006 – 140.538 (Manufacturer's specification is 200 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 8. Sunking Boom – 140.538 (Manufacturer's specification is 160 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 10. Jugnu 2 Tubelight – 140.538 (Manufacturer's specification is 440 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 11. Jugnu Lightbox L1406 – 140 (Manufacturer's specification is 140 Lumen which is less than threshold value of 140.538, hence 140 lumen value is considered) 11. Sunking Pro-200 – 140.538 (Manufacturer's specification is 200 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 12. Sunking Torch – 140.538 (Manufacturer's specification is 300 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered) 13. RAL Duron Mitva MST952A – 140.538 (Manufacturer's specification is 400 Lumen which is more than threshold value of 140.538, hence 140.538 lumen value is considered)
Measurement methods and procedures	Will be recorded at time of sale/installation in MEC Credit Tracker system
Monitoring frequency	Annual
QA/QC procedures	Each light installation has been geocoded (GPS coordinate or other specific location data) or provide address/location of household in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored on a regular basis.
Purpose of data	Calculation of baseline emissions
Additional comment	The lumen value for this model is recorded once and used for emission reduction calculations. The lumen value for the lamp setting with least luminosity is used for

	conservativeness. In line with the information given in the eligibility criteria section in this VPA-DD, the lumen value for solar lighting systems in this VPA has been capped at 140.54 Lumen for individual households (based on Table 5 for the year 2021). If the Lumen value of solar lighting systems in an individual household is greater than 140.54 Lumen, value of 140.54 Lumen is used to calculate emission reductions. If the Lumen value of solar lighting systems in an individual household is less than 140.54 Lumen, actual (lesser) lumen value is used to calculate emission reductions. Additionally, each household in the database only receives one solar lighting system and if any of the households are found to have another solar lighting system installed during quarterly monitoring, then no ERs are claimed for that household. Further, a consolidated database of sales is submitted to the verifying VVB to cross check the same

Data / Parameter	$N_{i,a}$
Unit	Lamps
Description	Total number of solar lamps of type *i* that have been deployed in period *a*
Source of data	Primary data collected by PO/VPA implementer and recorded in Credit Tracker
Value(s) applied	

Model	Total Sales (2021)	Total Sales 2022
Midland		
d.light S550 (BH)	1,052	1,052
d.light S550 (UP)	9	9
Sunking Boom (HR)	72	72
Sunking Boom (PJ)	180	180
Sunking Boom (RJ)	197	197
Sunking Pro200 (HR)	39	39
Sunking Pro200 (RJ)	250	250
Sunking Pro200 (PJ)	2	2
Sunking Torch (PJ)	55	55
d.light ST100 (BH)	121	121

d.light ST100 (JK)	24	24
RAL Duron Mitva MST952A (BH)	7,173	7,175
RAL Duron Mitva MST952A (JK)	1,452	1,452
Satin		
Jugnu TWP29006 (BH)	9	9
Jugnu TWP29006 (OD)	143	143
d.light D333 (BH)	10	10
d.light D333 (KA)	8	8
d.light S500 (MP)	-	3
d.light S500 (PJ)	-	1
d.light S550 (BH)	17	17
d.light S550 (GJ)		1
d.light S550 (HR)	24	43
d.light S550 (MP)	31	60
Jugnu 2 Tubelight (CG)	8	8
Jugnu 2 Tubelight (OD)	35	35
Jugnu lightbox L1406 (OD)	1,195	1,195
Jugnu Lightbox L2005 (BH)	2,213	2,213
Jugnu Lightbox L2005 (CG)	30	30
Jugnu Lightbox L2005 (MP)	2	2
Jugnu Lightbox L2005 (OD)	3,492	3,492
Jugnu Lightbox L2005 (PJ)	4	4

	Jugnu Solar Lantern Torch (BH)	17	17
	Jugnu Solar Lantern Torch (CG)	45	45
	Jugnu Solar Lantern Torch (HR)	186	218
	Jugnu Solar Lantern Torch (MP)	-	4
	Jugnu Solar Lantern Torch (OD)	593	593
	d.light ST100 (BH)	2,479	2,479
	d.light ST100 (GJ)	-	1
	d.light ST100 (HR)	77	103
	d.light ST100 (KA)	5	5
	d.light ST100 (MP)		1
	d.light ST100 (OD)	15	15
	d.light ST100 (PJ)	2	11
	Total Sales	**21,266**	**21,394**

Measurement methods and procedures	N.A.
Monitoring frequency	Annual
QA/QC procedures	Each light installation has been geocoded (GPS coordinates or other specific location identifiers) in the MEC Tracker System. Associated data resides in the MEC Tracker Database, allowing each installation to be monitored on a regular basis. The data in MEC tracker system can be crosschecked with the MIS system of the PO.
Purpose of data	Calculation of baseline emissions
Additional comment	6 models for Midland and 9 models for Satin are distributed under this VPA.

Data / Parameter	$d_{i,a,v}$
Unit	Days
Description	Average number of days lamps of type *i* that have been deployed in period a were operating in period v
Source of data	Monitoring partner, Credit Tracker

Value(s) applied

Model	days (2021)	days 2022
Midland		
d.light S550 (BH)	302	365
d.light S550 (UP)	291	365
Sunking Boom (HR)	286	360
Sunking Boom (PJ)	302	363
Sunking Boom (RJ)	304	363
Sunking Pro200 (HR)	297	365
Sunking Pro200 (RJ)	313	365
Sunking Pro200 (PJ)	314	365
Sunking Torch (PJ)	309	358
d.light ST100 (BH)	135	365
d.light ST100 (JK)	100	350
RAL Duron Mitva MST952A (BH)	185	365
RAL Duron Mitva MST952A (JK)	276	365
Satin		
Jugnu TWP29006 (BH)	67	365
Jugnu TWP29006 (OD)	87	365
d.light D333 (BH)	61	365
d.light D333 (KA)	290	365
d.light S500 (MP)	-	179
d.light S500 (PJ)	-	181
d.light S550 (BH)	43	365
d.light S550 (GJ)	-	346
d.light S550 (HR)	180	334
d.light S550 (MP)	287	322
Jugnu 2 Tubelight (CG)	249	365

Jugnu 2 Tubelight (OD)	313	365
Jugnu lightbox L1406 (OD)	331	365
Jugnu Lightbox L2005 (BH)	42	365
Jugnu Lightbox L2005 (CG)	99	365
Jugnu Lightbox L2005 (MP)	303	365
Jugnu Lightbox L2005 (OD)	204	365
Jugnu Lightbox L2005 (PJ)	174	365
Jugnu Solar Lantern Torch (BH)	54	365
Jugnu Solar Lantern Torch (CG)	41	365
Jugnu Solar Lantern Torch (HR)	29	362
Jugnu Solar Lantern Torch (MP)	-	177
Jugnu Solar Lantern Torch (OD)	28	365
d.light ST100 (BH)	45	365
d.light ST100 (GJ)	-	342
d.light ST100 (HR)	261	323
d.light ST100 (KA)	280	365
d.light ST100 (MP)	-	283
d.light ST100 (OD)	166	365
d.light ST100 (PJ)	168	278

Measurement methods and procedures	Exact date of sale (in the case of solar lights) and installation (in the case of solar lighting systems) for all clean energy products is tracked by monitoring partners and recorded in Credit Tracker. For products newly sold/installed in period *v*, the date of sale or installation

	will be used to calculate total days of operation in period *v*. For products sold/installed prior to period *v*, $d_{i,a,v}$ will be equal to the total number of days in period *v*.
Monitoring frequency	Annual
QA/QC procedures	The data in MEC tracker system can be cross checked with the MIS system of the PO –Midland and Satin
Purpose of data	Calculation of baseline emissions
Additional comment	Individual number of days solar lighting systems have operated during the monitoring period is calculated and the average value is used for calculating the emission reductions.

Data / Parameter	H
Unit	Hours/day
Description	Average operating hours of kerosene lamps in the baseline
Source of data	Methodology Default
Value(s) applied	3.5
Measurement methods and procedures	A N.A as default value is used.
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$LFR_{i,v}$
Unit	%
Description	Lamp failure rate: Share of lamps of lamp type i in checked sample group $g_{i,v}$ not operational in period v
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	

Model	**LFR (2021)**	**LFR (2022)**
Midland		
d.light S550 (BH)	0.1%	0.1%
d.light S550 (UP)	0%	0%
Sunking Boom (HR)	0%	1.39%
Sunking Boom (PJ)	0%	0%

Sunking Boom (RJ)	0%	0.51%
Sunking Pro200 (HR)	0%	0%
Sunking Pro200 (RJ)	0%	0%
Sunking Pro200 (PJ)	0%	0%
Sunking Torch (PJ)	0%	1.82%
d.light ST100 (BH)	0%	0%
d.light ST100 (JK)	0%	4.17%
RAL Duron Mitva MST952A (BH)	0%	0%
RAL Duron Mitva MST952A (JK)	0%	0%
Satin		
Jugnu TWP29006 (BH)	0%	0%
Jugnu TWP29006 (OD)	0%	0%
d.light D333 (BH)	0%	0%
d.light D333 (KA)	0%	0%
d.light S500 (MP)	-	0%
d.light S500 (PJ)	-	0%
d.light S550 (BH)	0%	0%
d.light S550 (GJ)	-	0%
d.light S550 (HR)	0%	0%
d.light S550 (MP)	0%	0%
Jugnu 2 Tubelight (CG)	0%	0%
Jugnu 2 Tubelight (OD)	0%	0%
Jugnu lightbox L1406 (OD)	0%	0%
Jugnu Lightbox L2005 (BH)	0%	0%
Jugnu Lightbox L2005 (CG)	0%	0%

	Jugnu Lightbox L2005 (MP)	0%	0%
	Jugnu Lightbox L2005 (OD)	0%	0%
	Jugnu Lightbox L2005 (PJ)	0%	0%
	Jugnu Solar Lantern Torch (BH)	0%	0%
	Jugnu Solar Lantern Torch (CG)	0%	0%
	Jugnu Solar Lantern Torch (HR)	0%	0%
	Jugnu Solar Lantern Torch (MP)	-	0%
	Jugnu Solar Lantern Torch (OD)	0%	0%
	d.light ST100 (BH)	0%	0%
	d.light ST100 (GJ)	-	0%
	d.light ST100 (HR)	0%	0%
	d.light ST100 (KA)	0%	0%
	d.light ST100 (MP)	-	0%
	d.light ST100 (OD)	0%	0%
	d.light ST100 (PJ)	0%	0%
Measurement methods and procedures	CME/PO have tracked the usage status of all solar lighting systems from each quarter of the year with results recorded in Credit Tracker. At the end of each quarter of the calendar year, PO tracks and reports back to CME on whether the household is using their solar device and also whether they have purchased any other solar lighting product. This quarterly monitoring is conducted in March, June, September, and December months of every year. In cases where the end of the monitoring period does not coincide with the end month of a calendar year quarter, field staff from POs also conducts the quarterly monitoring in the same month as the end of the monitoring period.		

	POs conduct quarterly monitoring during the course of their regular interactions with Self-Help Groups (SHGs), which hold weekly meetings with MFI Field Officers. At the end of each quarterly monitoring period, MFI Field Officers survey clients as to the product usage status and information on presence of any other solar product. This data is reported to MEC through and recorded in the Credit Tracker platform. Any solar lighting systems that are non-operational (due to failure or disuse by owner) are recorded as "failed" lamps. For such solar lighting systems emission reduction are not claimed. This data is stored in Credit Tracker and output in a report format.
Monitoring frequency	Annual
QA/QC procedures	CME/PO has tracked the usage status of all solar lighting systems from each quarter of the year with results recorded in Credit Tracker.
Purpose of data	Calculation of baseline emissions
Additional comment	Quarterly monitoring also checks if the households have any other solar product in the household. If the users report having additional solar product then no ERs are claimed for that household.

Data / Parameter	$CF_{i,v,LFR}$
Unit	%
Description	This factor corrects the total number of lamps of type i by the share of these lamps that were found to be non-operational according to the sampling in period v. The statistical error is included in this parameter (confidence level 90%) when 90/10 precision is not met. Otherwise, the mean value of LFR will be used.
Source of data	$LFR_{i,v}$
Value(s) applied	

Model	**$CF_{i,v,LFR}$ (2021)**	**$CF_{i,v,LFR}$ (2022)**
Midland		
d.light S550 (BH)	99.18%	99.17%
d.light S550 (UP)	100%	100%
Sunking Boom (HR)	100%	95.81%
Sunking Boom (PJ)	100%	100%
Sunking Boom (RJ)	100%	97.79%

Sunking Pro200 (HR)	100%	100%
Sunking Pro200 (RJ)	100%	100%
Sunking Pro200 (PJ)	100%	100%
Sunking Torch (PJ)	100%	94.98%
d.light ST100 (BH)	100%	100%
d.light ST100 (JK)	100%	90.46%
RAL Duron Mitva MST952A (BH)	100%	100%
RAL Duron Mitva MST952A (JK)	100%	100%
Satin		
Jugnu TWP29006 (BH)	100%	100%
Jugnu TWP29006 (OD)	100%	100%
d.light D333 (BH)	100%	100%
d.light D333 (KA)	100%	100%
d.light S500 (MP)	-	100%
d.light S500 (PJ)	-	100%
d.light S550 (BH)	100%	100%
d.light S550 (GJ)	-	100%
d.light S550 (HR)	100%	100%
d.light S550 (MP)	100%	100%
Jugnu 2 Tubelight (CG)	100%	100%
Jugnu 2 Tubelight (OD)	100%	100%
Jugnu lightbox L1406 (OD)	100%	100%
Jugnu Lightbox L2005 (BH)	100%	100%
Jugnu Lightbox L2005 (CG)	100%	100%
Jugnu Lightbox L2005 (MP)	100%	100%

	Jugnu Lightbox L2005 (OD)	100%	100%
	Jugnu Lightbox L2005 (PJ)	100%	100%
	Jugnu Solar Lantern Torch (BH)	100%	100%
	Jugnu Solar Lantern Torch (CG)	100%	100%
	Jugnu Solar Lantern Torch (HR)	100%	100%
	Jugnu Solar Lantern Torch (MP)	-	100%
	Jugnu Solar Lantern Torch (OD)	100%	100%
	d.light ST100 (BH)	100%	100%
	d.light ST100 (GJ)	-	100%
	d.light ST100 (HR)	100%	100%
	d.light ST100 (KA)	100%	100%
	d.light ST100 (MP)	-	100%
	d.light ST100 (OD)	100%	100%
	d.light ST100 (PJ)	100%	100%
Measurement methods and procedures	The value is calculated using the recorded value for $LFR_{i,v}$ – $$CF_{i,v,LFR} = 1 - \left(LFR_{i,v} + z * \sqrt{\frac{LFR_{i,v} * (1 - LFR_{i,v})}{n_{i,v,total}}} \right)$$		
Monitoring frequency	Annual		
QA/QC procedures	The statistical error is included in this parameter (confidence level 90%) when 90/10 precision is not met. But in this monitoring period, 90/10 precision is met.		
Purpose of data	Calculation of baseline emissions		
Additional comment	-		

Data / Parameter	$n_{,i,v,total}$
Unit	Lamps

Description	Total number of lamps checked for which a valid result was obtained.
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	

Model	$n_{i,v,total}$ (2021)	$n_{i,v,total}$ (2022)
Midland		
d.light S550 (BH)	30	29
d.light S550 (UP)	9	9
Sunking Boom (HR)	30	29
Sunking Boom (PJ)	30	30
Sunking Boom (RJ)	30	29
Sunking Pro200 (HR)	30	30
Sunking Pro200 (RJ)	30	30
Sunking Pro200 (PJ)	2	2
Sunking Torch (PJ)	30	29
d.light ST100 (BH)	30	30
d.light ST100 (JK)	24	23
RAL Duron Mitva MST952A (BH)	30	30
RAL Duron Mitva MST952A (JK)	30	30
Satin		
Jugnu TWP29006 (BH)	9	9
Jugnu TWP29006 (OD)	30	30
d.light D333 (BH)	10	10
d.light D333 (KA)	8	8
d.light S500 (MP)	-	3
d.light S500 (PJ)	-	1
d.light S550 (BH)	17	17
d.light S550 (GJ)	-	1
d.light S550 (HR)	24	30
d.light S550 (MP)	30	30

	Jugnu 2 Tubelight (CG)	8	8
	Jugnu 2 Tubelight (OD)	30	30
	Jugnu lightbox L1406 (OD)	30	30
	Jugnu Lightbox L2005 (BH)	30	30
	Jugnu Lightbox L2005 (CG)	30	30
	Jugnu Lightbox L2005 (MP)	2	2
	Jugnu Lightbox L2005 (OD)	30	30
	Jugnu Lightbox L2005 (PJ)	4	4
	Jugnu Solar Lantern Torch (BH)	17	17
	Jugnu Solar Lantern Torch (CG)	30	30
	Jugnu Solar Lantern Torch (HR)	30	30
	Jugnu Solar Lantern Torch (MP)	-	4
	Jugnu Solar Lantern Torch (OD)	30	30
	d.light ST100 (BH)	30	30
	d.light ST100 (GJ)	-	1
	d.light ST100 (HR)	30	30
	d.light ST100 (KA)	5	5
	d.light ST100 (MP)	-	1
	d.light ST100 (OD)	15	15
	d.light ST100 (PJ)	2	11
Measurement methods and procedures	The solar lighting systems are monitored based on a survey with sample size calculated in line with the CDM		

	standard for Sampling and surveys for CDM project activities and programme of activities version 9.0 and guideline for Sampling and surveys for CDM project activities and programme of activities version 4.0. The total number of solar lighting systems which are found to be operational are noted down and used for this parameter.
Monitoring frequency	Annual
QA/QC procedures	CME/PO randomly and representatively tracked households contacted and reached for monitoring lamp usage status for each lamp type i in the monitoring period, p. This data is recorded in Credit Tracker. Survey methods are used.
Purpose of data	Calculation of baseline emissions
Additional comment	For some of the solar lighting systems distributed under this VPA, this monitoring parameter has been conservatively calculated by assuming that any solar lighting system with "installed_damaged" status as a result of the annual usage status monitoring is not working and that for these "installed_damaged" products it is assumed that usage is 0. This has been done despite providing evidence to VVB that the products with this status had minor repairs that did not impact its functionality.

Data / Parameter	Kerosene Usage in the Baseline
Unit	n/a
Description	Determination of whether or not the end user used kerosene for lighting prior to the project activity
Source of data	Primary data collected by PO/CME/monitoring partner and recorded in Credit Tracker
Value(s) applied	100%
Measurement methods and procedures	At the time of loan application for the solar lighting system, the household is asked about the fuel they use for lighting. A baseline document is used for this purpose that is part of the loan application form filled out by the customer while applying for a loan to buy the product. The results are recorded. Any solar lighting system with a different baseline is removed from crediting.
Monitoring frequency	Annual
QA/QC procedures	The recorded information is stored on credit tracker platform.

Purpose of data	Calculation of baseline emissions
Additional comment	The emission reduction calculation sheet accounts for this parameter by removing any solar lighting system from crediting that does not have kerosene as the baseline for lighting. All solar lighting systems distributed under this VPA used kerosene for lighting purposes in the baseline.

SDG 13 (For Water Purification Systems)

<table>
<tr><td>Parameter ID</td><td>SDWS 18</td></tr>
<tr><td>Data/parameter</td><td>$M_{q,y}$</td></tr>
<tr><td>Unit</td><td>Fraction</td></tr>
<tr><td>Description</td><td>Ongoing water quality indicated as the fraction of the samples that pass microbial quality standard requirements specified in relevant microbial quality standard for drinking water of the host country. In case a national standard is not available, the water quality shall comply with WHO Guideline values for verification of microbial quality i.e., all water directly intended for drinking must not have detectable E.Coli in any 100 ml sample i.e., less than 1 Colony Forming Unit (CFU) of E.Coli /100 ml</td></tr>
<tr><td>Source of data</td><td>Testing of water at the exits of the treatment technology for a representative sample of end-users</td></tr>
<tr><td>Value(s) applied</td><td>
<table>
<tr><th>VPA</th><th>Partner</th><th>Model - State</th><th>M_q (2021)</th><th>M_q (2022)</th></tr>
<tr><td>VPA38</td><td>Asirvad</td><td>EFL Nakshatra - Bihar</td><td>1</td><td>1</td></tr>
<tr><td>VPA38</td><td>Asirvad</td><td>EFL Nakshatra - Karnataka</td><td>1</td><td>1</td></tr>
<tr><td>VPA38</td><td>Asirvad</td><td>EFL Nakshatra - Uttar Pradesh</td><td>1</td><td>1</td></tr>
<tr><td>VPA38</td><td>Asirvad</td><td>EFL Nakshatra - West Bengal</td><td>1</td><td>1</td></tr>
<tr><td>VPA38</td><td>Midland</td><td>HUL Pureit - Punjab</td><td>-</td><td>1</td></tr>
<tr><td>VPA38</td><td>Midland</td><td>HUL Pureit - Haryana</td><td>-</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Measurement methods and procedures</td><td>Water samples are collected from selected sample households and tested for pathogens in line with the potable water quality norms of the host country. Table 6, page 4 of the Indian Standard drinking water specification (IS 10500:2012) prescribes that any pathogens in a 100 ml sample means that the water is not safe for drinking.</td></tr>
<tr><td>Monitoring Frequency</td><td>Annual</td></tr>
<tr><td>QA/QC Procedures</td><td>NABL accredited laboratories were contracted to carry out water quality testing.</td></tr>
<tr><td>Purpose of data</td><td>Related to water quality</td></tr>
</table>

Additional comment	For water purifiers monitored under the VPA 38, this parameter has been calculated by accounting test results from minimum of 30 samples for water exiting from water filters. All samples passed the water testing and were found safe for drinking as per Indian Standard drinking water specification (IS 10500:2012).

Parameter ID	*SDWS 20*
Data/parameter	Water hygiene education campaigns
Unit	-
Description	Hygiene campaigns carried out among project safe water end-users.
Source of data	Report of annual hygiene campaigns results
Value(s) applied	A combined usage/project and hygiene survey has been conducted for 119 households in Year-1 and 237 households in Year-2 across 6 states. As per the survey, 90%, 93.5%, 92.9% and 96.7% of households from Bihar, Karnataka, Uttar Pradesh and West Bengal respectively were found to fulfill "basic" hygiene practices which means availability of a handwashing facility with soap and water at home. In Year-2, 96.9%, 97.0%, 91.7%, 91.0%, 92.9%, 96.9% of households from Bihar, Karnataka, Haryana, Punjab, Uttar Pradesh and West Bengal respectively were found to fulfill "basic" hygiene practices which means availability of a handwashing facility with soap and water at home. 94.44% and 91.61% of households in Year-1 and Year-2 to fulfil "safely managed" requirement of drinking water which means drinking water from an improved water source that is accessible on premises, available when needed and free from fecal contamination Annual hygiene report with details have been submitted. Also, none of the households reported any increase in diarrhoea or any other water borne disease during the current monitoring period.
Measurement methods and procedures	A questionnaire-based survey has been used to assess hygienic handling of clean water as per CME knowledge and experience and WHO/UNICEF JMP core questions on drinking and hygiene.
Monitoring Frequency	Annual
QA/QC Procedures	The fraction of the households where Safe water and Hygiene practices are found to fulfill "safely managed" or

	"basic" requirements is expected to increase over time as a result of the hygiene campaigns.
Purpose of data	Monitoring of SDG 6
Additional comment	-

Parameter ID	*SDWS 22*
Data/parameter	$X_{cleanboil,y}$
Unit	Percentage
Description	Proportion of project end-users that boil safe (treated, or from safe supply) water after installation of project technology in year y.
Source of data	Project survey
Value(s) applied	

VPA	Partner	Model - State	$X_{cleanboil,y}$ (2021)	$X_{cleanboil,y}$ (2022)
VPA38	Asirvad	EFL Nakshatra - Bihar	0%	0%
VPA38	Asirvad	EFL Nakshatra - Karnataka	0%	0%
VPA38	Asirvad	EFL Nakshatra - Uttar Pradesh	0%	0%
VPA38	Asirvad	EFL Nakshatra - West Bengal	0%	0%
VPA38	Midland	HUL Pureit - Punjab	-	0%
VPA38	Midland	HUL Pureit - Haryana	-	0%

Measurement methods and procedures	Sampling survey is carried out to determine the value
Monitoring Frequency	Annual
QA/QC Procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Parameter ID	*SDWS 24*
Data/parameter	QPW_p
Unit	Litre/person/day
Description	Volume of drinking water per person per day for premises type p

Source of data	Option 2: Water Consumption Field Tests. - In all cases, the value is capped at 5.5 L/person/day
Value(s) applied	
Measurement methods and procedures	The Pureit and Nakshatra model water purifier has a capacity of 23 litres and 16 litres storage respectively. At the time of surveying, the device is filled to its maximum capacity at the beginning of the day. At the end of the day, the leftover water is measured using a simple volumetric jar and the difference is taken as the water consumed per day. In case, the entire capacity of water purifier is consumed, it will be refilled for the second time to determine the actual water consumed. So, every time the filter is emptied it is again filled to its maximum capacity during the measurement day. This was done for 3 consecutive days. The average of 3 days was then divided by the total number of members in the household to get the value for the parameter. It is ensured that the survey is not done on a day when the water consumption is higher than normal days hence, weekends and festive days are avoided.
Monitoring Frequency	Every two years
QA/QC Procedures	The equipment used is a simple volumetric jar with least count of 100ml which does not require any calibration nor does it have standard error values. The CME/PO conducts the survey with expert assistance. Training is provided to enumerators and testers.
Purpose of data	Calculation of baseline emissions
Additional comment	-

VPA	Partner	Model - State	QPW_p
VPA38	Asirvad	EFL Nakshatra -Bihar	4.60
VPA38	Asirvad	EFL Nakshatra - Karnataka	4.65
VPA38	Asirvad	EFL Nakshatra -Uttar Pradesh	4.63
VPA38	Asirvad	EFL Nakshatra -West Bengal	4.57
VPA38	Midland	HUL Pureit -Punjab	4.61
VPA38	Midland	HUL Pureit -Haryana	4.50

Parameter ID	*SDWS 25*
Data/parameter	$HN_{p,y}$
Unit	-
Description	Number of individuals per premises type p in the project boundary in year y

Source of data	Project survey/ official government publication
Value(s) applied	

VPA	Partner	Model - State	Project Survey (2021)	Project Survey (2022)	Census
VPA38	Asirvad	EFL Nakshatra -Bihar	5.56	5.22	5.5
VPA38	Asirvad	EFL Nakshatra - Karnataka	5.06	4.78	4.5
VPA38	Asirvad	EFL Nakshatra -Uttar Pradesh	6.1	6.1	6.0
VPA38	Asirvad	EFL Nakshatra -West Bengal	4.5	5.12	4.5
VPA38	Midland	HUL Pureit -Punjab	-	5.01	5
VPA38	Midland	HUL Pureit -Haryana	-	4.75	5.2

Measurement methods and procedures	Project Survey
Monitoring Frequency	Annual
QA/QC Procedures	CME/PO conducted surveys by training the enumerators and testers.
Purpose of data	Calculation of baseline emissions
Additional comment	According to the applied methodology, the percentages applied shall be cross-checked against at least one other source on the list. For cross-check purposes, sources applied may be up to 5 years old. In this project the cross-check document is Census data by Government of India. CME has done comparison of project survey data and census state-wise and conservative value has been used.

Parameter ID	*SDWS 28*
Data/parameter	$N_{p,y}$
Unit	Number

Description	Accumulated number of premises type p with at least one individual project technology in year y
Source of data	Sales or distribution records
Value(s) applied	

VPA	Partner	Model - State	$N_{p,y}$ (2021)	$N_{p,y}$ (2022)
VPA38	Asirvad	EFL Nakshatra - Bihar	76	76
VPA38	Asirvad	EFL Nakshatra - Karnataka	54	54
VPA38	Asirvad	EFL Nakshatra - Uttar Pradesh	28	28
VPA38	Asirvad	EFL Nakshatra - West Bengal	163	163
VPA38	Midland	HUL Pureit - Punjab	-	1,111
VPA38	Midland	HUL Pureit - Haryana	-	12
Total			**321**	**1,444**

Measurement methods and procedures	Sales Database
Monitoring Frequency	Annual
QA/QC Procedures	Sales or distribution records to include 1. Date of sale/distribution 2. Geographic area of sale 3. Model/type of project technology sold 4. Quantity of project technologies sold Name and telephone number, and address (if available) or other traceable indicator of premises identity and location for all end users.
Purpose of data	Calculation of baseline emissions
Additional comment	For water purifiers monitored under this VPA, this parameter has been conservatively calculated by assuming that if any water purifier is found to be "non-functional" during monitoring survey for "Usage" then value for number of members in the household is also considered "0". This has been done as a conservativeness measure in calculating emission reductions. For some of the water purifiers monitored, this monitoring parameter has been conservatively calculated by assuming that any water purifier with "installed_damaged" status as a result of the annual usage status monitoring (which is carried out annually for all CEPs in the PoA) is not working and that for these "installed_damaged" products the number of

	members in the household is taken as 0. This has been done despite providing monitoring results of this parameter for water purifiers with "installed_damaged" status (with minor repairable issues).

Parameter ID	*SDWS 29*
Data/parameter	$U_{p,y}$
Unit	Percentage
Description	Usage rate of the project technology by premises type p during year y
Source of data	Project Survey of the premises using a project technology to determine the usage rate of the project technology during the year.
Value(s) applied	See table below
Measurement methods and procedures	Option 1: In-person survey of project premises.
Monitoring Frequency	Annual
QA/QC Procedures	WCFT was used to cross check the usage percentage.
Purpose of data	Calculation of baseline emissions
Additional comment	-

VPA	**Partner**	**Model - State**	**$U_{p,y}$ (2021)**	**$U_{p,y}$ (2022)**
VPA38	Asirvad	EFL Nakshatra - Bihar	100%	97%
VPA38	Asirvad	EFL Nakshatra - Karnataka	97%	97%
VPA38	Asirvad	EFL Nakshatra - Uttar Pradesh	100%	96%
VPA38	Asrivad	EFL Nakshatra - West Bengal	100%	94%
VPA38	Midland	HUL Pureit - Punjab	-	99%
VPA38	Midland	HUL Pureit - Haryana	-	100%

Parameter ID	*SDWS 30*
Data/parameter	$t_{p,y}$
Unit	Hours per day

Description	Usage time of the project technology by premises type p in year y
Source of data	Option 3. Default of 5 hours.
Value(s) applied	5 hours
Measurement methods and procedures	Option 3. Default of 5 hours
Monitoring Frequency	Annual
QA/QC Procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

Parameter ID	*SDWS 31*
Data/parameter	$DP_{p,y}$
Unit	Days
Description	Average days the project technology is present for end-users in the premises p in year y
Source of data	Sales or distribution records.
Value(s) applied	(see table below)
Measurement methods and procedures	This is calculated as the total days from date of installation of the device to the date of end of monitoring period or entire monitoring period whichever is lesser
Monitoring Frequency	Annual
QA/QC Procedures	-
Purpose of data	Calculation of baseline emissions
Additional comment	-

VPA	**Partner**	**Model - State**	**$DP_{p,y}$ (2021)**	**$DP_{p,y}$ (2022)**
VPA38	Asirvad	EFL Nakshatra - Bihar	296	360
VPA38	Asirvad	EFL Nakshatra - Karnataka	303	358
VPA38	Asirvad	EFL Nakshatra - Uttar Pradesh	200	352
VPA38	Asrivad	EFL Nakshatra - West Bengal	277	361
VPA38	Midland	HUL Pureit - Punjab	-	144
VPA38	Midland	HUL Pureit - Haryana	-	156

Parameter ID	*SDWS 32*
Data/parameter	$DN_{p,y}$
Unit	Number
Description	Average number of individual project technologies in each project premises type p in year y
Source of data	Sales or distribution records.
Value(s) applied	1
Measurement methods and procedures	Based on the sales or distribution records of "Quantity of project technologies sold" and identifying information of buyer/recipient, the average number of project devices per premises are calculated.
Monitoring Frequency	Annual
QA/QC Procedures	-
Purpose of data	Estimation of baseline emissions
Additional comment	-

Parameter ID	*SDWS 35*
Data/parameter	LE_y
Unit	tCO_2e per year
Description	Leakage emissions during year y
Source of data	Sources established by following Leakage emissions section
Value(s) applied	5%
Measurement methods and procedures	Monitoring survey
Monitoring Frequency	Every two years
QA/QC Procedures	Compliance with the general requirements for sampling and general requirements for data and information sources
Purpose of data	Estimation of baseline emissions
Additional comment	Monitoring parameters required for calculating leakage emissions shall be included in the monitoring plan in the PDD as required to monitor and quantify the sources of leakage determined by following the Leakage emissions section.

SDG 1

Data / Parameter	$BSA_{Project}$

Unit	Number
Description	Percentage of households having access to basic services
Source of data	Monitoring Survey Records
Value(s) applied	**VPA Number** | **Value (2021)** | **Value (2022)** VPA38 | 94.44% | 91.61%
Measurement methods and procedures	Monitoring and recording of number of WPS/SLS distributed under the project
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	SDG 1 contribution
Additional comment	No WPS implementation in VPA39 until end of the current monitoring period

SDG 6

Data / Parameter	Number of beneficiaries
Unit	Number
Description	Number of households served with safely managed water services
Source of data	CME Database and Monitoring Survey
Value(s) applied	**VPA Number** | **Value (2021)** | **Value (2022)** VPA38 | 288 | 1,236
Measurement methods and procedures	Using formula, Np,y*(1-Cb)*Up,y*Mq,y
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Monitoring of SDG 6
Additional comment	No WPS implementation in VPA39 until end of the current monitoring period.

SDG 7

Data / Parameter	$ACS_{Project}$
Unit	Number
Description	Number of households having access to operational clean energy products.
Source of data	WPS/SLS distribution records
Value(s) applied	**VPA Number** | **SLS (2021)** | **SLS (2022)** | **WPS (2021)** | **WPS (2022)**

	VPA38 | 54,570 | 103,078 | 319 | 1,418 VPA39 | 21,257 | 21,373 | - | -
Measurement methods and procedures	Monitor the number of WPS/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	No WPS implementation in VPA39 until end of the current monitoring period.

SDG 8

Data / Parameter	QE $IG_{project}$
Unit	Number
Description	Quantitative Employment and income generation
Source of data	Employment records
Value(s) applied	**VPA Number** | **Male** | **Female** VPA38 | 103 | 22 VPA39 | 32 | 16
Measurement methods and procedures	Recording the number of employees (male / female) in the project under administrative, sales, production and management positions. Employment record with date of birth has been provided.
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	SDG 8 contribution
Additional comment	-

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

Not Applicable. The monitoring period for the project is 01/01/2021-31/12/2022, which is the first monitoring period under GS4GG. Furthermore, these VPAs, no credits have been issued for the VPA under CDM. Hence, there are no values to be compared with the previous monitoring period.

D.4. Implementation of sampling plan

>>

Sampling plan was applied to all the following VPAs included in this issuance request: VPA38 and VPA39 values considered.

Description of implemented sampling design

As per Section B.7.2 of the VPA-DD and the CDM standard on "Sampling and surveys for CDM project activities and programme of activities" version 9.0, the following sampling design was implemented for the VPA –

Solar Lighting System:

The following steps were taken as part of the sampling procedure -

1. For VPAs with more than 1 Partner Organization (PO), the total sales population was split per partner.
2. For each partner organization, where sales were made in more than 1 state, the population was further split into state wise sales. This is done in order to capture the variation in solar product usage in different climatic zones.
3. For each state, the sales numbers were further split into solar lighting system model. Simple random sample was then applied for the proportion-based parameter "Total number of lamps checked for which a valid result was obtained" to determine the sample size. Simple random sample was adopted as the pilot data showed homogeneity regarding the usage of solar products for the PO in the VPA with solar lighting system sales. The pilot data used for determining the sample size is given in the emission reduction calculation sheet for the VPA. The sample size calculation equation was taken from Section 2.1.1, para 12, page 28 of the CDM guidelines for Sampling and surveys for CDM project activities and programmes of activities version 4.0.
4. The determined number of samples takes into consideration the vintage split. For e.g. if the total VPA population of solar lighting system is 300 with 60 of vintage 0-1 years, 100 of vintage 1-2 years and 140 of vintage 2-3 years, the selected samples were 6 for vintage 0-1 years, 10 for vintage 1-2 years and 14 for vintage 2-3 years for a sample size of 30.

   The vintage analysis sheet is provided to the VVB including the approach for selecting samples based on vintage and a further demonstration of the vintage split reflected in the monitored samples. For e.g. table below shows the vintage split for SKDRDP NCLT2F1HLS (Karnataka) for VPA38 for year-2 with a total sample requirement of 30:

Model	State	Sample	Vintage	Sales	Fraction	Samples	Fraction

		Requirement	Period	based on corresponding vintage	of Each Vintage in the Sales Population	Monitored for Each Vintage	of Each Vintage in the Monitored Samples
SKDRDP NCLT2 F1HLS	Karnataka	30	0-1 (01/01/2022 to 31/12/2022)	1,573	91%	27	91%
			1-2 (01/01/2021 to 31/12/2021)	147	9%	3	9%

Water Purification System:
As per Section B.7.2 of the VPA-DD and Safe water methodology v1.0, the following sampling design was implemented for the VPA-

The VPA is implemented in several state across the country. Population is homogenous within a state. Due to the homogeneity feature within the state, simple random sampling method was applied. The sample-based estimate (mean or proportion) is an unbiased estimate of the population parameter.

- **Usage/Project Survey**

For usage survey, the minimum sample size for HWT - for individual technology age group shall be minimum 30 household. The majority of interviews in a usage survey must be conducted in person. Thus, if technologies of age 1-5 are credited, the usage survey must include 30 representative samples from each age for total of 150 samples. The resulting usage parameter should be weighted based on the proportion of technologies in the total sales record of each age. For project survey, below mentioned guideline has been followed:

Group size	Minimum sample size
<300	30 or population size, whichever is smaller
300 to 1000	10% of group size
> 1000	100

CME has conducted common survey for usage and project taking into account both requirements. For e.g. for VPA38 table below shows vintage spit for WPS installations in Punjab for Year 2:

Vintage Year	Total Sales	Required Samples
2022	1,111	100
2021	0	0

- **Hygiene**

A combined usage/project and hygiene survey has been conducted for 119 households in Year-1 and 237 household sin Year-2 across 6 states in Year 1 and Year 2.

As per the survey, 90%, 93.5%, 92.9% and 96.7% of households from Bihar, Karnataka, Uttar Pradesh and West Bengal respectively were found to fulfill "basic" hygiene practices which means availability of a handwashing facility with soap and water at home. In Year-2, 96.9%, 97.0%, 91.7%, 91.0%, 92.9%, 96.9% of households from Bihar, Karnataka, Haryana, Punjab, Uttar Pradesh and West Bengal respectively were found to fulfill "basic" hygiene practices which means availability of a handwashing facility with soap and water at home. 94.44% and 91.61% of households in Year-1 and Year-2 to fulfil "safely managed" requirement of drinking water which means drinking water from an improved water source that is accessible on premises, available when needed and free from fecal contamination Annual hygiene report with details have been submitted. Also none of the hosueholds reported any increase in diarrhoea or any other water borne diseases during the current monitoring period..

- **Water Quality**

The sample for water quality testing has been made following the 90/10 precision rule indicated by the applied methodology.

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

1. VPA38: GS11897

Parameter	Monitoring Frequency	CEPs added during this MP (01/01/2021 to 31/12/2022)	New Monitoring for this MP
Usage/Project Survey	Annual	Yes	Yes
Water testing	Annual	Yes	Yes
Solar Lighting System	Annual	Yes	Yes

Water Purification System: Monitoring field surveys/field tests for various parameters in this monitoring period for year-1 (01/01/2021 to 31/12/2021) was conducted between 20/01/2022 to 10/02/2022 and year-2 (01/01/2022 to 31/12/2022) was conducted between 19/01/2023 to 15/02/2023 For next monitoring period, fresh monitoring will be carried out.

Solar lighting systems: Monitoring field surveys for various parameters in this monitoring period for year-1 (01/01/2021 to 31/12/2021) was conducted between 20/01/2022 to 10/02/2022 and year-2 (01/01/2022 to 31/12/2022) were conducted in 20/01/2023 to 10/02/2023 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. VPA39: GS11898

Parameter	Monitoring Frequency	CEPs added during this MP (01/01/2021 to 31/12/2022)	New Monitoring for this MP
Usage/Project Survey	Annual	NA	NA
Water testing	Annual	NA	NA
Solar Lighting System	Annual	Yes	Yes

Solar lighting systems: Monitoring field surveys for various parameters in this monitoring period for year-1 (01/01/2021 to 31/12/2021) was conducted between 20/01/2022 to 10/02/2022 and year-2 (01/01/2022 to 31/12/2022) were conducted in 20/01/2023 to 10/02/2023 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 this VPA included in this monitoring report is summarized as follows –

1. VPA38: GS11897

Solar lighting systems (Satin, Midland, Arman, SKDRDP and Arohan):

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:** Midland Sunking Boom (UP)– 10 SKDRDP NCL2HLS (KA) - 26 Satin Glosolar Jugnu SLT (UP)- 30 **Actual monitored samples for:** Midland Sunking Boom (UP)– 10	As per guidance given in para 13 and 14, page 7 and 8 of Standard for Sampling and surveys for CDM project activities and programme of activities version 9.0, 30 samples each are chosen randomly. For e.g. 30 samples are chosen randomly for monitoring for SKDRDP NCL2HLS (KA). For some models such as Midland Sunking Boom (UP) where total sales is less than 30, all sales (10) are monitored. For some models like Satin Glosolar Jugnu SLT (UP), the sample size is more than 30 and hence the required sample size requirement (30) are randomly selected and monitored. Detailed sample size for all other models and calculation is provided in Emission

			SKDRDP NCL2HLS (KA) - 30 Satin Glosolar Jugnu SLT (UP)- 30	reduction calculation sheet.

Water Purification System (Midland and Asirvad):

S.No.	Parameter	Sampling approach	Sample size		
1	Usage $U_{p,y}$	Simple random sampling		**Y-1**	**Y-2**
			Asirvad BH	30	30
			Asirvad KA	30	30
			Asirvad UP	28	28
			Asirvad WB	30	30
			Midland PJ	0	100
			Midland HR	0	12
2	Water Quality M_q	Simple random sampling		**Y-1**	**Y-2**
			Asirvad BH	30	30
			Asirvad KA	30	30
			Asirvad UP	28	27
			Asirvad WB	30	30

			Midland PJ	0	30
			Midland HR	0	12

2. VPA39: GS11898

Solar lighting systems (Midland and Satin):

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:** Midland Sunking Pro200 (PJ)– 2 Midland Sunking Boom (KA) - 26 Satin d.light ST100 (BH)-30 **Actual monitored samples for:**	As per guidance given in para 13 and 14, page 7 and 8 of Standard for Sampling and surveys for CDM project activities and programme of activities version 9.0, 30 samples each are chosen randomly. For e.g. 30 samples are chosen randomly for monitoring for Midland Sunking Boom (KA). For some models such as Midland Sunking Pro200 (PJ)– where total sales is less than 30, all sales (2) are monitored. For some models like Satin d.light ST100 (BH), the sample size is more than 30 and hence the required sample size requirement (30) are randomly selected and monitored. Detailed sample size for all other

			Midland Sunking Pro200 (PJ)–2 Midland Sunking Boom (KA) - 30 Satin d.light ST100 (BH)-30	models and calculation is provided in Emission reduction calculation sheet.

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 90/10 reliability level for simple random sampling few additional water purifiers 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 applied methodology AMS-I.A version 14.0. The confidence/precision of 90/10 is met for all models-state and parameters for WPS as per Safe water meth v1.0 for both Year-1 and 2. In case, the confidence/precision is not met for any parameter for WPS, the upper or lower bound is conservatively applied to arrive at final values for the parameter as per applied methodology.

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 Safe water meth v1.0 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

>>

Calculations for Water Purification System and Solar Lighting Systems

SDG 13: Climate Action (WPS)

The Emission reductions are calculated as follows:

$ERy = BEy - PEy - LEy$

Where:

ERy = Emission reductions in year y (t CO2e/yr)

BEy = Baseline emissions in year y (t CO2e/yr)

PEy = Project emissions in year y (t CO2e/yr)

LEy = Leakage emissions in year y (t CO2e/yr)

The baseline emission shall be calculated as

$BE_y = EF_b \times (1 - C_b - X_{cleanboil}) \times Q_y \times M_{q,y}$

Where:

BE_y	=	Baseline emissions from the use of fuel to obtain safe water in the baseline (tCO_2e)
C_b	=	Proportion of project end-users who in the baseline were already using a safe water supply that did not require boiling (%)
$X_{cleanboil,y}$	=	Proportion of project end-users that boil safe water in the project year y (%)
Q_y	=	Quantity of safe drinking water provided by the project in year y (L)
$M_{q,y}$	=	Modifier for the water quality in year y

The baseline emission factor shall be calculated as

$EFb = SEw,b,y * \Sigma(xf * (EFb,f,CO2 * fNRB,f,y + EFb,f,nonCO2)) \ f \div 10^9$

Where:

EF_b	=	Emission factor for the use of fuel to obtain safe water in the baseline (tCO2e/L)

$SE_{w,b,y}$	=	Specific energy required to boil water (kJ/L), to be calculated as per the paragraph below
xf	=	Proportion of fuel f used in the baseline (fraction determined based on an energy basis)
$EF_{b,f,CO2}$	=	CO2 emission factor from use of fuel f (tCO2/TJ)
$EF_{b,f,nonCO2}$	=	Non-CO2 emission factor arising from use of fuel f, when the baseline fuel f is biomass or charcoal (tCO2e/TJ). This parameter is omitted when f is a fossil fuel.
$f_{NRB,f,y}$	=	Fractional non-renewability status of woody biomass fuel during year y (fraction). For biomass, it is the fraction of woody biomass that can be established as non-renewable. This parameter is omitted when f is a fossil fuel.
F	=	Index for baseline fuel types

The specific energy required to boil water using the baseline technology (SEw,b,y) is determined as follows, by calculating the energy input required to obtain 1 L of boiling water, including boiling and vaporization losses, taking into account default or measured stove efficiency.

$SE_{w,b,y}$ = 360.83/η_{wb}

Where:

360.83 = Default amount of energy required to obtain 1 L of water after 5 minutes of boiling from a first principles approach kJ/l

η_{wb} = Efficiency of the stoves for baseline water boiling (%). Weighted average of baseline stove types.

The quantity of safe drinking water provided by the project Qy is calculated using following method (for HWT and IWT)

$Q_y = \sum N_{p,y} \times U_{p,y} \times QPW_{hh,p,y} \times DP_{p,y}$

Where:

$N_{p,y}$	=	Number of premises type p with at least one project technology in year y
$U_{p,y}$	=	Usage rate of the project technology by premises type p during year y (%)
$QPW_{hh,p,y}$	=	Volume of drinking water per premises p per day in year y (L)
$DP_{p,y}$	=	Days the project technology is present for end-users in the premises p in year y

The volume of drinking water per premises per day is determined by considering whether the capacity of the project device is sufficient to provide at least the default amount of drinking water, as follows:

$QPW_{hh,p,y}$ = min (($q_i \times t_{p,y} \times DN_{p,y}$), ($QPW_p \times HN_{p,y}$))

Where:

q_i	=	Capacity of the HWT or IWT individual project technology (L/h)
$t_{p,y}$	=	Usage time of the project technology by premises type p in year y (h/day)
$DN_{p,y}$	=	Average number of individual project technologies in each project premises type p in year y
$HN_{p,y}$	=	Number of individuals per premises type p (e.g. household, school) in year y
QPW_p	=	Volume of drinking water per person per day for premises type p (L). Apply the default value or monitored value through water consumption field tests in the project scenario, capped at 5.5 L per person per day.

For example, calculation for baseline emission for year-1 has been demonstrated below:

$ERy = BEy - PEy - LEy$

$BE_y = EF_b \times (1 - C_b - X_{cleanboil}) \times Q_y \times M_{q,y}$

Year	**VPA 38**	**VPA 39**
2021	674	0
2022	2,052	0
Total	**2,726**	**0**

13: Climate Action: Solar Lighting Systems

Applied methodology/approach	Equation/calculation
13.2.2 Amount of CO_2e emissions reduced by the project per year Approach: AMS.I.A., version 14.0	Total baseline emissions for period *v* are calculated as the sum of the baseline emissions of each lamp type *i* in the period: $BE_v = \sum_{i=1}^{n} BE_{i,v}$ (Eq. 2)

Parameter	Unit	Type	Value
BE_v	tCO_2	Calculated	Emissions generated in the absence of the project activity in period *v* by all lamps
$BE_{i,v}$	tCO_2	Calculated	Emissions generated in the absence of the project activity in period *v* by all lamps of type *i*

Ex post baseline emission for each lamp type *i* is calculated with the following equation:

$$BE_v = \sum_{a=1}^{n}(N_{i,a}*d_{i,a,v})*l_i * h * \frac{1}{LE_{ker}}*EF_{ker}*10^{-6}*3.6*CF_{i,v,LFR}$$

(Eq. 3)

Parameter	Unit	Type	Value
BE_v	tCO_2	Calculated	Emissions generated in the absence of the project activity in period *v* by all lamps of type *i*
$N_{i,a}$	Number	Monitored	The total number of solar lamps of type *i* deployed in period *a*
$d_{i,a,v}$	Days	Monitored/ calculated	Average number of days lamps of type *i* that have been deployed in period *a* were operating in period *v*
l_i	Lumen	Monitored (once per lamp type)	Nominal lumen output of solar lamps of the type *I* deployed as part of the project activity
H	Hours /day	Fixed	Average operating hours of kerosene lamps in the baseline
LE_{ker}	Lumen/W	Fixed	The specific light output of kerosene when burnt in a kerosene lantern
EF_{ker}	tCO_2/ GJ	Fixed	The specific CO_2-emissions of kerosene
$CF_{i,v,LFR}$	-	Monitored/ Calculated	This factor corrects the total number of lamps of type *i* by the share of these lamps that were found to be operational according to the sampling in period *v*. The statistical error is included in this parameter (confidence level 90%).

Where:

$$CF_{i,v,LFR} = 1- \left(LFR_{i,v} + z* \sqrt{\frac{LFR_{i,v}*(1-LFR_{i,v})}{n_{i,v,total}}}\right) \quad \text{(Eq. 4)}$$

Parameter	Unit	Type	Value
$CF_{i,v,LFR}$	-	Calculated	This factor corrects the total number of lamps of type *i* by the share of these lamps that were found to be operational according to the sampling in period *v*. The statistical error is included in this parameter (confidence level 90%).
$LFR_{i,v}$	%	Monitored	Share of lamps of lamp type *i* in checked sample group $g_{i,v}$ not operational in period *v*.
Z	-	Given	Standard normal for a confidence level of 90%
$n_{i,v,total}$	-	Monitored	Total number of lamps checked for which a valid result was obtained.

In line with the applied methodology and the registered PoA, project emissions and leakage emissions are not present and hence not included.

$$BE_v = \sum_{a=1}^{n}(N_{i,a} * d_{i,a,v}) * l_i * h * \frac{1}{LE_{ker}} * EF_{ker} * 10^{-6} * 3.6 * CF_{i,v,LFR}$$

Year	VPA38	VPA39
2021	7,583	3,635
2022	31,131	7,624
Total	38,714	11,259

The detailed calculations for baseline emissions for this VPA requesting issuance as part of this monitoring report is given in the corresponding emission reduction calculation sheets.

SDG 1: No Poverty

$BSA_{Baseline}$ Percentage of households having access to basic services in baseline

Year	VPA38	VPA39
2021	5.02%	0
2022	6.57%	0

SDG 6: Clean Water and Sanitation

$HHTS_{Baseline}$ Number of households served with safely managed water services = 0

SDG 7: Affordable and Clean Energy

$ACS_{Baseline}$ Access to affordable and clean energy (Number of operating WPS 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

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

>>

SDG 13: Climate Action

For Solar Lighting System

The project estimate for SLS = 0

For Water Purification System

As the project envisage implementation of gravity-based water filter, thus eliminating the usage of traditional stove for boiling water, project estimate are considered 0.

SDG 1: No Poverty (WPS)

$BSA_{Project}$ Percentage of households having access to basic services in project

Year	VPA38	VPA39
2021	99.46%	0

2022	98.18%	0

SDG 6: Clean Water and Sanitation (WPS)

Net Benefit (SDG 6) = $N_{p,y} * (1-C_b)*U_{p,y}*M_{q,y}$
Number of households served with satisfactory level of safe water in project

Year	VPA38	VPA39
2021	288	0
2022	1236	0

SDG 7: Affordable and Clean Energy (WPS)

$ACS_{Project}$ Access to affordable and clean energy (Number of operating WPS units under Project)

Year	VPA38	VPA39
2021	319	0
2022	1,418	0

SDG 7: Affordable and Clean Energy (SLS)

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

Year	VPA38	VPA39
2021	54,570	21,257
2022	103,078	21,373

SDG 8: Decent Work and Economic Growth

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

Year	VPA38	VPA39
Female	22	16
Male	103	32

E.3. Calculation of leakage

>>

For SLS: 0

For WPS = 5% (ex-ante estimation). As per section 3.8.3 of the methodology, "If the ex-ante evaluation shows that leakage emissions are less than 5% of total emission reductions, then no monitoring is needed, and emission reductions simply shall be adjusted 5% down." Therefore, the Emission reductions have been adjusted by 5% to account for leakage emissions.

E.4. Calculation of net benefits or direct calculation for each SDG Impact
Year 1: 2021

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Climate Action (SLS)	VPA38 – 7,583 VPA39 – 3,635	0[7]	VPA38 – 7,583 VPA39 – 3,635
13	Climate Action (WPS)	VPA38 – 674 VPA39 – 0	0[8]	VPA38 – 674 VPA39 – 0
13	**Climate (SLS+WPS)**	**VPA38 – 8,257 VPA39 – 3,635**	**0**	**VPA38 – 8,257 VPA39 – 3,635**
1	No poverty (WPS)	VPA38 – 5.02% VPA39 – 0	VPA38 – 99.46% VPA39 – 0	VPA38 – 94.44% VPA39 – 0
6	Clean Water and Sanitation (WPS)	0	VPA38 – 288 VPA39 – 0	VPA38 – 288 VPA39 – 0
7	Affordable and Clean Energy (SLS)	0	VPA38 – 54,570 VPA39 – 21,257	VPA38 – 54,570 VPA39 – 21,257
7	Affordable and Clean Energy (WPS)	0	VPA38 – 319 VPA39 – 0	VPA38 – 319 VPA39 – 0
8	Decent Work and Economic Growth	0	VPA38 – 125 VPA39 – 48	VPA38 – 125 VPA39 – 48

[7] Solar lighting system are renewable energy-based technologies. Renewable don't have any project emissions. Water purifier under the program is non-electric (gravity based) filters, hence no project emissions.
[8] Solar lighting system are renewable energy-based technologies. Renewable don't have any project emissions. Water purifier under the program is non-electric (gravity based) filters, hence no project emissions.

Year 2: 2022

SDG	SDG Impact	Baseline estimate	Project estimate	Net benefit
13	Climate Action (SLS)	VPA38 – 31,131 VPA39 – 7,624	0[9]	VPA38 – 31,131 VPA39 – 7,624
13	Climate Action (WPS)	VPA38 – 2,052 VPA39 – 0	0[10]	VPA38 – 2,052 VPA39 – 0
1	No poverty (WPS)	VPA38 – 6.47% VPA39 – 0	VPA38 – 98.18% VPA39 – 0	VPA38 – 91.61% VPA39 – 0
6	Clean Water and Sanitation (WPS)	0	VPA38 – 1,236 VPA39 – 0	VPA38 – 1,236 VPA39 – 0
7	Affordable and Clean Energy (SLS)	0	VPA38 – 103,078 VPA39 – 21,373	VPA38 – 103,078 VPA39 – 21,373
7	Affordable and Clean Energy (WPS)	0	VPA38 – 1,418 VPA39 – 0	VPA38 – 1,418 VPA39 – 0
8	Decent Work and Economic Growth	0	VPA38 – 125 VPA39 – 48	VPA38 – 125 VPA39 – 48

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

Year 1: 2021

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[11] achieved during this monitoring period
13 (SLS)	VPA38 -20,029 VPA39 -7,603	VPA38 -7,583 VPA39 -3,635

[9] Solar lighting system are renewable energy-based technologies. Renewable don't have any project emissions. Water purifier under the program is non-electric (gravity based) filters, hence no project emissions.

[10] Solar lighting system are renewable energy-based technologies. Renewable don't have any project emissions. Water purifier under the program is non-electric (gravity based) filters, hence no project emissions.

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

13 (WPS)	VPA38 -1,180 VPA39 -0	VPA38 -674 VPA39 -0
13 (SLS+WPS)	**VPA38 -21,209** **VPA39 -7,603**	**VPA38 -8,257** **VPA39 -3,635**
1	VPA38 -93.43% VPA39 -94.25%	VPA38 -94.44% VPA39 -0
6	VPA38 -24,292 VPA39 -24,504	VPA38 -288 VPA39 -0
7 (SLS)	VPA38 -225,530 VPA39 -202,532	VPA38 -54,570 VPA39 -21,257
7 (WPS)	VPA38 -10,753 VPA39 -10,400	VPA38 -319 VPA39 -0
8	VPA38 -20 VPA39 -20	VPA38 -125 VPA39 -48

Year 2: 2022

SDG	Values estimated in ex ante calculation of approved PDD for this monitoring period	Actual values[12] achieved during this monitoring period
13 (SLS)	VPA38 -37,030 VPA39 -8,710	VPA38 -31,131 VPA39 -7,624
13 (WPS)	VPA38 -7,278 VPA39 -0	VPA38 -2,052 VPA39 -0
13 (SLS+WPS)	**VPA38 -44,308** **VPA39 -8,710**	**VPA38 -33,183** **VPA39 -7,624**
1	VPA38 -93.43% VPA39 -94.25%	VPA38 -91.61% VPA39 -0
6	VPA38 -24,292 VPA39 -24,504	VPA38 -1,236 VPA39 -0
7 (SLS)	VPA38 -225,530	VPA38 -103,078

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

	VPA39 -202,532	VPA39 -21,373
7 (WPS)	VPA38 -10,753 VPA39 -10,400	VPA38 -1,418 VPA39 -0
8	VPA38 -20 VPA39 -20	VPA38 -125 VPA39 -48

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

>>

"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 VPA and number of crediting days in the current monitoring period.

To achieve a comparable value of estimates for this monitoring period for VPA38, these are the factors/values considered:

- Since, both the technologies (Solar Lighting System and Water purification systems) are implemented in this VPA are implemented total value of ex ante emission reduction is used for estimation. Total ex ante estimated value for Year-2 (21/12/2020 to 20/12/2021), Year-3 (21/12/2021 to 20/12/2022) and Year-4 (21/12/2022 to 20/12/2023) of CP-1 of operation of the VPA from start date of crediting period is considered. Current monitoring period (01/01/2021 to 31/12/2022) falls between Year-2, Year-3 and Year-4 of the crediting period.

- The estimation of ex ante value is made for 354 days (Year 2 i.e. 01/01/2021 to 20/12/2021), 365 days (Year 3 i.e. 21/12/2021 to 20/12/2022) and 11 days (Year 4 i.e. 21/12/2022 to 31/12/2022) totaling to 730 days (which is crediting days) for this monitoring period[13].

To achieve a comparable value of estimates for this monitoring period for VPA39, these are the factors/values considered:

- Since, only Solar Lighting Systems are implemented in this VPA, solar emission reduction value of ex ante emission reduction is used for estimation. Total ex

[13] For detailed calculation of "Amount estimated ex ante for this monitoring period in the VPA-DD (t CO_2e)" of this VPA, please refer to the emission reduction calculation sheet.

ante estimated value for Year-2 (21/12/2020 to 20/12/2021), Year-3 (21/12/2021 to 20/12/2022) and Year-4 (21/12/2022 to 20/12/2023) of CP-1 of operation of the VPA from start date of crediting period is considered. Current monitoring period (01/01/2021 to 31/12/2022) falls between Year-2, Year-3 and Year-4 of the crediting period.

- The estimation of ex ante value is made for 354 days (Year 2 i.e. 01/01/2021 to 20/12/2021), 365 days (Year 3 i.e. 21/12/2021 to 20/12/2022) and 11 days (Year 4 i.e. 21/12/2022 to 31/12/2022) totaling to 730 days (which is crediting days) for this monitoring period[14].

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

>>

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.

SECTION F. SAFEGUARDS REPORTING

>>

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, Satin, Arohan and Arman. 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

[14] For detailed calculation of "Amount estimated ex ante for this monitoring period in the VPA-DD (t CO_2e)" of this VPA, please refer to the emission reduction calculation sheet.

	contracts of SKDRDP, Midland, Satin, Arohan and Arman 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 Midland and Asirvad staffs, if any waste scrap disposal happened in the current monitoring. For the current monitoring period, no requests were received for waste scrap collection from the end users.
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.

>>

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
Telephone Access (Optional)	-
Other	Email: indira.ghosh@arohan.in, skdrdp@skdrdpindia.org, info@midlandmicrofin.com, finance@armanindia.com, pno@asirvad.in, info@satincreditcare.com

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

>>

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

>>

There was no legal contest 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 (01/01/2021 to 31/12/2022).

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