TRANSITION REQUEST FORM - CPA

PUBLICATION DATE **1.04.2021**

VERSION **1.0**

RELATED SUPPORT

- TEMPLATE GUIDE Key Project Information & VPA Design Document v.1.1

CONTACT DETAILS:

THE GOLD STANDARD FOUNDATION

Chemin de Balexert 7-9
1219 Châtelaine
International Environment House 2
Geneva, Switzerland
Tel: +41 22 788 70 80
Email: help@goldstandard.org

Summary:

The CPA transitioning from **CDM or other Standards to Gold Standard for Global Goals (GS4GG)** shall submit the transition request form and VPA - DD (this document)**.** The **Transition Request Form** is also to be completed for CPA that are already registered with GS4GG for CER labelling and seek to move to GSVER stream to issue Gold Standard VERs.

This document contains the following Sections:

0 – Summary of Safeguarding Principles and Gender Sensitive Assessment
0 – Summary of Local stakeholder consultation
Appendix 1 – Safeguarding Principles Assessment (mandatory)
0 - Contact information of VPA Implementer (mandatory)
0 - Summary of Approved Design Changes (project specific)

The following table summarises how different sections of this document shall be filled to facilitate request for transition from other standard to GS4GG.

Section	Required for	How to complete the section
Transition Request Form		
TRF.1 Eligibility check for transition	All CPAs	Answer the assessment questions and provide supporting information as needed
TRF.2 Transition project information	All CPAs	Provide CPA information pertaining to the standard, the project is transitioning from (e.g. CDM)
TFR.3 Transition checklist	All CPAs	Answer the assessment questions and provide supporting information in the section in the VPA - DD section as needed
VPA – DD		
Key project information	All CPAs	Include VPA details pertaining to GS4GG
Section A to E	All CPAs	Provide information as needed. Any section/subsections - that requires information/justification or additional information as per transition checklist, AND - that involves update/revision to the information provided for registration with other standards. In such cases, the project shall copy and paste the information from registered VPA - DD (other standard) and mark the additional information in track changes.

SECTION – TRANSITION REQUEST FORM

TRF.1 ELIGIBILITY CHECK FOR TRANSITION

To be completed for all CPAs seeking transition to GS4GG from other standards.

Requirement	CPA assessment (to be completed by CME)
The CPA must have a crediting period start date with CDM/other standard on or **after 01 January 2016**	Is the CPA(s) crediting period start date **after** 01 January 2016? ☒ Yes ☐ No (go to questions below)
The CPA that has a crediting period start date with CDM/other standard **before 01 January 2016** shall demonstrate the risk of discontinuation without carbon revenue.	*Explain the risks/barriers that may cause discontinuation of CPA without carbon revenue.* NA
The CPA that has a crediting period start date with CDM/other standard **before 01 January 2016** shall demonstrate how the project has been operational in the absence of carbon revenue, if carbon credits have not been issued to the project in recent years.	*Explain how the CPA has managed the operation in the absence of carbon revenue in recent years.* *NA*
List of supporting documents	*Please list all supporting documentation.* *If any of the supporting documents are confidential, please indicate here to ensure they are omitted from being published*

TRF.2 TRANSITION PROJECT INFORMATION

CME shall provide CPA information (in grey rows), pertaining to the standard, the CPA is transitioning from (e.g. CDM) in the table below.

Name of the original standard	☒ **CDM** ☐ **Other** (Add the standard name here)	
CPA status with original standard	*The current status of CPA with CDM/other standard at the time of submission of this form.*	
	☒ **Active** (registration status is valid) ☐ **Withdrawn** (deregistered) ☐ **Provisional** (awaiting guidance from the CMP at CMP 16, CDM CPAs only)	
CDM/ other standard reference ID	*The reference number/ID allocated to the CPA by CDM/other standard.*	
	CPA 9181-P1-0013-CP1	
CPA reference weblink	*The weblink of the project page of CDM/other standard.*	
	CDM: MicroEnergy Credits PoA – CPA 13 (unfccc.int)	
PoA reference ID and Title	Reference ID and Title For example 0457: Cooking stoves distribution programme in Uganda	
	9181: MicroEnergy Credits – Microfinance for Clean Energy Product Lines – India	
Title of CPA	*The title of the CPA used for registration with CDM/other standard.*	
	MicroEnergy Credits PoA – CPA 13	
New title of CPA (if applicable)	*The title of the CPA if it has been changed for registering with Gold Standard. (Follow GS4GG requirements Section 5, PoA requirements)*	
	NA	
Methodology used	*Methodology title and the version number applied for registration with CDM /other standard.*	
	AMS-I.A "Electricity generation by the user" (Version 14) AMS-II.G "Energy efficiency measures in thermal applications of non- renewable biomass" (Version 3)	
Amount of reductions	*Average annual emission reductions (tCO_2eq/year).*	
	490,909 tCO_2	
Inclusion date	*The CPA inclusion date with CDM/other standard.*	
	24/08/2018	
Type of crediting period	☒ renewable crediting period ☐ fixed crediting period	
Crediting period	*The CPA registered crediting period start date and end date with CDM/other standard.*	
	Start date: 25/08/2018 End date: 24/08/2025	
Total monitoring periods issued	*The total period that has already been issued by CDM/other standard.*	
	Start date: 25/08/2018 End date: 26/06/2020	
Latest monitoring period	*The latest monitoring period that has already been issued or submitted for issuance to CDM/other standard.*	
	Start date: 27/12/2019 End date: 26/06/2020	
	Issuance Status	☒ Issued ☐ Awaiting issuance

	Date of Issuance, if issued.	08/12/2021
Declaration	*Click on the tick box to confirm.*	
	The Coordinating/Managing Entity hereby acknowledges that project developer; ☐ Option 1 - has included information in this document that has not been validated/verified as part of CDM PDD **OR** ☒ Option 2 - has copied all validated information as it appears in the original and then used tracked changes to highlight any information that not been validated/or has changed - *Note if option 2 is selected the project developer shall fill all sections in the PDD template of this document.* The Coordinating/Managing Entity hereby acknowledges that project developer; ☒ is aware that for a given vintage, a registered Gold Standard CPA can request the issuance of the emission reductions under only one standard/certification scheme. (applicable to all projects). ☒ is aware that all CPAs that transition to GS4GG shall demonstrate Ongoing Financial Need at the time of renewal of their crediting period following applicable GS4GG requirements. (applicable to all CPAs). ☒ confirms that the project developer/representative will make a declaration, in writing, in the monitoring report submitted to Gold Standard that (applicable to CDM CPAs) - CPAs will/has not issue both a CER/other compliance units under Paris Agreement and a GSVER for the same vintage. - CME agrees to comply with all future UNFCCC COP/CMP decisions[1] including adjustment of GWP values	
Coordinating/Managing Entity / authorised signatory	*Name and designation of CME/authorised signatory*	
	Micro Energy Credits Corporation Private Limited	

TRF.3 TRANSITION CHECKLIST

Coordinating/Managing Entity shall answer all assessment questions listed below and provide additional information/justification in the VPA-DD section, where required. Please

[1] CDM clarification available on this topic as on date can be referred to here.

note that the checklist is based on the GHG Emissions Reductions and Sequestration Product Requirements.

The checklist also provides relevant requirements applicable to PoA/CPA transitioning to GS4GG for easy referencing. The CME shall refer to relevant GS4GG documents, as applicable, for further details. It is recommended that CME refers to Guidelines in the table below for more information on the requirements and flexibilities provided. This document (in word) shall be submitted to SustainCERT along with other required documents **for preliminary review** as listed below –

- Cover Letter
- Terms and Conditions
- Official Development Assistance declaration
- Stakeholder Consultation Report
- PoA Design Document (PoA-PDD) final version (CDM/other standard)
- CPA-DD registered with CDM/other standard
- Validation report submitted to CDM/other standard
- Last Monitoring and Verification report submitted to CDM/other standard

1| **TRANSITION PATHWAY**	
1.1 | **Option 1:** Is CPA seeking registration with GS4GG **to issue GSCERs** while maintaining the CDM registration? (Ref: GHG Product Requirements)	☐ Yes ☒ No
1.2 | **Option 2:** Is CPA seeking registration with GS4GG **to issue GSVERs** only and/or conversion of **issued CERs to GSVERs**? (Ref: Annex B, GHG Product Requirements) *Note – for conversion of issued CERs to GSVERs, the project must be registered with GS4GG.*	☒ Yes ☐ No
1.3 | **Option 3:** Is CPA seeking registration with GS4GG **to issue GSVERs only** and/or **conversion of emission reduction to GSVERs** issued by **standard other than CDM**? **(**Ref: Annex B, GHG Product Requirements**)**	☐ Yes ☒ No

Requirement:

All CPAs submitting request for transition on or after 1/1/2021 must demonstrate compliance with requirements stated in **Annex B,** GHG Product Requirements.

The CPA following ***option 1*** *above;*

- *may seek registration under GS4GG based on provisional CDM EB decision*
- *may seek issuance of GSVERs in exchange of provisional CERs based on CDM EB decision but must transfer issued CERs to the Gold Standard Swiss CDM Registry Account. If there are any implications for issued volume or project eligibility due to CMP decision regarding GWP, additionality or any other decision, the CME must address these issues, as applicable in consultation with SustainCERT/GS.*

The CPA transitioning to GS4GG following ***option 2*** *above,*

- *may convert issued CERs to GSVERs*
- *are not required to deregister from CDM but shall not claim emission reductions under both GS4GG and CDM for the same vintage*

The CPA transitioning to GS4GG following ***option 3*** *above,*

- *may convert issued emission reductions unit to GSVERs*
- *may issue GSVERs*
- *shall deregister project from other standard before registration with GS4GG*

Guidelines:
PoA/CPAs already undergoing design certification for CER labelling can continue with their existing process. SustainCERT shall be notified of the intention to switch to GSVER stream, at the earliest possible opportunity.

PoA/CPAs already certified for CER labelling can switch to GSVER stream by completing this form and notifying SustainCERT. Such project may leave the VPA-DD section blank as this information has been captured in GS4GG PDD version submitted earlier.

2| TRANSITION APPROVAL PROCEDURE

1.1 |	Option 1 - Is the project undergoing a preliminary review **by sustainCERT,** validation **by VVB** and design review by **SustainCERT**?	☐ Yes ☒ No
1.2 |	Option 2 - Is the project undergoing a **combined preliminary review, validation, and design review** by **SustainCERT**? (restrictions apply, see 5.3 below)	☐ Yes ☒ No
1.3 |	Option 3- Is the project undergoing preliminary review **by SustainCERT**, combined **validation & verification by VVB**, followed by combined design and performance review by SustainCERT?	☒ Yes ☐ No

***Requirement**:*
The PoA certification under GS4GG involves following key steps. Refer to Section 12. Project cycle Programme of Activity Requirements for details.

***Preliminary review** - Preliminary Review of the PoA is conducted once at the time of first submission to Gold Standard. It involves desk review of the Key Project Information and PoA-DD by SustainCERT. The PoA can only be listed once a preliminary review of PoA and each CPA submitted with PoA has been completed.*

***Design certification (validation + design review)** - Design certification involves validation by VVB and design review by SustainCERT. With successful design certification the PoA will obtain 'Certified design' status that is equivalent to registration under CDM and other standard. The real case CPA-DD is required with PoA-DD for design review as per Programme of Activity Requirements.*

***Performance certification (verification + performance review)** - Performance certification involves verification by VVB and performance review by SustainCERT. The positive conclusion of the Performance Review period shall result in Gold Standard 'Certified Project status' and CPAs can issue GSVERs. The CME may opt for combined Design Certification, conducting both the first Verification and Performance Review under GS4GG at the same time.*

***CPAs/VPAs Inclusion –** Once a real case CPA/VPA fully design certified, the CME may include CPAs/VPAs applying same technology measures following a simplified inclusion process. It involves, VVB's compliance check followed by SustainCERT design review (two weeks) or if selected for spot - check three week design review.*

To minimise disruption and keep the transition review time and costs minimum, the PoA is provided with flexibilities as summarised in the table below;

Certification stage	Option 1	Option 2*	Option 3

Certification outcome		Normal certification pathway	Combined Preliminary review + Validation + Design review	Combined validation + verification followed by combined design + performance review
PoA+ REAL Case CPA				
Listing	Preliminary review	SustainCERT	SustainCERT	SustainCERT
Certified Design = Registration	Validation	VVB		VVB
	Design review	SustainCERT		SustainCERT
Certified project = Issuance	Verification	VVB	VVB	VVB
	Performance review	SustainCERT	SustainCERT	SustainCERT
CPA/VPA inclusion				
CPA/VPA inclusion	Compliance check	VVB	SustainCERT	VVB
	Design review	SustainCERT		SustainCERT
	Verification	VVB	VVB	VVB
	Performance review	SustainCERT	SustainCERT	SustainCERT

For option 1, a validation/inclusion site visit by VVB is not required for CPAs proposed for inclusion as long as the VVB conducted a site visit as part of validation/verification in last three years (from time of first submission for preliminary review) and new/updated information can be audited based on desk review and/or using remote audit approaches.

For Option 2, SustainCERT conducts PoA/CPAs design elements desk based audit and approve PoA/CPAs transition, without VVB's opinion. ***Note that this option will involve additional review fee levied by SustainCERT. The project developer shall confirm the applicable fee and timelines with SustainCERT (help@sustain-cert.com) before submitting the request for transition.***

If transition PoA is applying a new/latest version of the methodology which requires full audit but VVB, option 2 cannot be applied.

CMEs may also directly include VPAs/CPAs in the registered PoA, without VVB compliance check

a. *If at least one VPA/CPA of the registered PoA has completed successful performance certification, and*
b. *The VPA/CPA that has completed performance certification and the VPAs/CPAs that are included by CME without VVB compliance check shall,*
   - involve same technology/measure and apply same methodology in case of single technology POA
   - involve same technologies/measures and apply same methodology(ies) combination in case of multi technology PoA

Refer to VPA/CPA INCLUSION REQUIREMENTS (RU 2020 P&R - PAR V1.2) for further details on applicability conditions and requirements.

This option is not captured in the table above.

This option doesn't involve additional fee levied by SustainCERT as mentioned in option 2 above.

3| CPA ELIGIBILITY

1.1 | Is the CPA eligible project type under Gold Standard for the Global Goals?	☒ Yes ☐ No

Requirement: *The transitioning project shall be one of the eligible project types for issuance of Gold Standard VERs (Ref: GHG Product Requirements).*

Guidelines: *Typical eligible activity types are Renewable Energy Supply, End-Use Energy Efficiency Improvement, Waste Handling & Disposal, Land Use and Forests.*

- *Afforestation/Reforestation project registered with CDM/other standard may transition to GS4GG for issuance of GSVERs only but are not eligible for labelling of issued emission reduction units.*
- *RE projects shall refer to Renewable Energy Activity Requirements for eligibility check.*
- *RE projects for example - · Hydropower · biomass resources · landfill gas and biogas from agro-processing, wastewater and other residues · Waste Heat/Gas recovery · Fossil co-generation · Waste incineration and gasification · Waste handling and disposal are required to demonstrate compliance with the specific eligibility requirements. Refer to Annex – A of Renewable Energy Activity Requirements for further details.*
- *Community Services Activities projects for example - Hydropower · biomass resources · landfill gas and biogas from agro-processing, wastewater and other residues · Waste Heat/Gas recovery · Fossil co-generation · Waste incineration and gasification · Waste handling and disposal · Relighting · End-use fossil switching are required to demonstrate compliance with the specific eligibility requirements. Refer to Annex – A of Community Services Activity Requirements for further details.*

COMPLIANCE WITH RELEVANT ACTIVITY REQUIREMENTS

1.2 |	Does the CPA conform to the relevant Activity Requirements (CSA/RE)**?**	☒ Yes ☐ No
1.3 |	Does any specific eligibility criteria/requirement stipulated in Annex A of CSA/RE requirements apply to the CPA?	☐ Yes ☒ No
1.4 |	Does specific eligibility criteria/requirement stipulated in Annex A of CSA/RE requirements that apply to the CPA, lead to any change in the registered PoA -DD or VPA -DD? If Yes, please provide a full explanation in section A.1.3. below.	☐ Yes ☒ No

Requirement:
(Ref: Section 4.1.1 of GHG Product Requirements)
CPA shall conform to the relevant Activity Requirements and Gold Standard Approved Methodologies, including eligible CDM Methodologies.

RE rule update / RE PoA rule update:
Grid connected Renewable Energy CPAs seeking to transition from another carbon crediting scheme to GS4GG or labelling of emission reductions under GS4GG are exempted from eligibility requirements listed in para 2.1.3 of the RE Activity Requirements. This exemption is only allowed to projects that started the first crediting period with the original carbon crediting scheme from 01/01/2016 or later but before 24/01/2020. (Ref: Section 2.1.1 and 2.1.2 of RU 2020 AR –RE V1.2)

Specific Renewable Energy Activity requirements (refer to Annex A): Hydropower, biomass resources, landfill gas and biogas from agro-processing, wastewater and other residues, Waste Heat/Gas recovery, Fossil co-generation, Waste incineration and gasification, Waste handling and disposal.

Specific Community Service Activity requirements (refer to Annex A): Hydropower, biomass resources, landfill gas and biogas from agro-processing, wastewater and other residues, Waste Heat/Gas recovery, Fossil co-generation, Waste incineration and gasification, Waste handling and disposal, Relighting, End-use fossil switching.

5| APPLICABILITY OF THE METHODOLOGY/TOOL VERSION

1.5 |	Does the CPA apply an eligible GS methodology? Refer to list of the eligible methodologies **here**.	☒ Yes ☐ No

1.6 |	Does the CPA apply the version of the methodology and applicable tools **applied for CDM/other standard registration or renewal**?	☒ Yes ☐ No
1.7 |	Does the CPA apply the latest version of the methodology and applicable tools applied in registered PoAs for inclusion of new VPAs after transition to GS4GG? If Yes, please provide a full explanation in section B below. And note that the CPA cannot opt for option 2 mentioned transition approval procedure, above.	☐ Yes ☒ No

Requirement: (Ref: Annex B of GHG Product Requirements)

Transition CPA shall

a. *conform to the relevant Activity Requirements and Gold Standard Approved Methodologies, including eligible CDM Methodologies referring to the inclusion criteria of registered PoA.*
b. *also meet the additional GS4GG methodology eligibility requirements, where applicable. Refer to CDM Methodologies for Gold Standard Eligibility Requirements, referring to the inclusion criteria of registered PoA.*

Transition CPA shall apply the version of GS approved CDM methodology or methodology tool for transition to GS4GG as follows;

a. *version applied for inclusion in the registered PoAs with other standard, OR*
b. *latest version applied by the registered PoAs for inclusion of new VPAs after transition to GS4GG.*

Note that The Transition PoA may include the latest version of the methodology and applicable tool for inclusion of new VPA(s), at the time of first submission (preliminary review) or at any later stage of certification cycle, but before submitting the request for inclusion for new VPAs. In such cases, VVB shall validate the updated PoA and VPA documents as per applied version of the methodology and or methodology tool before or with the request for inclusion of new VPAs.

6| DEMONSTRATION OF ADDITIONALITY

1.8 |	Are you aware that the transitioning CPA will be required to demonstrate Ongoing Financial Need as per the relevant GS rules and requirements available at the time of renewal of crediting period? (Refer to para 4.1.51 – 4.1.53 of Principles & Requirements.)	☒ Yes ☐ No
1.9 |	Does CPA meet the PoA inclusion criteria with respect to the additionality justification?	☒ Yes ☐ No

Requirement:

- *The CDM PoA/CPAs are not required to carry out additional assessment for demonstration of additionality over and above what has been done for registration/determination with the CDM unless the project falls into a category that is deemed non-additional in an applicable Gold Standard Activity Requirement. In such cases the relevant Activity Requirement shall take precedence.* ***Ref: Annex B GHG Product Requirements.***
- *Transition PoA/CPAs registered with standards other than CDM are required to undergo additionality revalidation to re-establish the validity of the underlying assumptions applied in the demonstration of additionality at the time of registration with the other standard.*
- *The PoA/CPAs seeking combined transition and renewal of crediting period with GS4GG are not required to demonstrate OFN at the time of transition but must demonstrate OFN at the time of Crediting Period renewal after transitioning to GS4GG.*

7| SUSTAINABLE DEVELOPMENT ASSESSMENT

7.1 |	Does the CPA positively contribute towards **minimum three Sustainable Development Goals (SDGs) -** SDG13 (mandatory) + two other SDGs?	☒ Yes ☐ No
7.2 |	Have you identified the monitoring parameters linked with selected SDGs and	☒ Yes

	corresponding SDG targets? For example – the monitoring parameter Amount of GHGs emissions avoided or sequestered is linked with SDG 13. Climate action, SDG target 13.2 Integrate climate change measures into national policies, strategies and planning.	☐ No

Fill section B.6. Sustainable Development Goals (SDG) outcomes and B.7 Monitoring plan, below for SDGs monitoring parameters not covered in registered CPA-DD with other standards.

Fill Table 1 – Estimated Sustainable Development Contributions below.

***Requirement**:*
The transitioning CPA shall demonstrate a clear, direct contribution to sustainable development, defined as making demonstrable, positive impacts on at least three Sustainable Development Goals (SDGs), one of which must be SDG 13 (Ref: Section 4.(c) of Principles and Requirements)

Refer to Annex B, GHG Product Requirements for further guidelines for transition projects.

Guidelines:
Selected SDG impacts must not result from a one-off from design/construction/distribution/ start-up or decommissioning of the project.

You may refer to /use the SDG impact Tool (under consultation currently) to identify the relevant monitoring indicator, SDGs and corresponding SDG targets and design monitoring plan for identified indicators.

8| START DATE AND DURATION OF THE CREDITING PERIOD

8.1 |	Has the crediting period of the transitioning CPA registered with other carbon standard/certification scheme changed and/or extended?	☐ Yes ☒ No
8.2 |	Is the total duration of the crediting period of CPA (i.e. including period that had been issued under the host standard) less than/equal to the maximum crediting period allowed under relevant GS4GG activity requirements?	☐ Yes ☒ No

Complete the section C.2.2 Total length of crediting period below.

Requirement:

- *The crediting period of the transitioning CPA registered with other standards or certification schemes cannot be changed/extended.*
- *Maximum crediting period allowed under GS4GG are as*
  CSA – 15 Yrs, RE – 15 Yrs, if not defined in activity requirement or applicable methodology – 10 Yrs.
- *The start date of the GS crediting period shall be same as the start date of the CDM crediting period. (Annex B, GHG Product Requirements)*
- *For a transitioning CPA the total duration of the crediting period, including the period that has been claimed under the host standard, shall not exceed the maximum crediting period allowed under relevant GS4GG activity requirements.*

If a given CPA transitioning to GS4GG, was registered under Standard X with -

- *fixed crediting period (10 years): The total crediting period (Standard X + GS4GG) must remain 10 years. The CPA can only claim remaining years of its 10-year crediting*

period after transitioning to GS4GG.

- *renewable crediting period (7*3 year): The total crediting period (Standard X + GS4GG) must be equal to that allowed under relevant GS4GG activity requirements. The CPA can only claim remaining years of the maximum allowed crediting period after transitioning to GS4GG. For example; the maximum crediting period allowed for renewable energy project is 15 years. A renewable energy CPA that has already claimed 5 years under Standard X can only claim remaining 10 years of the total 15 years of its allowed crediting period after transitioning to GS4GG*

- *For a transitioning CPA, the start date of the Gold Standard Crediting Period starts with crediting period start date with other standard or maximum two years before the date of first submission (submission for preliminary review), whichever occurs later.. (Ref: GHG Product Requirements)*
- *All transition CPAs shall be renewed every 5 years. The first crediting period renewal under GS4GG takes into account the crediting years that has already been issued by other standard. For example, if a CPA start date with standard X is 01/01/ 2019, the CPA shall renew its crediting period with GS4GG on or before 1st Jan 2024, irrespective of date of transition approval with GS4GG.*

9| SAFEGUARDING PRINCIPLES ASSESSMENT

9.1 |	Does the CPA conform to the Gold Standard Safeguarding Principles and Requirements?	☒ Yes ☐ No
9.2 |	Is there any risk and/or likely adverse outcomes of the project?	☐ Yes ☒ No
9.3 |	If answer is yes for Q **Error! Reference source not found.Error! Reference source not found.**, can the project achieve requirements with regards to the relevant principle through design, management or risk mitigation?	☐ Yes ☐ No
9.4 |	If answer is yes for Q **Error! Reference source not found.Error! Reference source not found.**, have the Mitigation Measures added to the Monitoring Plan (if required)?	☐ Yes ☐ No

Complete the Annex 1 and section D. Summary of Safeguarding Principles below.

***Requirement**: The transitioning project shall conform to the Gold Standard Safeguarding Principles and Requirements. (Ref: Section 4.1.19 of GS4GG Principles and Requirements)*

***Guidelines:** The detailed Safeguarding Principles and Requirements checklist is available in Annex 1 of this document.*

10| STAKEHOLDER CONSULTATION REQUIREMENTS

10.1 |	Has the CPA conducted a Stakeholder Consultation in accordance with the requirements of Gold Standard Stakeholder Consultation & Engagement Requirements? The answer to Q 10.1 is "No", if any of the questions below is answered as "No". The project should take the question(s) into account and address the gap when conducting supplementary stakeholder consultation to comply with GS4GG requirements.	☐ Yes ☒ No

Please answer the below question with regards to the stakeholder consultation conducted to comply with CDM/other standard requirements?

10.2 | Did you conduct the stakeholder consultation before the CPA start date?	☒ Yes ☐ No
10.3 | Did you discuss identified direct positive and negative impacts of the CPA with stakeholders?	☒ Yes ☐ No
10.4 | Does the invited stakeholder covers all stakeholder groups (a to g) listed in paragraph 3.1.1. of STAKEHOLDER CONSULTATION AND ENGAGEMENT REQUIREMENTS?	☐ Yes ☒ No
10.5 | Did the invitation methods solicit input from women and marginalised groups?	☒ Yes ☐ No
10.6 | Were the stakeholders invited at least 30 days before the stakeholder meeting?	☒ Yes ☐ No
10.7 | Did a local language version of the non-technical summary with information required as per paragraph 5.1.1. of STAKEHOLDER CONSULTATION AND ENGAGEMENT REQUIREMENTS, shared with stakeholders?	☐ Yes ☒ No
10.8 | Was a physical meeting conducted?	☒ Yes ☐ No
10.9 | Was a gender lens applied to assessing comments? (for example, if only men provided comments on household device project, was this taken into consideration when assessing the relevance of the comment?)	☒ Yes ☐ No
10.10 | Were any serious, reasonable and proportional concerns raised and taken into account and satisfactorily addressed?	☒ Yes ☐ No
10.11 | Were any points that warrant 'Mitigation measures' marked as such and monitoring plan has been designed and included in the PDD?	☒ Yes ☐ No
10.12 | Is the mandatory Continuous Input / Grievance Expression Process Book's location clearly stated (and therefore usable)?	☐ Yes ☒ No
10.13 | Does PDD include a summary report of the comments received from local stakeholders?	☒ Yes ☐ No

Complete the section E. Summary of Local Stakeholder Consultation below.

***Requirement**: Ref: Section 4.1.25 of GS Principles and Requirements.*

***Guidelines:** CPA that conducted a stakeholder consultation meeting to comply with CDM/other standard requirements, should conduct, at minimum,*

- *one round of consultation for identified gaps i.e., gaps due to differences in stakeholder consultation requirements of GS4GG and CDM/other standard. For instance, if original consultations only involve one physical meeting, CME/PD should conduct a stakeholder feedback round covering all the identified gaps. The additional stakeholder consultations may involve a physical meeting or stakeholder feedback round, as necessary.*

If COVID interim measures are applicable (currently till 30/06/2021), the physical meeting and stakeholder feedback round may be postponed, and a draft SCR shall be mandatorily submitted to cover the consultation activities carried out till date.

KEY PROJECT INFORMATION

GS ID of Project	GS11483
Title of Project	MicroEnergy Credits PoA – CPA 13
Time of First Submission Date	05/01/2022
Date of Design Certification	DD/MM/YYYY
Version number of the VPA-DD	1
Completion date of version	27/12/2021
Coordinating/managing entity	Micro Energy Credits Corporation Private Limited
VPA Implementer (s)	- Shri Kshetra Dharmasthala Rural Development Project (SKDRDP) - Sarala Development and Microfinance Private Limited - Simpa Networks - Greenway appliances (GGI).
Project Participants and any communities involved	-
Host Country (ies)	India
GS ID and Title of applicable Design Certified VPA	
GS ID and Title of applicable Performance Certified VPA	
Activity Requirements applied	☒ Community Services Activities ☐ Renewable Energy Activities ☐ Land Use and Forestry Activities/Risks & Capacities ☐ N/A
Scale of the project activity	☐ Micro scale ☒ Small Scale ☐ Large Scale
Other Requirements applied	-
Methodology (ies) applied and version number	AMS-I.A "Electricity generation by the user" (Version 14) Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1
Product Requirements applied	☒ GHG Emissions Reduction & Sequestration ☐ Renewable Energy Label ☐ N/A
Project Cycle:	☐ Regular ☒ Retroactive

Table 2 – Estimated Sustainable Development Contributions

Sustainable Development Goals Targeted	SDG Impact (defined in B.6.)	Estimated Annual Average	Units or Products
13 Climate Action (mandatory)	Number of VERs	714,945 102,275	tCO_2 VERs-SLS tCO_2 VERs-ICS
1 End poverty in all its forms everywhere	Number of clean energy products distributed	27,000 2,000,000	ICS SLS
3 Good Health and Wellbeing	% Households confirming less smoke with the use of improved cookstove and Solar lighting Systems instead of kerosene lamps	100	%
5 Gender Equality	%time saving associated with cooking and fuel collection	100	% of time saving
7 Affordable and Clean Energy	Number of CEPs distributed	27,000 2,000,000	ICS SLS
8 Decent Work and Economic Growth	Total number of jobs created	20	jobs
12 Responsible Consumption and Production	Reduction in use of non-renewable biomass per household	6.12	kg/hh-day
15 Life on Land	Reduction in use of non-renewable biomass per household	6.12	kg/hh-day

SECTION A. DESCRIPTION OF PROJECT

A.1 Purpose and general description of project

>>

The project activity is implemented in India. In the rural areas in India, the predominant means of cooking are traditional cook stoves that use woody biomass as fuel. The smoke

and fumes from these traditional inefficient stoves contribute heavily to indoor air pollution, which overall claim approximately 400,000 lives per year in India[2]. Moreover, in such areas, households are either not connected to the grid or in households even with grid connectivity, there are frequent power outages and low voltage so rural households use kerosene for indoor lighting, which also contributes to indoor air pollution and GHG emissions.

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

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

Table A.1.1 Total stoves in operation over the crediting period

Year	**Sales**
Year 1	27,000
Year 2	27,000
Year 3	27,000
Year 4	27,000
Year 5	27,000

Table A.1.2 Estimated Solar Lighting system in Operation

Year	**Sales**
Year 1	1,000,000
Year 2	1,500,000
Year 3	2,000,000
Year 4	2,500,000
Year 5	3,000,000

[2] http://www.pciaonline.org/sierra-club

Sales in this VPA for solar lighting devices can happen in any Indian state. It will be ensured that threshold for Type 1 SSC projects is not exceeded and all requirements of the applied methodologies (namely TPDDTEC v3.1 and AMS.I.A. v14)and the PoA eligibility criteria are met. ERs shall be calculated at actual sales numbers complying with relevant methodological requirements.

The program is a voluntary initiative coordinated by Micro Energy Credits Corporation Private Limited (MEC), the CME of the PoA, and implemented by MEC's Partner Organizations (PO). The improved cookstove are implemented by Shri Kshetra Dharmasthala Rural Development Project (SKDRDP)[3] and solar lighting system are implemented by SKDRDP and several other PO's. The exact number of solar lighting systems implemented will be made available at the time of verification as deployment of these systems is done in a phased manner depending on demand from clients.

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 improved cook stoves in India.

The CME has approved the inclusion of the proposed VPA in the registered PoA and also confirms that the proposed VPA will not be part of another PoA or any single CDM/VCS/GS project activity.

The technologies/measures employed by the VPA - POs offers loans for a suite of Clean Energy Products ("CEP") including efficient cookstoves, and solar lighting systems.

The project boundary – The POs included in this CPA will be working in branches located in India (Coordinates: 20.5937°N 78.9629°E)

---

[3] skdrdpindia.org

The baseline scenario –

SOLAR LIGHTING: This VPA involves the introduction of solar lighting systems into households and SMEs in several states in India to replace the main baseline fuel, kerosene.

EFFICIENT STOVES: The cookstoves distributed under the proposed VPA replace traditional cookstoves thereby reducing the amount of fuelwood used for cooking in the baseline by households. Improved cookstoves will only be distributed in the Indian state of Karnataka.

A.1.1 Eligibility of the project under approved PoA

>>

No.	Eligibility criterion	Description/ Required condition	Means of Verification/Supporting evidence for inclusion
1	Boundary and location of the VPA	The VPA is located within India	Location and boundary is specified in section A.2 of the VPA-DD stating that the location is limited to India and supported with GPS coordinates. Document: Statement of CME that the location and boundary is within India and supported with GPS coordinates.
2	Project technology	VPAs involves use of the following technologies- 1. distribution of safe drinking water systems (HWT and CWT technologies) to residential area. 2. Distribution of improved cookstoves to households 3. Distribution of Solar lighting	The VPA-DD specifies the target end-user group and the technology being distributed i.e. Improved Cookstoves and Solar Lighting Systems in section A.3 Supporting evidence: Sales database

		systems to households	
3	No Double counting of CEPs impacts within this PoA and across other registered or deregistered PoAs	A unique numbering or identification system for the CEP installed is applied. This shall ensure no double counting of CEPs within the same VPA and same PoA and ensure that CEP can be identified as belonging to this PoA and not to a PoA managed by any other CME. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME. This shall ensure that POs, stove/lamp manufacturers and distributors do not claim ERs separately.	The unique numbering is supported by the individual distribution record matching such information is included in the specific VPA-DD and consistent with the PoA-DD A legally binding contract between CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME. Document: Credit Tracker stove sales receipt showing CME and PO information, end user details including name and address and CEP ID number. A legally binding contract between CME and manufacturer/micro finance institution/POs would be required to ensure that all carbon title is transferred to the CME.
4	VER ownership	End users receiving CEP under the specific VPA and POs contractually cede their rights to claim and own emission reductions to the CME of the PoA.	The default CEP Booking Record is including the provision that emission reductions generated by the CEP are transferred from the end-user to the PO and ultimately owned by the CME. The receipts will clearly specify that

			carbon rights are ceded in favour of CME. Documents: 1. Default Booking Record
5	No Double counting of VPA	The VPA is exclusively bound to the PoA. Confirmation that the programme activity has not been and will not be registered either as a single project activity or as a VPA under another registered PoA in other offset schemes nor the project activities that have been deregistered.	A declaration from the CME on its letterhead has been provided that this VPA will not be part of another single CDM project activity or CPA/VPA under another PoA. In addition, declaration from VPA operators as part of their contract with the CME, stating that their activities are not registered as part of another single CDM project activity of CPA under another PoA. Evidence: Contract between the CME and MFI.
6	Awareness and Agreement of those operating a CPA on PoA subscription	Contractual provisions to ensure that those operating the VPA are aware and have agreed that their activity is being subscribed to the PoA. In the case that the CME is not responsible for implementing the CPA, the organization responsible for CPA implementation, known as the Partner Organisation (PO), has signed a contractual agreement with the CME to participate in the PoA. This agreement: - Defines the ownership of the	Contractual agreement for VPA operators, stating that they are aware and have agreed that their activity is being subscribed to the PoA

		carbon emission reduction rights - Covers the PO's distribution and monitoring related responsibilities - Confirms that the CEPs to be distributed under the VPA have not and will not be distributed under any other carbon project (CDM project, PoA or voluntary carbon market project) Cedes the PO's rights to the carbon credits generated from VPAs under the PoA to the CME	
7	Non-diversion of ODA in case of Public funding	The CME and the VPA operator (in case of being different from the CME) shall confirm that there is no public funding or in the case of public funding, the Annex 1 party will confirm that funding is not a diversion of Official Development Assistance.	Statement from the CME and the VPA operator (in case of being different from the CME) that there is no public funding Or In the case that there is public funding, an Annex 1 party will confirm that funding is not a diversion of ODA. Document: ODA Declaration
8	Specification of the technology such as the level and type of service, as well as performance specification;	The VPAs will include distribution of improved cookstoves which will replace inefficient cookstoves thereby improving the indoor air pollution levels. The VPAs will include distribution of solar lighting systems which will replace kerosene lamps in baseline	Technological and performance specifications are given in section A.3 of the VPA-DD for the technologies included in the VPA. The project technologies comply with the minimum specification requirements prescribed in the applied

			methodologies (as applicable).
9	VPA Start Date	The VPAs start date is as registered with the CDM from which the project is transitioning. The VPA can request issuance of GS-VERs or convert issued GS-CERs to GS-VERs for a retroactive period.	Link of the UNFCCC webpage of the CDM PoA and CPAs to be shared with the VVB.
10	VPA Crediting Period	Crediting period shall be 15 years in line with the Community Service Activity Requirements. The maximum crediting period includes the time that a project or CPA has been issued emission reductions under CDM. Each VPA shall provide verifiable evidence.	Maximum crediting period under Community Services Activity requirements is 15 years from start date i.e. 25/08/2018 to 24/08/2033. Details on years in which emission reductions were issued under CDM shall be provided to GS VVB.
11	Approval of CPA by CME	CME approved each VPA to be included into its registered PoA.	A letter by CME giving approval for the VPA to be included into its registered PoA.
12	Target groups of the programme	The VPAs included in the POA will involve distribution of WPS or ICS and/or SLS directly to the domestic end users individually or to community in case of WPS.	Sale invoices and agreements between the end user/community head and the CME.
13	Additionality of VPAs	Additionality will be demonstrated in accordance with the paragraph 1.1.3 of Annex B (Positive List) of Community Services Activity Requirements, version 1.2 "Project activities solely composed	The VPA is in compliance with item 1.1.3 of Annex B – positive list mentioned in the 'Community Services Activity Requirements', Version 1.2. It is solely composed of isolated units (CEPs) where the users of the

		of isolated units where the users of the technology/measure are households or communities or institutions and where each unit results in <= 600 MWh (1.8 GWh th)of energy savings per year or <=600 tonnes of emission reductions per year"	technology/ measure are households or communities or institutions and where each unit results in <= a. 1.8 GWh of thermal energy savings per year for Improved Cook Stoves (ICS), b. 600 tCO_2 per year for Solar lighting systems (SLS). Hence, according to paragraph 4.1.9 of the 'Community Services Activity Requirements', the VPA is deemed additional and therefore is not required to prove financial additionality at the time of Design Certification.
14	Sampling requirements for the PoA	The VPAs will follow the usage survey and sampling requirements/ guidelines of the applied methodology(ies) and UNFCCC guidelines on sampling and survey for Programme of Activities version 4.0	VPA-DD has incorporated the sampling procedure in section B.7.2 and sampled survey forms shall be provided to GS VVB.
15	Application of Methodologies	The methodologies that can be applied to a VPA include: - AMS-I.A (version 14) - AMS-III.AR (version 7) - TPDDTEC (version 3.1) - Emission reduction from Safe Drinking Water Supply (version 1.0)	The VPA applied the following combination of methodologies: AMS-I.A (version 14) and TPDDTEC (version 3.1) The justification for meeting each of the applicability criterion of the applied methodologies for both Improved Cookstoves and Solar Lighting Systems in given in section B.2 of the VPA-DD.

		Each VPA can implement these methodologies in isolation. In addition, the following combinations of methodologies are eligible under the PoA: - AMS-I.A (Version 14) or AMS-III.AR (version 7) and TPDDTEC (version 3.1) - AMS-I.A (Version 14) or AMS-III.AR (version 7) and Emission reduction from Safe Drinking Water Supply (version 1.0)	
16	End User Group	The VPA is either aimed at households, community organisations (e.g. schools) or small/medium enterprises.	The VPA-DD identifies the target end-user group and describes the appropriate baseline scenario in subsequent sections of the VPA-DD.
17	Baseline parameters to be established at VPA level	Each VPA shall demonstrate how the baseline parameters for baselines not established at the PoA level (that applies for baselines and options not applicable at the first VPA at the time of PoA registration) that are to be calculated at the VPA level have been determined. Parameters to be monitored are listed in VPA-DD.	VPA-DD outlines the approach for establishing baseline parameters in sections B.6.2 and B.7.1 and provides supporting documents including copies of any official government reports, statistics or literature sources used for determining parameters. For local surveys or representative sampling the copies of questionnaires, sampling design etc. shall be provided to GS VVB.
18	Local Stakeholder Consultation	Local stakeholder consultation for VPA to be conducted prior to the VPA start date.	The summary of LSC has been provided in section E of the VPA-DD. - VPA LSC report

			- Record of invitations sent to the stakeholders - Attendance sheet of the VPA LSC meeting
19	Unit level threshold check to avoid compliance with the appliable Small Scale thresholds at the aggregate level of the VPA	In accordance with GHG Emission Reduction & Sequestration Product Requirements, if each of the independent subsystems/measures included in the VPA of a PoA is no larger than 1,500 kW that employ distributed renewable energy generation technology (Type 1) or that achieve energy savings at a scale of no more than 600 MWh per year (Type II) or that achieve emission reductions at a scale of no more than 600 tCO2 per year (TYPE III) for household/community/SME applications, then Small Scale projects and VPAs, solely comprising of such distributed units are not required to demonstrate compliance with the appliable Small Scale thresholds at the aggregate level of the project and VPA, if VPAs are **NOT** applying suppressed demand baseline.[4]	No suppressed demand baseline is applied in the VPA. Each improved cookstove is less than 1.8 GWh of thermal energy savings per year. Each Solar lighting systems (SLS) are less than 1500 kW. Product data sheets or specification or product information sheets from manufacturer are available.

[4] https://globalgoals.goldstandard.org/ru-2020-ssc-application-of-suppressed-demand/

		Please note that not all solar lighting system or ICS may have been deployed at VPA inclusion stage, but the threshold however can also be checked during verification, and in case any deployed CEP type will be found not in line with the requirement, those CEPs will not be counted for emission reduction calculation.	
20	Conditions to be met by each VPA regarding SDG outcomes assessment	The CME shall conduct the Sustainable Development Goals (SDGs) impact assessment at the VPA level as per Principles & Requirements	SDG outcome assessment shall be reported in the VPA-DD and shall be submitted to GS VVB.
21	Conditions to be met by each VPA regarding safeguarding principles	Projects shall conduct a Safeguarding Principles Assessment and conform to Gold Standard Safeguarding Principles and Requirements.	Safeguarding principles assessment report as provided in Appendix 1 of the VPA-DD

Analysis of VCS/CDM/GS Registries:

An analysis of other registries is carried out and the following projects are observed:

Requirement as per CDM project Standard for Programme of Activities V2.0	**Solar Lamps**	**Efficient cookstoves**
It utilizes both a different measure and a different technology from those of the former project	A registered CDM project activity (Reference number – 2699) exists, however, the technology (specifically the solar lamp models) used in this project are different from the solar	There are multiple CDM Projects and Programme of Activities for improved cookstoves in India. However, the technology type used by these registered PAs and PoAs is different from the technology (Grameen

	lamp models in the proposed CPA[5]. Also, the solar models mentioned in the registered CDM project have been discontinued by the manufacturer and also have different technical specifications than the models included in the proposed CPA.	Greenway manufactured cookstoves – Smart and Jumbo Stoves) used in the proposed VPA.
It does not share or utilize any of the assets of the former project	The registered existing project activity solely utilizes the network of distributors and retailers to disseminate the products. However, the VPA relies extensively on microfinance channel to disseminate the products.	The registered existing project activity solely utilizes the network of distributors and retailers to disseminate the products. However, this VPA relies extensively on microfinance channel to disseminate the products.
It utilizes a different resource type compared to the former project	While the resource type is solar energy for both, the existing registered CDM project as well as this VPA, however, the resource (solar energy) is available in abundance and hence is not shared.	While the resource type is woody biomass for both, the existing registered CDM project as well as the VPA, however, the resource is available in abundance and hence is not shared.

A.1.2. Legal ownership of products generated by the project and legal rights to alter use of resources required to service the project

>>

[5] Associated evidence (product technical specifications) is submitted to the validating DOE to substantiate that the models are different.

Participation in the VPA is voluntary for every beneficiary. If a household wishes to participate in the VPA, they confirm that MEC has full and uncontested legal ownership of the CO_2 emissions reductions (SDG 13) that are generated from the use of ICS/SLS distributed under the VPA.

MEC has the legal ownership of the Verified Emission Reductions (VERs) that are generated through the Gold Standard Certification. For each CEP distributed under the VPA, the beneficiary agrees at the time of distribution/dissemination of ICS/SLS that, in return for receiving a CEP, the ownership of emissions reductions and VERs lies with MEC. With effect to this, the carbon title for the product is signed off by end user directly to MEC waiving any claim or rights on carbon credits generated under the VPA.

A.2. Location of project

>>

The products sold will be restricted to the boundary of the Republic of India. The ~~SSC-CPA~~ VPA project activities will involve households in many states of the host country. 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.

The location of each clean energy installation[6] 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 VPA, making it easy to identify, locate and verify any or all of the installations that pertain to the VPA. The MEC Credit Tracker Platform is a hosted internet service, limiting the risk of loss of data.

A.3. Technologies and/or measures

>>

Efficient Cookstoves

There will be one model of efficient cook stoves disseminated under the proposed ~~SSC-CPA~~ VPA. In the absence of the project activity, the households with efficient cook stoves would have continued to use inefficient traditional cook stoves, including three-stone fires and conventional stoves built of mud/clay lacking a chimney and grate to provide energy for cooking. These stoves use firewood as the fuel. The efficiencies of these conventional stoves are low and are of the order of 10%[7]. The technical specifications[8] of the clean energy products are as follows -

There will be two models of improved cook stoves disseminated under the proposed project activity.

The Greenway Smart Stove (GSSV3) is a single burner, high efficiency cookstove that delivers fuel savings up to 70% and minimizes harmful emissions of CO, CO_2 and Particulate Matter. The rated thermal efficiency is 25.19%[8].

The Greenway Smart Stove (GSSV3) –

Stove Body Size – 9.8" x 7.6" x 11.6"
Net weight: 2.5 kg
Life span under standard use conditions: 5 years (average)

[6] Location is defined by one of the following sets of information:
A. Precise GPS location of the household that purchases/installs clean energy product.
B. GPS location within one mile of the household and credible address for household.
C. Three of the following identifiers: purchaser name, household address, phone number, bank ID number, national ID number, product serial number, household GPS location, or GPS location within one mile of household.

[7] Manufacturer's certificate on specifications

[8] As per stove testing results

The Greenway Jumbo Stove (GJS) is a single burner, high efficiency cook stove that delivers fuel savings up to 70% and minimizes harmful emissions of CO, CO_2 and Particulate Matter. The rated thermal efficiency is 31.17%[9].

Greenway Jumbo Stove (GJS) –

Stove Body Size – 12.4" x 10.6" x 11.6"
Net weight: 5 kg
Life span under standard use conditions: 5 years (average)

Solar Lighting Systems

A variety of solar lighting systems will be offered under the proposed VPA. Households receiving these solar lighting systems are either not connected to the grid or have intermittent electricity supply from the grid resulting in use of kerosene for lighting in the baseline scenario.

Some of the models that will be distributed, including their technical specifications[10] are –

Model Name	**Lumen**	**Lighting Wattage (W)**	**Average Lifetime (years)**
d. Light S20	29	0.5	5
d. Light S320	120	3	5

[9]As per stove testing results

[10] As per manufacturer's product information sheet

d. Light S100	65	1	5
d. Light M350+	130	3	5
Sunking Pro 2	150	1.1	5
Barefoot Go 250	135	1.64	5
SP Breeze 2.0	1008	3	5
Pico	200	1	5
SP100	1800	2	5
Magic TV	672	3	5
SP Inverter	2700	3	5
Turbo 240	1008	3	5
SP50	1008	3	5
Turbo Classic	1008	3	5
SP Breeze	1008	3	5
Spark Go	1008	3	5
Spark Pro	1800	2	5
Phoenix 120	672	3	5
Turbo 80	672	3	5
Turbo 120	1008	3	5
Spark Series	1125	2.5	5
Turbo	1008	3	5
Star 200 4L+F	720	3	5
Sunny Lantern	40	3	5
Sunny Tubelight	90	3	5

All products contain a solar panel, lights as shown in the photograph –

Sun King Pro2

Sun King™ Pro2 defines the industry's gold standard in affordable solar-powered lanterns with mobile-phone charging capability.

Sun King™ Pro2 features long lasting (5 years of daily performance) Lithium Ferro-Phosphate (LFP) batteris, dual phone charging capacity and the leading level of brightness available. It shines 15x brighter than kerosene making it the perfect solar light in under-electrified homes.

15x BRIGHTER THAN KEROSENE

36 HRS OF LIGHT ON 1 DAY'S CHARGE

5 YR BATTERY LIFE LiFePo4 TECHNOLOGY

Technical Specifications

LEDs	Power LED with 165 lumens total flux (150 lumens per watt)
Battery	3000 mAh, 3.3 volt Lithium Ferro-Phosphate (LFP) battery
Solar Panel	3.3W, 5.8 volt polycrystalline panel with aluminum frame and 5 meter wire
Enclosure	Polycarbonate & ABS IP64 rated, water-resistant enclosure
LED Metre Display	Battery Indicator. While in use, digital LED meter displays battery power remaining. Solar charge indicator. Digital LED meter displays charging effectiveness on a scale of 1 to 5 to help optimize panel placement
Power Control	Battery management technology automatically switches to low power when battery is running dry, giving user 5 hours of additional light

Barefoot Go

Barefoot Go 250
Portable Solar Light

Product Highlights:

Signature design developed in Australia by Barefoot Power

Ultra bright 135-lumen LED lamp is the brightest in its class

24-month warranty on all components

Multiple light settings night light (60 hours) bright (12 hours) and ultra bright (5 hours)

USB output for charging mobile phones and many smart phones

USB phone-charging kit included

Next power off pressing the power button will always turn the lamp off once it's been on for more than ive seconds

Sleep mode press the power button for 5 seconds and the lamp will enter a sleep mode to conserve power

Three-stage battery charge indicators low, medi - um and high

Charging indicators will lash when battery is charging

Full-battery indicators will double lash every 10 seconds when the battery is full

Low-battery indicator will lash once every 20 seconds when battery capacity is low

USB compatibility for charging the lamp

Auto-dim will dim the lamp automatically to conserve power when battery capacity is low

Barefoot Connect compatibility for charging the lamp

Versatile design can be used in nine different positions

2.5W solar panel the largest available for a single-lamp product (4m cable)

3.3Ah LiFePO4 Battery the largest and longest-lasting battery in its class

BATTERY 3.2V 3.3Ah

SOLAR PANEL 2.5W

RUN TIME 5 - 50 HOUR

RADIO

PHONE

Other models of solar lighting systems may also be offered under the VPA as long as they meet all the requirements of the methodology AMS-I.A v14. and the PoA eligibility criteria in the registered PoA-DD.

The following table provides information on how the project helps in reducing GHG emissions and contributes to SDGs

Sustainable Development Goals Targeted	How the project contributes to the identified SDG
13 Climate Action (mandatory)	The emissions from the project stove are less than the baseline stove. Similarly, SLS replace kerosene lanterns and reduce emissions. Therefore, GHG emissions are reduced.
1 No Poverty	The project stoves and SLS provides access to basic services (namely cooking and lighting) that are efficient and less polluting compared to baseline technologies/practices.
3 Good Health and Wellbeing	The project stoves and SLS results in lesser emissions of CO/PM2.5 therefore improving the indoor air quality and health of the end-users.
5 Gender Equality	The project results in reduced time for wood collection for women thereby freeing up time for them to utilize on other income generating/productive activities.
7 Affordable and Clean Energy	The project provides access to affordable and cleaner technologies, i.e., improved cookstoves for cooking and Solar lighting Systems for lighting purposes.
8 Decent Work and Economic Growth	Employment is generated in manufacturing, dissemination and maintenance of CEPs by the project.
12 Responsible Consumption and Production	The project leads to reduced consumption of non-renewable biomass fuel due to dissemination of energy efficient and cleaner cooking and lighting technologies.
15 Life on Land	The project leads to reduced reliance on forest fuels (non-renewable biomass) thereby promoting forest restoration/conservation due to dissemination of energy efficient and cleaner cooking and lighting technologies.

A.4. Scale of the project

>>

The VPA is a small-scale project activity in line with the criteria laid out in the Community Services Activity Requirements.

A.5. Funding sources of project

>>

There is no public funding for the PoA or the VPA. No ODA funding will be used, as confirmed by signed ODA Declaration submitted to GS.

SECTION B. APPLICATION OF APPROVED GOLD STANDARD METHODOLOGY (IES) AND/OR DEMONSTRATION OF SDG CONTRIBUTIONS

B.1. Reference of approved methodology (ies)

>>

Technologies and Practices to Displace Decentralized Thermal Energy Consumption (TPDDTEC), version 3.1[11]

AMS-I.A "Electricity generation by the user" (Version 14)[12]

B.2. Applicability of methodology (ies)

>>

Improved Cookstoves- TPDDTEC ver 3.1			
1	Methodological criteria	The project boundary needs to be clearly identified, and the technologies counted in the project are not included in any other voluntary market or CDM project activity (i.e. no double counting takes place). In some cases there maybe another similar activity within the same target area. Project proponents must therefore have a survey mechanism in place together with appropriate	The location and boundary of the VPA is limited to the country of India. The VPA entails distribution of clean cookstoves to households and SMEs in the Indian state of Karnataka. The location of each cookstove installation will be tagged through GPS or verified address of the end user will be recorded in Micro Energy Credit's Credit Tracker Platform. Moreover, a legally binding contract between

[11] Microsoft Word - 401.13 TPDDTEC V3.1_20170921 CLEAN.docx (goldstandard.org)
[12] AMS-I.A (UNFCCC)

		mitigation measures so as to prevent any possibility of double counting.	CME and manufacturer/micro finance institution/POs would be established to ensure that all carbon title is transferred to the CME.
2	Methodological criteria	The technologies each have continuous useful energy outputs of less than 150kW per unit (defined as the total useful energy delivered from start to end of operation of a unit divided by time of operation). For technologies or practices that do not deliver thermal energy in the project scenario but only displace thermal energy supplied in the baseline scenario, the 150kW threshold applies to the displaced baseline technology	The energy output of the improved cookstove in the VPA is less than 150kW. Document: Manufacturer's specification/project data sheet
3	Methodological criteria	Using the baseline technology as a backup or auxiliary technology in parallel with the improved technology introduced by the project activity is permitted as long as a mechanism is put into place to encourage the removal of the old technology (e.g. discounted price for the improved technology) and the definitive discontinuity of its use. The project documentation must provide a clear description of the approach chosen and the monitoring plan must allow for a good understanding of the extent to which the	The VPA involves distribution of technology to only those HHs which have dismantled or discontinued the use of baseline stoves. If an old technology remains in use in parallel with the improved cookstoves, the corresponding emissions shall be accounted for as part of the project emissions in the VPA-DD. CME will conduct campaigns as part of the incentive mechanism to encourage removal of baseline stoves in place.

		baseline technology is still in use after the introduction of the improved technology.	
4	Methodological criteria	The project proponent must clearly communicate to all project participants the entity that is claiming ownership rights of and selling the emission reductions resulting from the project activity. For technology producers and the retailers of the improved technology or the renewable fuel in use, this must be communicated by contract or clear written assertions in the transaction paperwork. If the claimants are not the project technology end users, the end users will need to be informed and notified that they cannot claim for emission reductions from the project	The CME will clearly communicate to the end users of project technologies (through means such as sales receipts and engagement with community representatives) that it shall have ownership rights of and selling the emission reductions resulting from the project activity. The default CEP Booking Record is including the provision that emission reductions generated by the CEP are transferred from the end-user to the PO and ultimately owned by the CME. The receipts will clearly specify that carbon rights are ceded in favour of the CME.
5	Methodological criteria	Project activities making use of a new biomass feedstock in the project situation (e.g. shift from non-renewable to green charcoal, plant oil or renewable biomass briquettes) must comply with relevant Gold Standard specific requirements for biomass related project activities, as defined in the latest version of the Gold Standard rules. If the biomass feedstock is sourced from a dedicated	Not Applicable. The project makes use of the existing non-renewable biomass for improved cookstoves. The amount of NRB used however will reduce in project scenario. No new biomass feedstock usage is there in the project activity. Document: Monitoring and sample surveys

		plantation, the criteria must apply to both plantations established for the project activity AND existing plantations that were established in the context of other activities but will supply biomass feedstock.	
6	Methodological criteria	Adequate evidence is supplied to demonstrate that indoor air pollution (IAP) levels are not worsened compared to the baseline, and greenhouse gases (as listed in section 2.1) emitted by the project fuel/stove combination are estimated with adequate precision. The project fuel/stove combination may include instances in which the project stove is a baseline stove.	Sample surveys shall be carried out during annual monitoring to check IAP levels in the HHs.
7	Methodology criteria	Records of renewable fuel sales may not be used as sole parameters for emission reduction calculation, but may be used as data informing the equations in section 2.0 of this methodology. These records need to be correlated to data on distribution and results of field tests and surveys confirming (a) actual use of the renewable fuel and usage patterns (such as average fraction of non-renewable fuels used in mixed combustion or seasonal variation of fuel types), (b) GHG emissions, (c) evidence of CO levels	Not Applicable. The project does not entail utilization of renewable fuel but makes use of the existing non-renewable biomass for improved cookstoves.

		not deteriorating (d) any further factors effecting emission reductions significantly.	
Solar Lighting Systems- AMS I.A version 14.0			
9	Methodological criteria	This category comprises renewable electricity generation units that supply individual households/users or groups of households/users included in the project boundary. The applicability of the methodology is limited to individual households and users that do not have a grid connection except when: (a) A group of households or users are supplied with electricity through a standalone mini-grid powered by renewable energy generation unit(s) where the capacity of the generating units does not exceed 15 MW (i.e. the sum of installed capacities of all renewable energy units connected to the mini-grid is less than 15 MW) e.g. a community-based stand-alone off-the-grid renewable electricity systems; or (b) For renewable energy-based lighting applications, the emission reductions per system is less than 5 tonnes of CO_2e a year and it shall be demonstrated that that fossil fuels would have	The VPA involves dissemination of renewable energy-based lighting systems (solar lighting systems), where the emission reduction per system is less than 5 tonnes of CO_2e per year. Based on official statistics from the host country government agencies (mentioned in section B.4 of the VPA-DD), in the absence of project technology, end users would have used wick-based kerosene lanterns for lighting. Document: Manufacturers specification And NSSO's 2007 report on "Energy Sources of Indian Households for Cooking and Lighting, 2004-05.

		been used in the absence of the project activity by: (i) A representative sample survey of target households; or (ii) Official statistics from the host country government agencies; (c) A group of households or users are connected to a grid prior to the start date of the project activity (or the start date of validation with due justification), however the electricity from the grid is available for the households and users for less than 36 hours in any given calendar month during the crediting period or the grid connected household coverage in the host country is less than 50%. (d)	
11	Methodological criteria	Hydro power plants with reservoirs that satisfy at least one of the following conditions are eligible to apply this methodology: (a) The project activity is implemented in an existing reservoir with no change in the volume of reservoir; (b) The project activity is implemented in an existing reservoir, where the volume of reservoir is increased and the power density of the project activity is greater than 4 W/m2;	The VPA does not involve installation/operation of hydro power plants. Thus, this criterion is not applicable.

		(c) The project activity results in new reservoirs and the power density of the power plant, is greater than 4 W/m2.	
12	Methodological criteria	Combined heat and power (cogeneration) systems are not eligible under this category.	The VPA does not involve installation/operation of combined heat and power (cogeneration) systems. Thus, this criterion is not applicable.
13	Methodological criteria	If the unit added has both renewable and non-renewable components (e.g. a wind/diesel unit), the eligibility limit of 15 MW for a small-scale CDM project activity applies only to the renewable component. If the unit added co-fires fossil fuel, the capacity of the entire unit shall not exceed the limit of 15 MW.	The VPA does not involve installation/operation of hybrid units (having both renewable and non-renewable components). Thus, this criterion is not applicable. .
14	Methodological criteria	Project activities that involve retrofit or replacement of an existing renewable electricity generation unit are included in this category. To qualify as a small-scale project, the total output of the modified or retrofitted unit shall not exceed the limit of 15 MW.	The VPA does not involve retrofit or replacement of an existing renewable electricity generation unit. Thus, this criterion is not applicable.
15	Methodological criteria	In the case of project activities that involve the	The VPA does not involve addition of renewable

		addition of renewable electricity generation units to an existing renewable electricity generation facility, the total capacity of the units added by the project should be lower than 15 MW and should be physically distinct from the existing units.	electricity generation units to an existing renewable electricity generation facility. Thus, this criterion is not applicable.

B.3. Project boundary

>>

SOLAR:

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Combustion of kerosene fuel used for light;	CO_2	Yes	Primary source of emissions
		CH_4	No	Minor source
		N_2O	No	Minor source
Project scenario	Renewable energy source solar lamps used for light	CO_2	No	Project activity does not involve consumption of fossil fuels or electricity therefore no CO_2 emissions are generated
		CH_4	No	Minor source
		N_2O	No	Minor source

IMPROVED COOKSTOVES

Source		GHGs	Included?	Justification/Explanation
Baseline scenario	Combustion of non-renewable biomass for cooking or heating	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	Yes	Important source of emissions
Project scenario	Combustion of non-renewable biomass for cooking or heating	CO_2	Yes	Important source of emissions
		CH_4	Yes	Important source of emissions
		N_2O	Yes	Important source of emissions

B.4. Establishment and description of baseline scenario

>>

BASELINE DESCRIPTION – SOLAR LIGHTING

The project activity involves the introduction of solar lighting systems into households and SMEs throughout India. Solar lighting systems replace the main baseline fuel, kerosene. Baseline parameters for this project activity were primarily derived from data presented in India's National Sample Survey Organization's (NSSO) 2007 report, "Energy Sources of Indian Households for Cooking and Lighting, 2004-05". It reports information from the national Household Consumer Expenditure survey conducted from July 2004 to June 2005, and contains the most recent data on household lighting consumption in India. Other supporting studies were used for non-India specific parameter values, such as luminous efficiency and the net calorific value of kerosene.

Households in India use kerosene, gas, candle, electricity, and other oil for lighting. Among these, kerosene and electricity are most commonly used. At a national level, kerosene and electricity is used by 99% of the households in both rural and urban areas. The use of kerosene as the primary source of lighting is common in rural areas where nationally 44% of the rural population consumes kerosene for lighting, as compared to 7% in urban areas.

According to Methodology AMS-I.A (version 14), the energy baseline is: the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate the equivalent quantity of energy, estimated using one of three options. This project activity will use Option 3, a trend-adjusted projection of historic fuel consumption in situations where an existing technology is replaced, to calculate emissions baseline in year y (BE_{CO2}), as outlined in the methodology.

Data from the 2007 NSSO report is used to calculate this projection. The baseline scenario identified in this VPA-DD will serve to calculate the emission reductions creditable from the installation of solar lighting applications, and the replacement of kerosene lanterns.

Objectives and Reliability Requirements

The 2004-05 Household Consumer Expenditure survey presents the distribution of rural and urban households by primary source of energy used for cooking and lighting in all of the states and UTs of India. The survey sampling design and instruments, as well as the preparation of the 2007 report, were developed by NSSO's Survey Design and Research Division. The field work was conducted by the Field Operations Division and the data processing and table generation by the Data Processing Division.

Target Population

The target population for this project activity consists of households throughout India where the CME's partner Microfinance Institutions (MFIs) operate. NSSO survey sample was collected to represent all Indian states and different socio-economic categories.

NSSO data is used to calculate historic consumption rates of kerosene for the baseline of this project activity.

Sample Size

The 2004-05 NSSO survey covered all the States and UTs in India. The data was collected from a sample of 79,298 rural and 45,346 urban households spread over 7,999 villages and 4,602 urban blocks, respectively.

BASELINE SAMPLING DESIGN

Sampling Method

Clustered random sampling was used to select villages and urban blocks included in the survey. Each district within a state or UT was divided into two clusters that were comprised of all rural areas and all urban areas within a district. The number of villages or blocks sampled within a state or UT was determined based on the proportion of population as per the 2001 Census, and was subject to the availability of investigators to ensure a uniform workload. The allocation of the sample between the rural and urban sectors was determined by the proportion of the population as per the 2001 Census with a 1.5 weighting for the urban sector. Households were selected using simple random sampling without replacement with respect to rural/urban location, income, and monthly per capita expenditure.[13]

Sampling Frame

The sampling frame was comprised of two different sources: For households in rural areas, a list of villages from the 2001 national census constituted the sampling frame. For households in the urban sector, the latest available list from the Urban Frame Survey (UFS) blocks was used as the sampling frame.

Quality Assurance/Quality Control

Technical guidance from the governing council NSSO and survey working group was provided at every stage of the survey. Since surveying was conducted over four rounds, an equal number of villages/blocks were sampled in each to ensure a uniform spread.

BASELINE DATA ANALYSIS

According to Methodology AMS-I.A (version 14), the energy baseline is: *the fuel consumption of the technology in use or that would have been used in the absence of the project activity to generate*

[13] See Appendix B of "Energy Sources of Indian Households for Cooking and Lighting, 2004-5" for detailed description of sampling procedures.

the equivalent quantity of energy. The technology that would have been used in the absence of the project activity is determined as a simple wick-based kerosene lantern.

PARAMETER: $BE_{CO2,y}$

Calculation Definitions

To calculate the energy baseline, this project activity will use Option 3 (which is specifically recommended for lighting devices) listed in AMS.I.A*, a trend-adjusted projection of historic fuel consumption in situations where an existing technology is replaced*. The fuel consumption trend ofIndia shows the average level of kerosene consumption for lighting in the target households over the years. The trend extrapolation is used to ensure that no carbon credits can be claimed for a lighting service which exceeds the general lighting service that people could obtain from their average kerosene consumption. The specific equivalent level of lighting service is calculated for each improved lamp model, to ensure that in the end only the actual lighting service which is provided by an improved lamp will be converted into carbon credits.

As defined by AMS.I.A., paragraph 11, emissions in the baseline ($BE_{CO2,y}$) is calculated using thefollowing equation:

Equation 1

$$BE_{CO2,y} = \sum_{j} FC_{j,y} * NCV_{j} * EF_{CO2,j}$$

Where:

Table 2

Parameter	Unit	Project Calculation
$BE_{CO2,y}$	tCO_2	Emissions in the baseline in year *y*
$FC_{j,y}$	kg	Amount of kerosene consumption in year *y*
NCV_j	GJ/kg	Net calorific value of kerosene
$EF_{CO2,j}$	tCO_2/GJ	CO_2 emission factor of kerosene
J	kg	Kerosene

Step 1: Baseline Technology

Applying a conservative approach we assume the kerosene lamp model in the baseline is a hurricane lamp, which is conservative because it has a glass cover making it more efficient than most homemade lanterns. This baseline lantern has an average efficiency

of 0.13 lumen/watt (Louineau et al, 1994)[14]. This again is conservative, as the World Bank has reported an efficiencyof 0.1 lumen/Watt for this model.

Step 2: General Energy Baseline:

The most recent kerosene consumption volume of households that use kerosene for lighting in allof rural India is 6.98 L/month (NSSO data, 2004; see Table 3 below).

Table 3

Year	Kerosene usage (L/month)
1987	3.85
1993	5.48
1999	8.1
2004	6.98

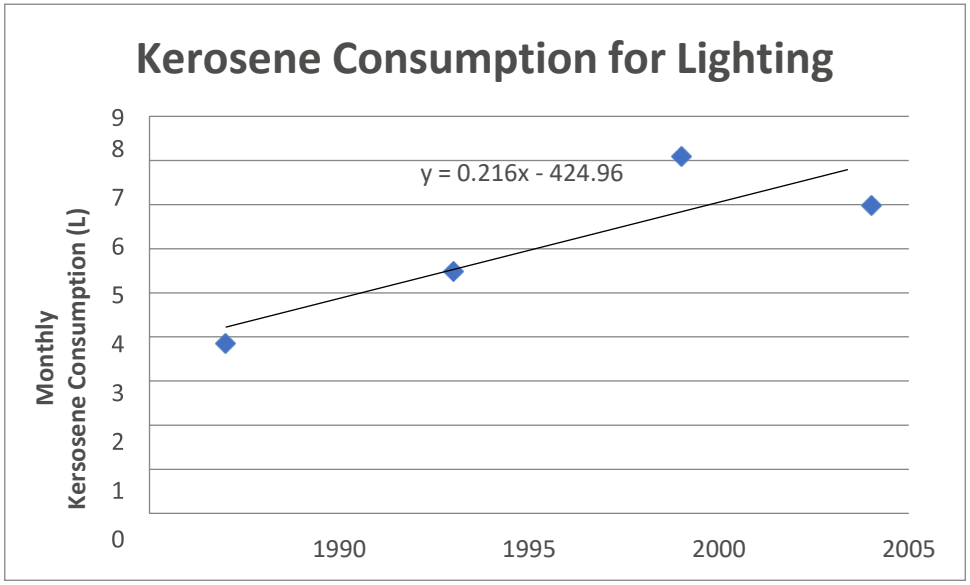
Source: NSSO, 1987, 1993, 1999, and 2004.

The following values were calculated based on the following formula:

Equation 2

KChh = KCcapita * HHsize / P(ker all India)

Figure 1: Kerosene Consumption in Rural India (based on historic NSSO data)



[14] 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.

Step 3: Specific equivalent level of lighting service:

As a next step, the energy baseline calculated in Step 2 will be adjusted according to the actual level of lighting service provided by the improved lamps, in lumen*hours. The units of kerosene consumption per month per household will be adjusted to lumen*hours per month per household inthe following way:

1. Calculate the lighting service provided to a household using the volume of keroseneconsumption established in Step 2.
2. Compare the calculated lighting service in the previous step to the lighting service providedby the project lamps
3. Ensure carbon credits for project lamps per household do not surpass the lighting service ofthe energy baseline
4. Calculate the actual baseline emissions per project lamp based on the actual specificlighting service provided

The above steps are followed with detailed calculations below. As mentioned in Step 1, the luminous efficiency of the baseline technology = .13 lumens / watt (using a conservative value asdescribed above).

Using the parameters below, the equivalent level of lighting service of the kerosene consumed byhouseholds in the baseline can be calculated:

Table 3

Parameter	Unit	Description	Value	Source
LS(month)	Lumen*hr/month	Lighting per month	9021.4	Calculated
KC(HH)	Liter/ month	Household Kerosene consumption per month	6.98	NSS0 511
LE(ker)	Lumen / W	Luminous efficiency of kerosene with baseline lantern	0.13	Louineau et al, 1994
NCV(ker)	TJ/Gg	Net calorific value of kerosene	43.8	IPCC 2006
Dens (ker)	KG/L	Density of kerosene	0.81715	www.simetric.co.u

1. Methodology AMS-I.A. allows for a default daily lighting usage of 3.5 hours in the baseline. The calculation below represents the average light output that households get from the kerosene consumed. This value will be used to compare the lighting output of the new technology from this project.

   The Lighting per month can be calculated using the following formula:
   Equation 3

$$LS_{month} = KC_{HH} * LE_{ker} * NCV_{ker} * \frac{10^3}{3.6} * dens_{ker}$$

The lighting per month based on 2004 kerosene usage = 9021.4 Lumen hr / month. Thereference cap can then be calculated using the formula:

Equation 4

RC = LS (month) * 12/ 365*h

The reference cap equals 84.7, based on 2004 data, and will be extrapolated to future years as new data arises on usage. The reference cap for possible carbon savings is defined such that in a single household it shall not be allowed more emission reductions claimed than those that arise from the general baseline lighting service.

2. The possible carbon savings in a single household has a reference cap as defined by the baseline light output. According to AMS-I.A, it shall not be allowed that for a single household more emission reductions are claimed than those that arise from the general baseline lighting service. The reference cap values for all years of the crediting period are presented in the table below:

Table 4: Extrapolated monthly kerosene consumption per household, equivalent lighting serviceand reference cap values

Year	Extrapolation of Kerosene Consumption (L/month)	Equivalent lighting service (lumen*hours/month)	Reference Cap (lumens)
2012	9.632	12448.96	116.9374
2013	9.848	12728.14	119.5598
2014	10.064	13007.31	122.1821
2015	10.28	13286.48	124.8045
2016	10.496	13565.65	127.4268
2017	10.712	13844.82	130.0492
2018	10.928	14123.99	132.6715
2019	11.144	14403.16	135.2939
2020	11.36	14682.33	137.9162
2021	11.576	14961.5	140.5386
2022	11.792	15240.68	143.1609

3. The baseline emissions for the lighting systems that are being distributed under this project are calculated as the emissions corresponding to the specific equivalent level of lighting service in the baseline.

The following equation is used to calculate baseline emissions for a solar lamp (n) in period(v); the emissions that would have been generated by the burning of kerosene in the baseline to generate that same lighting as provided by n lamp over period v:

Equation 5

$$BE_{n,v} = l_n * d_v * h * \frac{1}{LE_{\text{ker}}} * EF_{\text{ker}} * 10^{-6} * 3.6$$

The values are defined as follows:

Table 5

Parameter	Unit	Description	Value	Source
l(n)	Lumen	Lumen output of solarlamp, n	Variable (see table)	Technical specs (see references)
d	Days	Number of days inperiod v	365	-
h	Hours / day	Average number of hours lamps are used	3.5	Meth AMS I.A.
LE(ker)	Lumen/W	Specific luminous efficiency of kerosene when burnt in kerosene lantern	.13	Louineau et al1994
EF(ker)	TCO_2/GJ	Specific CO2 emissions of kerosene	.0719	IPCC 2006

For the solar lighting component, baseline scenario is the use of fossil fuel to provide lighting in thehouseholds in the project boundary as per AMS-I.A. "Electricity generation by the user" (Version 14).

Rural households in India rely on kerosene for lighting. As per the "Energy sources of Indian Households for cooking and lighting" report (dated September 2012) of the Government of India's National Sample Survey Office, 44% of households in rural India use kerosene for lighting. Since, the solar lighting systems are implemented in a phased manner, the baseline scenario for individual solar lighting system will be identified in line with the guidelines given in AMS-I.A version 14.

14. A representative sample survey (90% confidence interval, +/- 10% error margin) was alsocarried out in the project population to determine their pre-project fuel.

To ensure that the baseline requirements of the methodology and the registered PoA-DD are complied with by the VPA, the CME also carried out a baseline survey to determine the baseline attime of VPA inclusion. This survey was carried out through a random

representative approach by considering end-users that have expressed an interest in buying the solar products from PO – GGI.

A representative sample survey (90% confidence interval, +/- 10% error margin) was carried out in the anticipated project population to determine their pre-project fuel. All respondents said that they used kerosene in wick lamps in the baseline scenario and are not connected to the grid.

Methodology for the sample survey:

1. The total sample size required to meet (90% confidence interval, +/- 10% error margin) was calculated using http://www.raosoft.com/samplesize.html.
2. The number of final samples taken i.e. 70 was more than the sample size required (68 samples as per http://www.raosoft.com/samplesize.html calculation) to meet 90% confidence interval, +/- 10% error margin to cover for contingencies like residents not being in the house, residents not willing to talk etc.
3. A questionnaire was prepared in consultation with PO's for conducting the survey. The questionnaire includes the name of the product owner, address and ask questions on what their baseline fuel was. The questions are designed to make sure that they are not leading and ensure that the respondents are not asked questions with bias.
4. MEC enumerators visited the selected households during the day (between 9 AM and 6 PM) to ask them the questions and collect the answers

As an additional measure, since solar sales in this VPA will be made in a phased manner across several states in India, and to ensure that the baseline requirements of the applied methodology AMS.I.A. v14 and registered PoA-DD are met, the baseline is also one of the monitoring parameters in Section B.7.1 of the VPA-DD. As part of the monitoring, it will be recorded whether or not households being given the solar lighting system used kerosene in the pre-project scenario. Only those households that used kerosene for lighting in the baseline scenario are included in the VPA for crediting.

Hence, it can be established that for households with solar lighting systems in the proposed VPA, the baseline is use of kerosene.

BASELINE DESCRIPTION – IMPROVED COOKSTOVES

The use of three stone/open fire or conventional inefficient stoves / charcoal pots for cooking by the project stove users is the applicable pre-project scenario. Traditional biomass remains the main energy source for cooking in rural areas and poor urban clusters.

The baseline scenario identified in this VPA-PDD will serve to calculate the emission reductions creditable from the introduction of improved biomass cookstoves to replace traditional unimproved stoves used for cooking and heating water for drinking purposes at the household level.

A summary of baseline information for India is provided in this section. Parameters for the baseline scenario are established using data primarily from the Ministry of Environment and

Forest report titled, "India State of the Forest Report" by the Forest Survey of India (FSI), as well as supporting sources identified below. The baseline scenario identified in this PoA-PDD will serve to calculate the emission reductions creditable from the introduction of improved biomass cookstoves to replace traditional unimproved stoves used for cooking and heating water for drinking purposes at the household level.

The baseline scenario for this project activity is derived using data from the above-mentioned study, including the calculation of $f_{NRB,y}$, the fraction of woody biomass saved by this project activity that can be established as non-renewable.

Objectives and Reliability Requirements

The objective of the 2011 FSI report was to assess fuelwood and small timber requirements at the state and national level by analyzing the growing stock of various Indian forests and village wood consumption surveys. Households were specifically surveyed about fuel sources and consumption. The sample size for estimating household wood consumption was established by referencing the 1995 FSI survey, "Wood Consumption Study of Haryana".

Target Population

The target population for the PoA consists of the beneficiary households in India using traditional cookstoves for cooking and heating water. These households collect wood from forests and other common property resources, which is to a large extent non-renewable. The FSI study targeted consumption points of wood across India by State, including industries, households and other sectors such as hostels and jails.

Sample Size

According to the 2011 FSI report, a total of 1,800 households were surveyed in 100 villages and 50 UFS blocks in India.

Baseline Sampling Design Sampling Method

The 2011 FSI study used stratified random sampling to survey the target population. In order to achieve a representative sample, it was determined that 62 districts needed to be included in the study, but in actuality 75 districts were randomly selected and included. The villages and UFS blocks surveyed were equally distributed within these districts. Households were categorized and stratified based on economic status (i.e. "affluent, "less affluent", and "others"). Two "affluent", five "less affluent", and 5 "other class" households were surveyed in each village or UFS block.

Sampling Frame

The 2001 FSI study established a sampling frame by dividing the entire country of India into 23 clusters, based on large states or group of states/Union territories. The primary sampling frame for this project activity was fuel sources and biomass consumption of households.

Quality Assurance/Quality Control

The Forest Survey of India is administered by the government of India and was responsible for quality assurance and quality control measures.

Baseline Data Analysis

The 2011 "India State of the Forest Report" was used to estimate the fraction of woody biomass saved by this project activity that can be established as non-renewable biomass (fNRB).

The non-renewable woody biomass (NRB) is defined as the quantity of woody biomass used in the absence of the project activity (Bold) minus the DRB component, as long as at least two of the following supporting indicators are shown to exist:

I. A trend showing an increase in time spent or distance travelled for gathering fuel-wood by users (or fuel-wood suppliers), or alternatively, a trend showing an increase in the distance the fuel-wood is transported to the project area;

a. A 2006 study found that the average time taken to collect one bundle of firewood currently is 3.84 hours, as against 2.36 hours a quarter century ago. Distance to the forest increased from 2.06 to 2.31 km, which indicates greater time spent within the forest due to degradation.

b. A recent 2011 study based on surveys covering 4,296 individuals in Himachal Pradesh found that on average, women walk 30 km each month taking 2.7 h per trip for fuel wood collection over hilly terrain, often at high altitudes and undergo stress like stiff-neck, backache, headache and loss of work days

II. Survey results, national or local statistics, studies, maps or other sources of information, such as remote-sensing data, that show that carbon stocks are depleting in the project area;

a. The India State of the Forest Report 2011 conducted an assessment of forest cover of the entire country which was carried out at an interval of two years by interpretation of remote-sensing satellite data. The study found that between 2009 and 2011, the actual national forest cover reduced by 36,700 hectares. The FSI noted that the main reasoning behind this reduction is the decrease in forest cover in certain states due to illicit felling, forest clearances in encroached areas, shortening of shifting cultivation cycle and biotic pressure.

III. Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;

a. The wholesale price of wood and wood products in India has increased 25% in the past ten years. The Ministry of Statistics and Programme implementation reports that the price of wood in 2000 was $180 and has since increased to $239 in 2010 (price measured in $RPS/0.173 units of wood).

IV. Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.

a. Not applicable

NRB Conclusion: The woody biomass used in the absence of the project activity meets three of the four supporting indicators for NRB (only two are required). Therefore, the NRB is the total fuelwood consumed by households in India, minus the biomass that is considered demonstrably renewable.

Qualitative Assessment of Demonstrably Renewable Biomass (DRB)

The principle of Demonstrably Renewable Biomass should be considered when establishing the fraction of non-renewable biomass used in the project activity. The biomass used in India for cooking comes from woody biomass originating from trees in forests and trees outside of forests (TOF).

Woody biomass is "renewable" if the following conditions are satisfied: The woody biomass is originating from land areas that are forests where:

I. The land area remains a forest;

a. According to the FAO Forest Resource Assessment India Country Report 2010, the area of forest has increased 7% from 63.939 million hectares in 1990 to 68.434 million hectares in 2010. However, while there has been improvement in significantly reducing and controlling the rate of deforestation, forest degradation appears to be continuing, as evidenced by the fall in the average growing stock of wood and bio mass volume per ha. Declining production of timber and fuel wood is also indicative of continuing forest degradation.

II. Sustainable management practices are undertaken on these land areas to ensure, in particular, that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

a. Although 29% of India's forest area is designated as protected, there is no forest area under sustainable forest management.

b. India's forest management program adopts a silviculture system influenced by sustained yield forestry principles, in which wood should be harvested at an average rate, which is not greater than the forest can regenerate. However, the forest productivity in India is low compared to the global average. The Mean Annual Increment (MAI), which is a measure of forest productivity, is 0.7 cu m/ha for Indian forests as against the world average

of 2.1 cu m/ha. This has resulted in a demand-supply gap in various forest products, especially fuelwood, which has led to forest degradation.

The biomass is woody biomass and originates from non-forest areas (e.g., croplands, grasslands) where:

I. The land area remains as non-forest or is reverted to forest; and

a. The Non-Forest area in India has remained constant from 1990 to 2004, while the non-forest area with tree cover increased 11% from 2000 to 2004.

II. Sustainable management practices are undertaken on these land areas to ensure in particular that the level of carbon stocks on these land areas does not systematically decrease over time (carbon stocks may temporarily decrease due to harvesting); and

a. There is no evidence or reports that indicate that sustainable management practices are undertaken on trees outside the forest.

III. Any national or regional forestry, agriculture and nature conservation regulations are complied with.

a. There is no evidence or reports that indicate that there are any national or regional forestry conservation regulations for the area of trees outside the forest.

DRB Conclusion: The woody biomass used in the project activity originating from trees within forests and non-forest areas do not meet all of the requirements to be considered demonstrably renewable.

Assessment of baseline technology –

Studies conducted by organizations like GIZ[15] and the Global Alliance for clean cookstoves[16] show that majority of rural Indians use traditional (inefficient) wood-based stoves like the three-stone fired for cooking.

Assessment of Fraction of non-renewable biomass (fNRB) –

Although the woody biomass used in the project activity did not meet all the qualitative requirements to be considered demonstrably renewable, DRB is still accounted for by assessing the sustainable extraction rate of fuelwood in forests and trees outside of forests

[15] http://www.giz.de/en/downloads/giz2014-en-kaleidoscope-of-cooking-india.pdf

[16] http://cleancookstoves.org/resources_files/india-cookstove-and-fuels-market-assessment.pdf

(TOF). The total sustainable yield from forests in India is estimated by taking the percent of each forest cover type from the FSI 2011 report and applying it to the total forest area (68,434,000 hectares) presented in FAO's India Forest Resource Assessment Country Report 2010[17] to yield the total area of each forest cover type. Sustainable extraction rates for specific forest cover types from a 2001 forestry and carbon sequestration study[18] were then applied to each forest cover type area to find the sustainable yield of forests and plantations/TOF (26,315,679 tons/year).

To account for fuelwood extracted from outside the forest, the ratio of sustainable fuelwood produced to the total area of the forest (0.38 sustainable tons/forest ha) was applied to the total area of other wooded land, 3,267,000[19]:

Calculation 1
3,267,000 ha x 0.38 = 1,256,295 tons

Therefore, the total DRB from both forest and non-forest areas in India is 27,571,974 tons/year.

The woody biomass used in the absence of the project activity in India meets the CDM requirements for non-renewability, and therefore the NRB is calculated as the total household fuelwood demand minus the DRB. NRB for this project activity is calculated as follows:

Calculation 2
NRB = Bold – DRB
188,849,029 tons = 216,421,000 tons – 27,571,974 tons

The fraction NRB for India is calculated accordingly:

Calculation 3
fNRB = NRB/ (NRB + DRB)
0.8726 = 188,849,029 tons / (188,849,029 tons + 27,571,974 tons)

Since the stoves in this VPA are distributed in Karnataka state, the fNRB,y value is calculated individually for this state. The value is mentioned in Section B.6.2 of the VPA-DD.

Baseline scenario for this VPA:

[17] Food and Agriculture Organization. (2010). Forest Resource Assessment India Country Report. Table T1– Extend of Forest and Other Wooded Land.
[18] Ravindranath, N.H., et al. (2001). Forestry for Sustainable Biomass Production and Carbon Sequestration in India. Mitigation and Adaptation Strategies for Global Change, 6:233-256. Table AI. Projected and sustainable rates of extraction from forests and plantation, pg. 254. See India NRB Report (Table 2) for a complete summary of sustainable fuelwood extraction estimates for India's forests.
[19] FAO, 2010.

The quantity of fuel consumed by traditional cookstoves using wood/wood residue in baseline scenario ($B_{b,y}$) is 0.7 t/capita/year based on survey results. The surveys shall be carried out ex-post before Verification.

B.5 Demonstration of additionality

>>

Specify the methodology, activity requirement or product requirement that establishes deemed additionality for the proposed project (including the version number and the specific paragraph, if applicable).	Community Services Activity Requirements (Version 1.2), paragraph 4.1.9: "Projects that meet any of the following criteria are considered as deemed additional and therefore are not required to prove Financial Additionality at the time of Design Certification: (a) Positive list (Annex B) i.e. All VPAs will be solely composed of isolated units (CEPs) where the users of the technology/ measure are households or communities or institutions and where each unit results in <= a. 600 MWh of thermal energy savings per year for ICS. b. 600 tCO_2 per year for HWT and IWT technologies (b) Projects located in LDC, SIDS, LLDC (c) Micro-scale projects"
Describe how the proposed project meets the criteria for deemed additionality.	Project activities under the VPA are solely composed of isolated units where the users are households or institutions and where each unit results in GHG emission not exceeding 600 ton of CO_2e in any year of the crediting period for SLS and 1.8 GWh (thermal) for ICS. Thus, the project activity meets the criteria (a) and is therefore deemed additional.

The VPA meets the requirements of the Community Services Activity Requirements, as follows –

Eligibility Criteria Category	Eligibility criterion - Required condition	Justification
1. Eligible Project Types	All CSA Projects shall lead to climate change mitigation and/or adaptation by providing or improving access to services/resources at the household or community or institution level. Eligible services include electricity and energy, water and sanitation, waste management, housing, etc.	The goal of the VPA is to distribute Improved Cook Stoves (ICS), and Solar lighting systems (SLS) in the households/SMEs of the host country of India. Thus, the VPA leads to climate change mitigation (and other sustainable development impacts) by providing access to clean cooking and lighting technologies/services at the household and institution level.
GENERAL ELIGIBILITY CRITERIA		
2. Type of project	(b) End-use energy efficiency: Project activities that reduce energy requirements as compared to baseline scenario without affecting the level and quality of services or products, where the end-user of the products and services are clearly identified and when the physical intervention is required at the user end. For example, efficient cooking, heating, lighting, etc.	The PoA involves distribution of cleaner and energy efficient ICS and SLS thereby resulting in reduction of baseline energy requirements, without compromising the quality and level of services/products for households/SMEs
3. Project Area, Boundary and scale	Project Area and Boundary shall be defined in line with the applicable Impact Quantification Methodologies and Product Requirements.	The project area is point location of CEP beneficiaries in the host country of the VPA. The project boundary will be limited to the geographical boundary of the host country of India. For the purpose of applying UNFCCC methodologies for quantification of GHG reductions, 'small scale' is: a. Type I: Renewable energy project activities with a maximum output capacity of 15 MW (or an appropriate equivalent) b. Type II: Energy-efficiency improvement project activities < = 60 GWh(e) or 180 GWh(th) energy savings per year c. Type III: Other project activities not included in Type I or Type II < = 60,000 tCO2eq per year

Eligibility Criteria Category	Eligibility criterion - Required condition	Justification
		The CPA involves both Type II and type III which shall not cross the above small-scale limits due to use of suppressed demand baseline. Scale is no limit For Improved Cookstoves, since TPDDTEC methodology is followed and there is no suppressed demand element. Also, scale is no limit for Solar lighting systems, since each unit will be less than 1,500 kW.[20]
4. Legal Ownership	(a) Projects involving the distribution of a large number of devices for services such as heating, cooking, lighting, electricity generation, water treatment technology such as water filter, etc. shall provide a clear description of the ownership of the Products that are generated under Gold Standard Certification all along the investment chain. In line with the FPIC requirement, the proofs that end-users are aware of and willing to give up their rights on Products shall be provided. (b) The transfer of Product ownership shall be discussed during local stakeholder consultations for projects.	The CEP owners confirm that rights to the ownership of carbon credits reside with the CME according to the end user agreement /declaration form signed via monitoring app etc (refer Eligibility under GS4GG section above). This shall again be explained in future VPA-level LSC meetings.

B.5.1 Prior Consideration

>> N/A as the VPA is submitted for transition from CDM and there is no Design Change involved.

B.5.2 Ongoing Financial Need

[20] See footnote #2 at https://globalgoals.goldstandard.org/ru-2020-ssc-application-of-suppressed-demand/

>>

N/A as the VPA is not renewing its crediting period with transition.

B.6 Sustainable Development Goals (SDG) outcomes

Relevant Target/Indicator for each of the three SDGs

Sustainable Development Goals Targeted	Most relevant SDG Target	SDG Impact Indicator (Proposed or SDG Indicator)
13 Climate Action (mandatory)	N/A	Emission Reductions
1 End poverty in all its forms everywhere	1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	Number of households with clean energy products
3 Good Health and Well-being	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	% households confirming less smoke with the use of improved stove
3 Good Health and Well-being	3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	% households confirming less smoke with the use solar lighting systems instead of kerosene lamps
5: Gender Equality	5.4 Recognize and value unpaid care and domestic work through	% time saving associated with cooking and fuel collection

	the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	
7: Affordable and Clean Energy	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	Number of CEPs distributed
8: Decent Work and Economic Growth	8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services	Total no of jobs created
12: Responsible Consumption and Production	12.2 By 2030, achieve the sustainable management and efficient use of natural resources	Reduction in use of non-renewable biomass per household
15: Life on Land	15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	Reduction in use of non-renewable biomass per household

B.6.1 Explanation of methodological choices/approaches for estimating the SDG Impact

>>

SDG 1: No Poverty

Applied methodology/approach	Equation/calculation
1.4.1 Proportion of population living in households with access to basic services Approach: 1. Monitor the number of households where CEPs are distributed under the project as an indicator of providing basic service access to households	1. CEP distribution records: Net Benefit (SDG 1) = $BSA_{Project} - BSA_{Baseline}$ Where: $BSA_{Baseline}$ Number of households where CEPs were distributed in baseline = 0 $BSA_{Project}$ Number of households where CEPs were distributed in Project = XXX

SDG 3: Good Health and Well Being

Applied methodology/approach	Equation/calculation
3.9.1Mortality rate attributed to household and ambient air pollution Approach: Monitoring Surveys conducted to capture information on users' perception on reduction in health issues after shifting to project CEPs	Ex-post Monitoring Surveys to check change in health issues like reduction in smoke levels. Net Benefit (SDG 3) = $SPM_{HH,Project} - SPM_{HH,Baseline}$ Where: $SPM_{HH,Baseline}$ % HH reporting reduction in smoke while cooking on improved stove in baseline = 0 $SPM_{HH,Project}$ % HH reporting reduction in smoke while cooking on improved stove in project

SDG 5: Gender Equality

Applied methodology/approach	Equation/calculation
5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location Approach: Monitoring Surveys conducted to capture information on time savings due to reduced fuel collection needs after shifting to project ICS	Ex-post Monitoring Survey Records measuring time savings from reduced fuel collection, due to reduced fuel consumption in households Net Benefit (SDG 5) = $HHTS_{Project} - HHTS_{Baseline}$ Where: $HHTS_{Project}$ % HH reporting time saving from fuel collection due to

	reduced fuel consumption in project $HHTS_{Baseline}$ % HH reporting time saving from fuel collection due to reduced fuel consumption in baseline = 0

SDG 7: Affordable and Clean Energy

Applied methodology/approach	Equation/calculation
7.1.2 Proportion of population with primary reliance on clean fuels and technology Approach: Monitor the number of ICS and SLS distributed under the project as an indicator of providing clean technology (relative to baseline stoves).	ICS and SLS distribution records Net Benefit (SDG 7) = $ACS_{Project}$ - $ACS_{Baseline}$ Where: $ACS_{Baseline}$ Access to affordable and clean energy (Number of operating ICS and SLS units under Baseline) = 0 $ACS_{Project}$ Access to affordable and clean energy (Number of operating ICS and SLS units under Project)

SDG 8: Decent Work and Economic Growth

Applied methodology/approach	Equation/calculation
8.5.1 Average hourly earnings of female and male employees, by occupation, age and persons with disabilities Approach: Recording the number of employees (male / female) in the project under administrative, sales, production and management positions	Employment records Net Benefit (SDG 8) = QE $IG_{Project}$ - QE $IG_{Baseline}$ Where: QE $IG_{Baseline}$ Quantitative Employment and income generation (Number of person (male and female) hired under Baseline) = 0 QE $IG_{Project}$ Quantitative Employment and income generation (Number of person (male and female) hired under Project)

SDG 12: Responsible Consumption and Production

Applied methodology/approach	Equation/calculation
12.2.2 - Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP Approach:	Refer SDG 13 for determination of fuel savings due to project activity

Reduction in domestic fuel consumption after shifting to ICS	

SDG 13: Climate Action : Improved Cookstoves

Applied methodology/approach	Equation/calculation
13.2.1 Amount of CO_2e emissions reduced by the project per year Approach: TPDDTEC, version 3.1	The Emission Reductions can be calculated using the following equation: When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission are considered the same, the overall GHG reductions achieved by the project activity in year y are calculated as follows: $ERy = \sum_{b,p} (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\ fuel} * (f_{NRB,b,\ y} * EF_{fuel,\ CO2} + EF_{fuel,\ nonCO2})) - \sum LE_{p,y}$ Where: $\sum_{b,p}$ — Sum over all relevant (baseline b/project p) couples $N_{p,y}$ — Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y $U_{p,y}$ — Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction) $P_{p,b,y}$ — Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from the field tests $f_{NRB,b,\ y}$ — Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario) $NCV_{b,fuel}$ — Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton) $EF_{b,fuel,CO2}$ — CO_2 emission factor of the fuel that is substituted or reduced. 112 tCO_2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel

	$EF_{b,fuel,nonCO2}$ Non-CO_2 emission factor of the fuel that is reduced $LE_{p,y}$ Leakage for project scenario p in year y (tCO_2e/yr) Leakage, if applicable, will be assessed on the following points: a. The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project. b. The NRB or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources. c. The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario. d. The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology. By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.

SDG 13: Climate Action: Solar Lighting Systems

Applied methodology/approach	Equation/calculation
13.2.1 Amount of CO_2e emissions reduced by the project per year Approach: AMS.I.A., version 14.0	The emissions reductions for solar lighting projects under AMS-I.A are determined to be the same as the baseline emissions. Therefore, the equations for calculating the emissions reductions are: The per-lamp baseline emissions are calculated in Baseline Step 3. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration. This is done using the following equations, as per methodology approved for use in d.Light PDD, GS448:

Total baseline emissions per project lamp in year *y* for period *v* are calculated as the sum of the baseline emissions of each lamp type *i* in the period:

$$BE_v = \sum_{i=1}^{n} BE_{i,v} \quad \text{(Eq. 2)}$$

Parameter	Unit	Type	Value
BE_v	tCO2	Calculated	Emissions generated in the absence of the project activity in period *v* by all lamps
$BE_{i,v}$	tCO2	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:

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

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.

B.6.2 Data and parameters fixed ex ante

For Improved Cookstoves

SDG13

Data/parameter	$P_{b,y}$
Unit	kg/household-day
Description	Quantity of fuel that is consumed in baseline scenario b during year y
Source of data	Baseline FT or default baseline fuelwood consumption
Value(s) applied	9.01 (fixed ex-ante for the entire crediting period)
Choice of data or Measurement methods and procedures	See Section B.4
Purpose of data	For baseline emission calculations
Additional comment	The value is based on pilot study results. However, ex-post KPT shall be performed to arrive at the results.

Data/parameter	$EF_{b,i,CO2}$
Unit	tCO_2/t_{fuel}
Description	CO_2 emission factor arising from use of fuel type *i* in baseline scenario
Source of data	Methodology default, Other fuels: IPCC defaults
Value(s) applied	Fuelwood: 112 tCO_2/TJ
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	For baseline emission calculations
Additional comment	-

Data/parameter	$EF_{b,i,nonCO2}$
Unit	$tCO_2/tfuel$
Description	Non-CO_2 emission factor arising from use of fuel type i in baseline scenario
Source of data	Wood: Methodology default Other fuels: IPCC default
Value(s) applied	Wood: 33.95 tCO2e/TJ (AR5 GWP)
Choice of data or Measurement methods and procedures	Methodology defaults have been applied for wood and charcoal and for other fuels IPCC default values shall be used.
Purpose of data	For baseline emission calculations
Additional comment	-

Data/parameter	$EF_{p,i,CO2}$
Unit	tCO_2/t_{fuel}
Description	CO_2 emission factor arising from use of fuel type *i* in project scenario
Source of data	Wood: Methodology default, Other fuels: IPCC default
Value(s) applied	Fuelwood / wood chips: 112 tCO2/TJ
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	For baseline emission calculations
Additional comment	-

Data/parameter	$EF_{p,i,nonCO2}$
Unit	tCO_2/TJ
Description	Non-CO_2 emission factor arising from use of fuel type *i* used in project scenario
Source of data	Methodology default: Wood
Value(s) applied	33.95 tCO2e/TJ (AR5 GWP)
Choice of data or Measurement methods and procedures	Default IPCC values have been applied
Purpose of data	For baseline emission calculations
Additional comment	-

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

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

Data/parameter	$f_{NRB,b,i,y}$
Unit	Fractional non-renewability
Description	Non-renewability status of woody biomass fuel type *i* that can be established as non-renewable during year y
Source of data	Forest Survey of India Report 2011
Value(s) applied	Fuelwood / wood chips / woody charcoal: 0.8726 for Karnataka
Choice of data or Measurement methods and procedures	N.A.
Purpose of data	For emission reduction calculations
Additional comment	-

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	1.290, 1.645; 1.96
Choice of data or Measurement methods and procedures	This is the statistical standard value for standard normal for a confidence level of 90% for a one-sided test, and 90% and 95% for a two-sided test, respectively.
Purpose of data	Calculation of baseline emissions
Additional comment	-

B.6.3 Ex ante estimation of SDG Impact

>>

Calculations for Improved Cookstoves and Solar Lighting Systems

SDG 1: No Poverty

1. ICS distribution records

$$\text{Net Benefit (SDG 1)} = BSA_{Project} - BSA_{Baseline}$$

Where:

$BSA_{Baseline}$ Number of ICS distributed in baseline = 0

$BSA_{Project}$ Number of ICS distributed in Project = 27,000

2. SLS distribution records

$$\text{Net Benefit (SDG 1)} = BSA_{Project} - BSA_{Baseline}$$

Where:

$BSA_{Baseline}$ Number of SLS distributed in baseline = 0

$BSA_{Project}$ Number of SLS distributed in Project = 3,000,000

SDG 3: Good Health and Well Being

Ex-post Monitoring Surveys to check change in health issues like reduction in smoke levels.

$$\text{Net Benefit (SDG 3)} = SPM_{HH,Project} - SPM_{HH,Baseline}$$

Where:

$SPM_{HH,Baseline}$ % HH reporting reduction in smoke while cooking on improved stove in baseline = 0

$SPM_{HH,Project}$ % HH reporting reduction in smoke while cooking on improved stove in project = 100%

SDG 5: Gender Equality

Ex-post Monitoring Survey Records measuring time savings from reduced fuel collection, due to reduced fuel consumption in households

$$\text{Net Benefit (SDG 5)} = HHTS_{Project} - HHTS_{Baseline}$$

Where:

$HHTS_{Project}$ % HH reporting time saving from fuel collection due to reduced fuel consumption in project = 100%

$HHTS_{Baseline}$ % HH reporting time saving from fuel collection due to reduced fuel consumption in baseline = 0

SDG 7: Affordable and Clean Energy

ICS distribution records

$$\text{Net Benefit (SDG 7)} = ACS_{Project} - ACS_{Baseline}$$

Where:

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

$ACS_{Project}$ Access to affordable and clean energy (Number of operating ICS units under Project) = 27,000

SLS distribution records

$$\text{Net Benefit (SDG 7)} = ACS_{Project} - ACS_{Baseline}$$

Where:

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

$ACS_{Project}$ Access to affordable and clean energy (Number of operating SLS units under Project) = 3,000,000

SDG 8: Decent Work and Economic Growth

Employment records

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

Where:

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

$QE\ IG_{Project}$ Quantitative Employment and income generation (Number of person (male and female) hired under Project) = 20

SDG 12: Responsible Consumption and Production

Refer SDG 13 for determination of fuel savings due to project activity

SDG 13: Climate Action (Improved Cookstoves)

The overall GHG reductions achieved by the project activity will be calculated as follows:

$ER_y = \sum BE_{b,y} - \sum PE_{p,y} - \sum LE_{p,y}$

Where:

ER_y	Emission reduction for total project activity in year y (tCO_2e/yr)
$BE_{b,y}$	Baseline emissions for baseline scenario b in year y (tCO_2e/yr)
$PE_{p,y}$	Project emissions for project scenario p in year y (tCO_2e/yr)
$LE_{p,y}$	Leakage for project scenario p in year y (tCO_2e/yr)

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

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

Where:

$BE_{b,y}$	Emissions for baseline scenario b during the year y in tCO2e
$B_{b,y}$	Quantity of fuel consumed in baseline scenario b during year y, in tons, as per by-default factors (cases with project performance field test only)
$f_{NRB,\ y}$	Fraction of biomass used during year y for the considered scenario that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)
$NCV_{b,fuel}$	Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)
$EF_{b,fuel,CO2}$	CO2 emission factor of the fuel that is substituted or reduced. 112 tCO2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel
$EF_{b,fuel,nonCO2}$	Non-CO_2 emission factor of the fuel that is substituted or reduced

EF can include a combination of emission factors from fuel production, transport, and use. CO_2 and non-CO_2 emissions factors for charcoal may be estimated from project specific monitoring or alternatively by researching a conservative wood to charcoal production ratio (from IPCC, credible published literature, project-relevant measurement reports, or project-specific monitoring) and multiplying this value by the pertinent EF for wood.

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

Where:

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

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

Project emission calculations are conducted as follows:

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

Where:

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

$B_{p,y}$ Quantity of fuel consumed in project scenario p during year y, in tons, and as derived from the statistical analysis conducted on the data collected during the project performance field tests (cases when no baseline performance field test are performed, e.g. by-default baseline factors)

$f_{NRB,\ y}$ Fraction of biomass used during year y that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)

$NCV_{p,fuel}$ Net calorific value of the project fuel (IPCC default for wood fuel, 0.015 TJ/ton). This is equal to the baseline fuel NCV in projects which use the same fuel.

$EF_{p,fuel,CO2}$ CO_2 emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel, 112 tCO2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel

$EF_{p,fuel,nonCO2}$ Non-CO_2 emission factor of the project fuel. This is equal to the baseline fuel EF in projects which use the same fuel.

Whereas, ex-post the Emission Reductions can be calculated using the following equation:

1. When the baseline fuel and the project fuel are the same and the baseline emission factor and project emission are considered the same, the overall GHG reductions achieved by the project activity in year y are calculated as follows:

$$ERy = \Sigma_{b,p}\ (N_{p,y} * U_{p,y} * P_{p,b,y} * NCV_{b,\ fuel} * (f_{NRB,b,\ y} * EF_{fuel,\ CO2} + EF_{fuel,\ nonCO2})) - \Sigma\ LE_{p,y}$$

Where:

$\Sigma_{b,p}$ Sum over all relevant (baseline b/project p) couples

$N_{p,y}$ Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y

$U_{p,y}$ Cumulative usage rate for technologies in project scenario p in year y, based on cumulative adoption rate and drop off rate revealed by usage surveys (fraction)

$P_{p,b,y}$ Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day, as derived from the statistical analysis of the data collected from the field tests

$f_{NRB,b,\ y}$ Fraction of biomass used in year y for baseline scenario b that can be established as non-renewable biomass (drop this term from the equation when using a fossil fuel baseline scenario)

$NCV_{b,fuel}$ Net calorific value of the fuel that is substituted or reduced (IPCC default for wood fuel, 0.015 TJ/ton)

$EF_{b,fuel,CO2}$ CO_2 emission factor of the fuel that is substituted or reduced. 112 tCO_2/TJ for Wood/Wood Waste, or the IPCC default value of other relevant fuel

$EF_{b,fuel,nonCO2}$ Non-CO_2 emission factor of the fuel that is reduced

$LE_{p,y}$ Leakage for project scenario p in year y (tCO_2e/yr)

Leakage, if applicable, will be assessed on the following points:

e. The displaced baseline technologies are reused outside the project boundary in place of lower emitting technology or in a manner suggesting more usage than would have occurred in the absence of the project.
f. The NRB or fossil fuels saved under the project activity are used by non-project users who previously used lower emitting energy sources.
g. The project significantly impacts the NRB fraction within an area where other CDM or VER project activities account for NRB fraction in their baseline scenario.
h. The project population compensates for loss of the space heating effect of inefficient technology by adopting some other form of heating or by retaining some use of inefficient technology.

By virtue of promotion and marketing of a new technology with high efficiency, the project stimulates substitution within households who commonly used a technology with relatively lower emissions, in cases where such a trend is not eligible as an evolving baseline.

Emission reduction calculation:

Smart Stoves:

Parameter Symbol	**Definition**	**Value**	**Units**	**Source**
$f_{NRB,b,i,y}$	Non-renewability status of woody biomass fuel type *i* that can be established as non-renewable during year y	0.8726	Fraction	The data derives from historical data obtained from the Forest Survey of India, State of Forests Report 2011 for Karnataka.
$NCV_{b,wood}$	Net calorific value of the fuel that is substituted or reduced	0.0156	TJ/tonne	IPCC default value
$EF_{p,i,CO2}$	CO_2 emission factor of the fuel that is substituted or reduced	112	tCO2/TJ	Default
$EF_{p,i,non-CO2}$	Non-CO_2 emission factor of the fuel that is reduced	33.95	tCO_2/TJ	Default

$P_{p,b,y}$	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day	0.005	tonnes /HH/day	Based on KPT results
Up,y	Cumulative usage rate for technologies in project scenario p in year y	0.90	Fraction	Survey results
N	Total number of stoves disseminated	1	-	Estimated
$N_{p,y}$	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y	365	-	Estimated
Leakage emissions	Leakage for project scenario p in year y (tCO2e/yr)	0	-	Estimated
ER	Emission reductions	3.667	tCO_2	Calculated

Jumbo stoves:

Parameter Symbol	Definition	Value	Units	Source
$f_{NRB,b,i,y}$	Non-renewability status of woody biomass fuel type *i* that can be established as non-renewable during year y	0.8726	Fraction	The data derives from historical data obtained from the Forest Survey of India, State of Forests Report 2011 for Karnataka.
$NCV_{b,wood}$	Net calorific value of the fuel that is substituted or reduced	0.0156	TJ/tonne	IPCC default value
$EF_{p,i,CO2}$	CO_2 emission factor of the fuel that is substituted or reduced	112	tCO2/TJ	Default
$EF_{p,i,non\text{-}CO2}$	Non-CO_2 emission factor of the fuel that is reduced	33.95	tCO_2/TJ	Default

$P_{p,b,y}$	Specific fuel savings for an individual technology of project p against an individual technology of baseline b in year y, in tons/day	0.006	tonnes /HH/day	Based on KPT results
Up,y	Cumulative usage rate for technologies in project scenario p in year y	0.90	Fraction	Survey results
N	Total number of stoves disseminated	1	-	Estimated
$N_{p,y}$	Cumulative number of project technology-days included in the project database for project scenario p against baseline scenario b in year y	365	-	Estimated
Leakage emissions	Leakage for project scenario p in year y (tCO2e/yr)	0	-	Estimated
ER	Emission reductions	4.131	tCO_2	Calculated

Total Emission reductions for third year projections from Improved cookstove = $(3.667 \times 20{,}000)_{smart} + (4.131 \times 7{,}000)_{jumbo} = 102{,}275\ tCO_2$

SDG 13: Climate Action (Solar Lighting Systems)

As explained above, the emissions reductions for solar projects under AMS-I.A. are determined to be the same as the baseline emissions. Therefore, the equations for calculating the emissions reductions are:

The per-lamp baseline emissions are calculated in Baseline Step 3. To calculate total emission reductions, these must be aggregated across all lamps in use in the period under consideration. This is done using the following equations, as per methodology approved for use in d.Light PDD,GS448:

Total baseline emissions for period *v* are calculated as the sum of the baseline emissions of each lamp type *i* in the period:

(Eq. 2)

$$\sum_{i=1}^{n} BE_{i,v}$$

$BE_v =$

Parameter	Unit	Type	Value
BE_v	tCO2	Calculated	Emissions generated in the absence of the projectactivity in period *v* by all lamps
$BE_{i,v}$	tCO2	Calculated	Emissions generated in the absence of the projectactivity in period *v* by all lamps of type *i*

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

(Eq. 3)

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

Parameter	Unit	Type	Value
$BE_{i,v}$	tCO2	Calculated	Emissions generated in the absence of the projectactivity in period *v* by all lamps of type *i*
$N_{i,a}$	-	Monitored	The total number of solar lamps of type *i* deployedin period *a*
$d_{i,a,v}$	Days	Monitored/ calculated	Average number of days lamps of type *i* that havebeen 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 number of hours solar lamps are usedper day
LE_{ker}	Lumen/W	Fixed	The specific light output of kerosene when burnt in a kerosene lantern
EF_{ker}	tCO2/GJ	Fixed	The specific CO2-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 foundto be operational according to the sampling in period *v*. The statistical error is included in thisparameter (confidence level 90%).

Where:

$CF_{i,v,LFR} = 1 - (LFR_{i,v}$

$$+ Z * \sqrt{\frac{LFR_{i,v} * (1 - LFR_{i,v})}{n_{i,v,total}}})$$

(Eq. 4)

TEMPLATE

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.

Parameter Symbol	Definition	Value	Unit	Source
$N_{i,a}$	The total number of solar lamps of type *i* deployed in period *a*	1	Number	To be monitored
$d_{i,a,v}$	Average number of days lamps of type *i* that have been deployed in period *a* were operating in period *v*	365	Days	Assumption for ex-ante emission reduction calculation
L_i	Nominal lumen output of solar lamps of the type *I* deployed as part of the project activity	140.538	Lumen	The PoA-DD prescribes a cap of 140.538 Lumens for individual household with solar lighting systems implemented under the PoA in 2021 and hence a Lumen value of 140.538 is applied. For all solar lighting systems, the Lumen value will be capped at 140.538 for individual

				households.
h	Average operating hours of kerosene lamps in the baseline	3.5	hrs/day	Methodology default
LE_{ker}	The specific light output of kerosene when burnt in a kerosene lantern	0.13	Lumen/ Watt	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
EF_{ker}	The specific CO_2 emission factor of kerosene	0.0719	tCO_2/GJ	2006 IPCC guidelines for National Greenhouse Gas inventories
$CF_{i,v,LFR}$	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	100%		Estimate

	included in this parameter (confidence level 90%).			
Emission Reduction per solar lighting system	Emissions reductions generated by 1 solar lightingsystem	**0.3575**		Calculated

Leakage: No leakage emissions from solar lighting systems

Total (projected) emission reductions for solar lighting for all 2,000,000 installations projected for Year 3= = 714,945 tCO_2e

B.6.4 Summary of ex ante estimates of each SDG outcome

For Improved Cookstoves

SDG 1: No Poverty

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	27,000	27,000
Year 2	0	27,000	27,000
Year 3	0	27,000	27,000
Year 4	0	27,000	27,000
Year 5	0	27,000	27,000
Total	**0**	**27,000**	**27,000**
Total number of crediting years -5			
Annual average over the crediting period	0	27,000	27,000

SDG 3: Good Health and well being

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	100%	100%
Year 2	0	100%	100%
Year 3	0	100%	100%
Year 4	0	100%	100%
Year 5	0	100%	100%
Total	**0**	**100%**	**100%**
Total number of -5 crediting years			
Annual average over the crediting period	0	100%	100%

SDG 5: Gender Equality

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	100%	100%
Year 2	0	100%	100%
Year 3	0	100%	100%
Year 4	0	100%	100%
Year 5	0	100%	100%
Total	**0**	**100%**	**100%**
Total number of -5 crediting years			
Annual average over the crediting period	0	100%	100%

SDG 7: Affordable and Clean Energy

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	27,000	27,000
Year 2	0	27,000	27,000
Year 3	0	27,000	27,000
Year 4	0	27,000	27,000
Year 5	0	27,000	27,000
Total	**0**	**27,000**	**27,000**
Total number of -5 crediting years			
Annual average over the crediting period	0	27,000	27,000

SDG 8: Decent Work and Economic Growth

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	10	10
Year 2	0	10	10
Year 3	0	10	10
Year 4	0	10	10
Year 5	0	10	10
Total	**0**	**10**	**10**
Total number of -5 crediting years			

Annual average over the crediting period	0	10	10

SDG 13: Climate Action

Year	Baseline estimate	Project estimate	Net benefit
Year 1	102,275	0	102,275
Year 2	102,275		102,275
Year 3	102,275		102,275
Year 4	102,275		102,275
Year 5	102,275		102,275
Total	**511,375**		**511,375**
Total number of -5 crediting years			
Annual average over the crediting period	102,275	0	102,275

*** Actual Emission Reductions achieved under CDM**

For Solar Lighting Systems

SDG 1: No Poverty

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	1,000,000	1,000,000
Year 2	0	1,500,000	1,500,000
Year 3	0	2,000,000	2,000,000
Year 4	0	2,500,000	2,500,000

Year 5	0	3,000,000	3,000,000
Total	**0**	**3,000,000**	**3,000,000**
Total number of crediting years -5			
Annual average over the crediting period	0	2,000,000	2,000,000

*These are sales estimates used in CPA-DD. However, as per current data there have been no SLS sales in these years.

SDG 3: Good Health and well being

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	100%	100%
Year 2	0	100%	100%
Year 3	0	100%	100%
Year 4	0	100%	100%
Year 5	0	100%	100%
Total	0	**100%**	**100%**
Total number of -5 crediting years			
Annual average over the crediting period	**0**	**100%**	**100%**

SDG 7: Affordable and Clean Energy

Year	Baseline estimate	Project estimate	Net benefit

Year 1	0	1,000,000	1,000,000
Year 2	0	1,500,000	1,500,000
Year 3	0	2,000,000	2,000,000
Year 4	0	2,500,000	2,500,000
Year 5	0	3,000,000	3,000,000
Total	**0**	**3,000,000**	**3,000,000**
Total number of -5 crediting years			
Annual average over the crediting period	0	2,000,000	2,000,000

*These are sales estimates used in CPA-DD. However, as per current data there have been no SLS sales in these years.

SDG 8: Decent Work and Economic Growth

Year	Baseline estimate	Project estimate	Net benefit
Year 1	0	10	10
Year 2	0	10	10
Year 3	0	10	10
Year 4	0	10	10
Year 5	0	10	10
Total	**0**	**10**	**10**
Total number of -5 crediting years			
Annual average over the crediting period	0	10	10

SDG 13: Climate Action

Year	Baseline estimate	Project estimate	Net benefit
Year 1	357,473	0	357,473
Year 2	536,209	0	536,209
Year 3	714,945	0	714,945
Year 4	893,681	0	893,681
Year 5	1,072,418	0	1,072,418
Total	**3,574,726**	**0**	**3,574,726**
Total number of -5 crediting years			
Annual average over the crediting period	714,945	0	714,945

***** Actual Emission Reductions achieved under CDM registration. Since no SLS were installed during that period, hence emission reductions are zero.

B.7. Monitoring plan

B.7.1 Data and parameters to be monitored

SDG 13 (For Solar Lighting Systems)

Data / Parameter	Ln
Unit	Lumens
Description	Lumen output of each solar lamp *n* deployed as part of project activity
Source of data	Table 4, 2021 value
Value(s) applied	140.54

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 is geocoded (GPS coordinate or other specific location data) or provided with address/location of household in the MEC Tracker System. Associated data will reside in the MEC Tracker Database, allowing each installation to be monitored on a regular basis.
Purpose of data	To calculate baseline emissions
Additional comment	If lamp types allow for different settings of light intensity, the conservative value shall be chosen unless an accurate average value is substantiated through a representative sample survey (90% confidence interval +/- 10% error). A variety of solar lighting systems will be offered under the proposed VPA. The lumen output for the models sold under the proposed VPA will be used for calculating the final emission reduction. 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 will be capped at 140.54 Lumen for individual households (based on Table 4 for the year 2021).

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/CPA implementer and recorded in Credit Tracker
Value(s) applied	1,000,000 for Year-1

Measurement methods and procedures	Target population: all solar lamps of type i that have been deployed Objective: Establish the number of solar lamps of type i deployed during period a as part of the proposed SSC-CPA. Description and Reliability Requirements: Primary data collection. No sampling is applied to this parameter. All deployed solar lamps of type i will be recorded. $N_{i,a}$ is adjusted according to actual operational days during a given monitoring period y. The sales date for each solar lamp of type i listed in Credit Tracker for proposed SSC-CPA signifies the start of operation for each solar lamp. The operational days of each solar lamp is divided by the total number of days of the current monitoring period to determine the adjusted Ni,a number of solar lamps of type i in operation.
Monitoring frequency	Annual
QA/QC procedures	Each light installation will be geocoded (GPS coordinates or other specific location identifiers) in the MEC Tracker System. Associated data will reside 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	-

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	365

Measurement methods and procedures	Exact date of sale (in the case of solar lights) and installation (in the case of solar home 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. Target population: all solar lamps of type i that have been deployed Objective: Establish the number of days solar lamps of type i that have been deployed in period a were operating in period v. Description and Reliability Requirements: Primary data collection No sampling is applied to this parameter.
Monitoring frequency	Annual
QA/QC procedures	Results will be checked by contracted verifier
Purpose of data	Calculation of baseline emissions
Additional comment	The date in MEC tracker system can be crosschecked with the MIS system of the PO. Contracted verifier will check results.

Data / Parameter	H
Unit	Hours/day
Description	Average operating hours of kerosene lamps in the baseline
Source of data	Based on field survey results in baseline population.
Value(s) applied	3.5 (default value)
Measurement methods and procedures	AMS I.A version 14 par.8(c) states: For the specific case of lighting devices a daily usage of 3.5 hours shall be assumed, unless it is demonstrated that the actual

	usage hours adjusted for seasonal variation of lighting is different based on representative sample survey (90% confidence interval +/-10% error) done for minimum of 90 days. In practice, usage of more than 3.5 hours/day is expected. A representative sample survey (90% confidence interval +/- 10% error) within the baseline population may be conducted. The results of the survey shall be checked during the following periodic verification by the contracted verifier and shall afterwards permanently replace the default value used for the relevant CPA.
Monitoring frequency	Annual
QA/QC procedures	Results will be checked by contracted verifier
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 gi,v operational in period *v*
Source of data	Monitoring partner, Credit Tracker
Value(s) applied	0% (Ex-ante estimate). The real LFR shall be determined during annual monitoring
Measurement methods and procedures	CME/PO/Monitoring partner will track usage status of all lamps (or solar home systems) from each quarterly of the year with results recorded in Credit Tracker. Any lamps that are non-operational (due to failure or disuse by owner) will be recorded as "failed" lamps.

	Lamp failure rate will be calculated as: LFR = (Number of failed lamps/Total number of lamps monitored)
Monitoring frequency	Annual
QA/QC procedures	The lamp failure rate will also be checked by the verifier. The LFR measure in use based on regular monitoring for the full portfolio of lamps will be down-rated as appropriate according to the verifier rating.
Purpose of data	Calculation of baseline emissions
Additional comment	-

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 operational according to the sampling in period v. The statistical error is included in the 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	100%
Measurement methods and procedures	The value is calculated using the recorded value for $LFR_{i,v}$ – $$CF_{i,v,LFR} = 1 - (LFR_{i,v} + z * \sqrt{\frac{LFRi,v * (1 - LFRi,v)}{ni,v,total}})$$
Monitoring frequency	Annual
QA/QC procedures	This value is calculated based on the results of other monitored parameters. Calculation results will be checked by the CME to confirm accuracy.
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	30
Measurement methods and procedures	CME/PO/Monitoring partner will randomly and representatively track households contacted and reached for monitoring lamp usage status for each lamp type i in the monitoring period, p. This data will be recorded in Credit Tracker. Survey methods will be used.
Monitoring frequency	Annual
QA/QC procedures	Results will be checked by contracted verifier.
Purpose of data	Calculation of baseline emissions
Additional comment	As per the sampling procedure, a minimum of 30 samples is required to be checked for obtaining a valid result as this is a proportion based parameter. However, for some state/model combinations this could be lower as the total sales could be less than 30.

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% For all sales made under this proposed SSC-CPA will provide data on the number of end users who confirmed using kerosene in the absence of the project activity.

Measurement methods and procedures	Target population: all end users who purchased a solar lamp under a CPA included in this PoA Objective: Confirm whether or not the end user used kerosene for lighting prior to the project activity Description and Reliability Requirements: Primary data collection No sampling is applied to this parameter. All end users who purchased a solar lamp will be tracked.
Monitoring frequency	Annual
QA/QC procedures	Each light installation will be geocoded (GPS coordinates or other specific location identifiers) in the MEC Tracker System. Associated data will reside in the MEC Tracker Database, allowing each installation to be monitored on a regular basis.
Purpose of data	Calculation of baseline emissions
Additional comment	Kerosene Usage in the Baseline

SDG 13 (For Improved Cookstoves)

Data / Parameter	$P_{p,y}$
Unit	kg/household-day
Description	Quantity of fuel that is consumed in project scenario p during year y
Source of data	Total sales record, Project FT, project FT updates, and any applicable adjustment factors
Value(s) applied	2.89
Measurement methods and procedures	Project KPTs
Monitoring frequency	Updated every two years
QA/QC procedures	The equipment used for testing, if any either will be externally calibrated or newly purchased at the time of

	use so measurements are done with the necessary guarantees.
Purpose of data	For Baseline emission calculations
Additional comment	A single project fuel consumption parameter is weighted to be representative of baseline technologies being compared for project crediting. KPT protocol shall be used for PFT (for e.g.: PCIA KPT protocol may be used)

Data / Parameter	$U_{p,y}$
Unit	Fraction (or %)
Description	Usage rate in project scenario p during year y
Source of data	Annual usage survey (KS)
Value(s) applied	0.90
Measurement methods and procedures	Sampling surveys (telephonic / physical) may be conducted to record the continued operation of project devices. The usage rate shall be calculated for each age (simple random sampling to be applied as applicable)
Monitoring frequency	Annual
QA/QC procedures	CME will provide guidance and training to enumerators for conducting surveys to meet specific requirement of the methodology, if any. The value obtained will be tested to determine if the desired precision was met. For ex-post assessment, the "Cookstove Usage Rate Guidelines" will be followed and CME will ensure that the value applied for this parameter is in line with the guidance provided for the Level applied.
Purpose of data	For Baseline emission calculations
Additional comment	A single usage parameter is weighted to be representative of the quantity of project technologies of each age being credited in a given project scenario.

Data / Parameter	Policy for encouraging discontinuation of improved stove
Unit	--
Description	Measures adopted to encourage use of project technology / discontinue baseline technology
Source of data	Internal records
Value(s) applied	-
Measurement methods and procedures	The end user training events shall be monitored to demonstrate that the users have been informed about use of project stoves and phase out of baseline stove.
Monitoring frequency	Updated every two years
QA/QC procedures	Transparent data analysis and reporting.
Purpose of data	For Baseline emission calculations
Additional comment	-

Data / Parameter	$N_{p,y}$
Unit	Project technologies credited (Number)
Description	Technologies in the project Database for project scenario p through year y
Source of data	Total sales record
Value(s) applied	27,000 for Year-1
Measurement methods and procedures	Number of stoves listed in the Monitoring Database
Monitoring frequency	Continuous
QA/QC procedures	Values can be cross checked by sales records.
Purpose of data	For Baseline emission calculations
Additional comment	For sampling and monitoring purposes, the end user database which shall be a subset of the number of installations reported in the QPR shall be used.

Data / Parameter	$LE_{p,y}$
Unit	tCO_2e per year

Description	Leakage in project scenario p during year y
Source of data	Baseline and monitoring surveys for Leakage assessment
Value(s) applied	0
Measurement methods and procedures	Qualitative / quantitative assessment
Monitoring frequency	Every two years
QA/QC procedures	N.A.
Purpose of data	For leakage emissions
Additional comment	Aggregate leakage can be assessed for multiple project scenarios, if appropriate.

SDG 1

Data / Parameter	BSA / HHS
Unit	Number
Description	Access to basic service to households/institutions
Source of data	1. ICS/SLS distribution records Ex-post Monitoring Survey Records
Value(s) applied	27,000 ICS in use in 1st year 1,000,000 SLS in use in 1st year
Measurement methods and procedures	Monitoring and recording of number of ICS/SLS distributed under the project
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 1 contribution
Additional comment	-

SDG 3

Data / Parameter	SPM_{HH}
Unit	-
Description	Air Quality in project households/institutions
Source of data	Ex-post monitoring survey records

Value(s) applied	(No sampled user reported an increase in incidence of coughing, incidence of respiratory illness, and incidence of itchy eyes after shifting to ICS)
Measurement methods and procedures	% HH reporting reduction in smoke while cooking on improved stove
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 3 contribution
Additional comment	-

SDG 5

Data / Parameter	HHTS
Unit	hours
Description	Time savings due to reduced fuel collection needs after shifting to project ICS
Source of data	Ex-post Monitoring Survey Records
Value(s) applied	Currently data not available. Shall be updated based on monitoring surveys
Measurement methods and procedures	Monitor the time savings reported by project households on a sampling basis due to reduced fuel collection need (relative to baseline stoves).
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	SDG 5 contribution
Additional comment	-

SDG 7

Data / Parameter	$AACS_{HH}$
Unit	Number
Description	Number of CEPs distributed
Source of data	ICS/SLS distribution records

Value(s) applied	27,000 ICS in use in 1st year 1,000,000 SLS in use in 1st year
Measurement methods and procedures	Monitor the number of ICS/SLS distributed under the project as an indicator of providing reliable, clean and modern technology (relative to baseline stoves).
Monitoring frequency	Continuous
QA/QC procedures	-
Purpose of data	SDG 7 contribution
Additional comment	-

SDG 8

Data / Parameter	QE IG
Unit	Number
Description	Quantitative Employment and income generation
Source of data	Employment records
Value(s) applied	20
Measurement methods and procedures	Recording the number of employees (male / female) in the project under administrative, sales, production and management positions
Monitoring frequency	Annually
QA/QC procedures	-
Purpose of data	SDG 8 contribution
Additional comment	-

SDG 12

Data / Parameter	$B_{y,savings}$
Unit	Tonnes/HH/year
Description	Reduction in domestic fuel consumption after shifting to ICS
Source of data	Calculation of fuel savings for SDG 13
Value(s) applied	

Measurement methods and procedures	EX-post KPTs or WBTs to determine fuel savings or default
Monitoring frequency	Annually / biennially
QA/QC procedures	-
Purpose of data	SDG 12 contribution
Additional comment	-

B.7.2 Sampling plan

>>
A statistically valid sample can be used to determine parameter values, as per the relevant requirements for sampling in the "Methodology for Sampling and surveys for CDM project activities and programme of activities." Minimum 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In any case, for proportion parameter values, a minimum sample size of 30, or the whole group size if this is lower than 30, must always be applied.

The sampling plan for ICS will be as per Annex 4 of TPDDTEC methodology (v3.1) i.e. 90% confidence rule (Lower bound of the one-sided 90% confidence interval). This option allows to obtain a result even if 90/30 precision is not achieved, although in a similar manner to the 90/30 rule, a minimum sample size of 30 is recommended. This approach is used when the 90/30 rule forces a sample size which is difficult to implement in practice. This estimate is very conservative, and it will probably be worthwhile to augment the sample size instead in cases when augmentation is practically possible.

Sampling Methodology
India has a homogenous distribution of its population over the country with majority belonging to lower middle class. Due to the homogeneity feature of this program, simple random sampling method will be applied through all CPAs. A simple random sample is a subset of a population (e.g. villages, individuals, buildings, pieces of equipment) chosen randomly, such that each element (or unit) of the population has the same probability of being selected. The sample-based estimate (mean or proportion) is an unbiased estimate of the population parameter. Simple random sampling is conceptually straightforward and easy to implement – provided that a sampling frame of all elements of the population exists. Its simplicity makes it relatively easy to analyse the collected data. It is also appropriate when only minimum information of the population is known in advance of the data collection. The costs of data collection under

simple random sampling could be higher than other sampling approaches when the population is large and geographically dispersed.

Sampling Size
Sample size shall be determined using the following formula:

$$\mathbf{n} \geq \frac{\mathbf{1.962}N \times p(1-p)}{(N-1) \times \mathbf{0.12} \times p\mathbf{2} + \mathbf{1.962}p(1-p)}$$

Sampling frame
Sample sizes will be sufficient to ensure that the precision of the sample means/proportions are in accordance to the Sampling Frame established for the VPA within the PoA to estimate emissions reductions. In cases where survey results indicate that the desired precision is not achieved, the lower bound value of corresponding confidence interval of the parameter value may be used as an alternative to repeat the survey. Alternatively, the survey may be expanded to reach the required confidence/precision. To ensure a simple random sample selection, random number generators shall be applied. Each ICS/SLS in the target population is uniquely identifiable by its Serial ID number. Each CEP can thus be allocated a Sample Selection Number in each monitoring period, starting at 1 and increasing up to the total number of CEPs in the Database for that pre-defined simple random sampling frame. Applying the random number generators, the CEP can then be randomly chosen from the defined population up to the required sample size as calculated by the CME.

When a baseline and project survey is used the following sample size guidelines should be applied, unless otherwise stated:

Usage Survey

- The minimum total sample size for Usage Survey is 100 with at least 30 samples for project technologies of each age being credited. 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.

Group size	Minimum sample size
<300	30 or population size, whichever is smaller

300 to 1000	10% of group size
>1000	100

- In line with the applied methodology, any sampling methods can be used, provided that the sample is selected randomly. If sampling approach other than simple random sampling is applied, 'Guidelines for sampling and survey for CDM project activities and program of activities'[21] must be followed.

When applicable the Usage Survey and the Project Survey will be implemented together using the same sample.

B.7.3 Other elements of monitoring plan

>>

The monitoring activity provides a framework for project preparation and monitoring processes that will be 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 would be implemented, reported, consolidated and managed by the CME or a qualified expert partner to meet verification requirements. Monitored data will be stored in a suite of monitoring databases. These will be updated each monitoring period:

Summary:

1. Each PO keeps a record of all the CEPs it installs in the MEC Credit Tracker Platform. The record includes the name, date of installation, model of CEP and location of the product. All records are screened by the CME and cross-checked with the PO records to confirm the installation record is authentic and no double counting occurs.

2. The values of the two emission reduction parameters required for ex-post ER

[21] https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20151023152925068/Meth_GC48_%28ver04.0%29.pdf (site visited 03/06/2020)

calculation (efficiency of CEPs (ηnew), number of CEPs still operating ($U_{p,y}$) are found from sampling of CEPinstallations

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 will coordinate all ex-post monitoring activities in the PoA. The CME isultimately responsible for implementing the monitoring plan, ensuring the quality of data obtained and the use of this data for emissions reduction calculations. The CME will provide the DOE with asingle monitoring report for verification purposes for all CPA's requesting issuance together.

However, the actual field measurements to be conducted during monitoring (e.g. testing of ICS selected during sampling) will most likely be performed by third parties contracted to the CME and/or PO. In the case of using contractors, however, the CME will still be responsible for settingthe procedures and providing oversight and training to the contractors. The choice between conducting the actual monitoring activities itself

or employing another organization (for example, local marketing firm, university etc) will depend on location, operational factors and financial factors. In any case, a local partner will be important for providing local insight in questionnaire design, interview technique and for gaining physical access to project beneficiaries to obtain accurate results during monitoring.

Parameter values shall be estimated by sampling in accordance with the requirements in the applied methodology separately and independently for each of the VPAs included in a PoA exceptwhen a single sampling plan covering a group of VPAs is undertaken, in which case 95/10 confidence/precision is applied for the sample size calculation. A single sample plan will combine together the populations of all VPAs, and the sample size is determined and a single survey is undertaken to collect data e.g. if the parameter of interest is daily self-reported fuel consumption, itmay be feasible to undertake a single sampling and survey effort spread across geographic regions of several VPAs when either homogeneity of included VPAs relative to the fuel usage can be demonstrated or the differences among the included VPAs is taken into account in the sample size calculation, such as proportional and weighted averages. If a sampling plan is developed for each VPA, and where there is no specific guidance in the applicable methodology, project proponents shall use 90/10 confidence/precision as the criteria for reliability of sampling efforts for small-scale project activities (according to CDM-EB 69 Annex 4).

Sampling Objective – The sampling objective for each parameter is to determine via survey withstatistically significant value for the emission reduction calculations.

Desired precision / expected variance and sample size –

To monitor the required parameters, data will be collected from a statistically valid sample in the database as per this sampling plan during the monitoring period. The monitoring frequency for each parameter will be followed as per the methodology applied. After that, the relevant data will be archived in the electronic database tool and be used to determine sample size for each parameter. As per the methodology the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities" shall be followed. A 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. As per “Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities”, version 04, the following Sampling plan has been developed.

The data from the survey will be analyzed to calculate the value of the parameters. Data will be used for the preparation of monitoring reports for each VPA. The results of all monitoring will be included in the CME's management database. Where it is found that an installed ICS/SLS is no longer in use, the installation will be removed from inclusion in the VPA.

During sampling there may be non-response from the target population. Over-sampling by 20% may be 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 will be conducted at least annually at the end of the calendar year. The overall monitoring and the implementation of the sampling will be coordinated by the CME and the management staff. They will ensure successful monitoring of the emission reductions of the proposed project during its crediting period. Furthermore, the survey of the representative sample for the parameters will be carried out by the distributor together with the CME. The survey method that will be used by CME include: (a) Hard-copy questionnaires (b) Face to face interview (c) Telephone Interview.

All efforts of sampling will be conducted by qualified personnel who have undergone training as part of the programme. All the persons who carry out sampling plan will be required to speak the native language(s) allowing for a full understanding of any responses given by users and any questions therein. The date of all monitoring shall be recorded in the CPA database.

Primary data will be stored by the implementing entities/operators:

The MEC Credit Tracker Platform is used to keep detailed records of all installations under each VPA. Each installation is monitored annually to check usage status. The Project shall monitor a representative sample of households that have received both stoves and water technologies. All monitoring records are maintained in the Credit Tracker Platform.

1. The PO maintains in the Credit Tracker Platform a record of all clean energy products that are installed

2. The PO identifies the exact location of the CEP using GPS location and/or address

of thehousehold or organization.

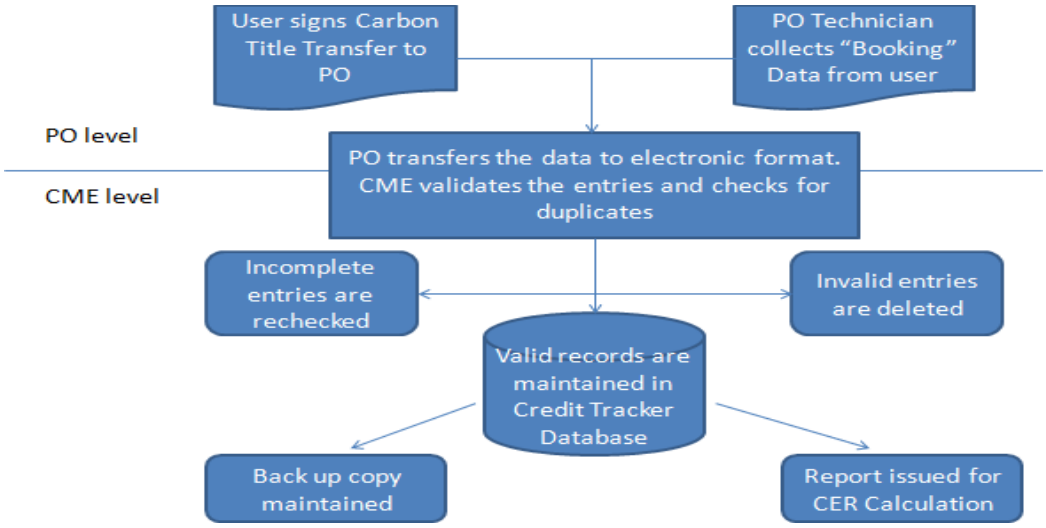
3. The emissions parameters required for ex-post management are also maintained in the CreditTracker Platform. These include the number of solar lighting systems still in operation, and then performance of the solar lighting systems. These parameters are determined through a samplingstudy as described above.

4. The CME uses the Credit Tracker Platform to cross-check the new records with the existing Platform in order to confirm that the installation record is authentic and that no double-countingoccurs.

5. The electronic files holding installation records are backed up on the Internet, reducing risk ofany loss of data.

6. All monitored data required for verification and issuance will be kept for two years after the endof the crediting period or the last issuance of CERs/VERs for the PoA, whichever occurs later. The unique system ID number which is linked to a GPS location and/or verified address eliminates anyrisk of double-counting between VPAs.

ORGANIZATIONAL DIAGRAM OF MONITORING PLAN



Quality Assurance/Quality control

As the PoA is intended to include multiple regions within India with a high level of cultural diversity as well as different end user groups, there is no "one size fits all" approach for dealing with these issues. However, in order to avoid many of these problems the CME will undertake the following strategies, tailoring the specific approach to the local circumstances:

1) Ensuring end user awareness. At the time of sale, the CEP customer is made aware that they are required to participate in monitoring activities. This will be via training sales personnel to explain the importance of monitoring to each customer, and during regularly scheduled microfinance group meetings for end-users.

2) Questionnaire design. The design of the questionnaire will ensure that the questions are non-intrusive and easy to understand for both the interviewee and interviewer.

3) Drawing on local knowledge. The local contractors to be hired by the CME in each region will play an important role in tailoring the approach to suit local circumstances. For example, in some instances, it may be essential for a local person to conduct the interview in order to obtain accurate results.

4) Quality of contractors. Any third parties hired by the CME to carry out sampling will be required to demonstrate a high level of cultural awareness, local language skills and appropriate experience with data entry and data management. The CME will ensure that contractors are adequately trained for the tasks they are contracted for (eg. carrying out of WBTs in line with a methodology supported by an appropriate international body such as PCIA). Training will also be provided on how to deal with non-responses, refusals and other problems should these occur.

SECTION C. DURATION AND CREDITING PERIOD

C.1. Duration of project

C.1.1 Start date of project

>>

05/09/2018 i.e. date of sale of first clean energy product (Improved cookstove)

C.1.2 Expected operational lifetime of project

>>

15 years 0 month

C.2. Crediting period of project

C.2.1 Start date of crediting period

>>

25/01/2019 i.e. the date of inclusion of the VPA as CPA-DD under CDM

C.2.2 Total length of crediting period

>>

15 years

SECTION D SUMMARY OF SAFEGUARDING PRINCIPLES AND GENDER SENSITIVE ASSESSMENT

D.1. Safeguarding Principles that will be monitored

A completed Safeguarding Principles Assessment is in Appendix 1.

D.2. Assessment that project complies with GS4GG Gender Sensitive requirements

Question 1 - Explain how the project reflects the key issues and requirements of Gender Sensitive design and implementation as outlined in the Gender Policy?	The local stakeholder consultation meeting will be carried out following a gender sensitive approach. The project will incorporate measures to ensure that there is no discrimination based on gender. The improved cookstoves will be distributed to all willing customers within the project boundary and the project will have a positive impact on women

	considering that they will spend less time on cooking or fuel procurement and will be able to cook in cleaner environment.
Question 2 - Explain how the project aligns with existing country policies, strategies and best practices	The project will contribute towards the goal of host country policy by providing women with efficient cookstoves, thereby they will spend less time on cooking or fuel procurement and will be able to cook in cleaner environment.
Question 3 - Is an Expert required for the Gender Safeguarding Principles & Requirements?	Not required. Improved cookstove projects not following Gender responsive approach do not require to contract an expert as per Gender Equality Requirements & Guidelines.
Question 4 - Is an Expert required to assist with Gender issues at the Stakeholder Consultation?	N/A

SECTION E. SUMMARY OF LOCAL STAKEHOLDER CONSULTATION

The below is a summary of the 2 step GS4GG Consultation for monitoring purposes. Please refer to the separate Stakeholder Consultation Report for a complete report on the initial consultation and stakeholder feedback round.

E.1 Summary of stakeholder mitigation measures

>> N/A

E.2 Final continuous input / grievance mechanism

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 the following address: Micro Energy Credits Corporation Private Limited, A203, business suites 9, S V road, Santacruz West, Mumbai 400054 By maintaining feedback book at the local office, it is ensured that stakeholders that don't have access to electronic media for expressing concerns / grievances are also able to share their concerns / feedback. Additionally, the end users always have an option to contact the partner organization (representative of MFI/ manufacturers etc.) in case of any feedback / complaints with the product post distribution.
GS Contact (mandatory)	help@goldstandard.org
Other	Email: contact@microenergycredits.com

APPENDIX 1 - SAFEGUARDING PRINCIPLES ASSESSMENT

Complete the Assessment below and copy all Mitigation Measures for each Principle into SECTION D above. Please refer to the instructions in the Guide to Completing this Form below.

Assessment Questions/ Requirements	Justification of Relevance (Yes/potentially/no)	How Project will achieve Requirements through design, management or risk mitigation.	Mitigation Measures added to the Monitoring Plan (if required)
Principle 1. Human Rights			
1. The Project Developer and the Project shall respect internationally proclaimed human rights and shall not be complicit in violence or human rights abuses of any kind as defined in the Universal Declaration of Human Rights	No	The VPA and CME both respect human rights and are not complicit in violence or human rights abuses.	Not required
2. The Project shall not discriminate with regards to participation and inclusion	No	The VPA does not discriminate with regards to participation and inclusion	Not required

Principle 2. Gender Equality			
3. The Project shall not directly or indirectly lead to/contribute to adverse impacts on gender equality and/or the situation of women a. Sexual harassment and/or any forms of violence against women – address the multiple risks of gender-based violence, including sexual exploitation or human trafficking.	No	Not relevant	Not required
b. Slavery, imprisonment, physical and mental drudgery, punishment or coercion of women and girls.	No	Not relevant	Not required
c. Restriction of women's rights or access to resources (natural or economic).	No	Not relevant	Not required
d. Recognise women's ownership rights regardless of marital status – adopt project measures where possible to support to women's access to inherit and own land, homes, and other assets or natural resources.	No	Not relevant	Not required
1. Projects shall apply the principles of non-discrimination, equal treatment, and equal pay for equal work	No	Not relevant	Not required

a. Where appropriate for the implementation of a VPA, paid, volunteer work or community contributions will be organised to provide the conditions for equitable participation of men and women in the identified tasks/activities.			
b. Introduce conditions that ensure the participation of women or men in Project activities and benefits based on pregnancy, maternity/paternity leave, or marital status.	No	Not relevant	Not required
c. Ensure that these conditions do not limit the access of women or men, as the case may be, to VPA participation and benefits.	No	Not relevant	Not required
4. The Project shall refer to the country's national gender strategy or equivalent national commitment to aid in assessing gender risks	No	The Project takes into account the National Policy for the Empowerment of Women (2011)[22] in the "advancement of gender equality and	Not required

[22] National Policy for the Empowerment of Women| National Portal of India- by Ministry of Women and Child Development

		empowerment of women". The Project is designed to empower women and improve livelihoods. No gender risks are envisaged in the PoA	
5. (where required) Summary of opinions and recommendations of an Expert Stakeholder(s)	No	Not relevant	Not required
Principle 3. Community Health, Safety and Working Conditions			
1. The Project shall avoid community exposure to increased health risks and shall not adversely affect the health of the workers and the community	Yes	The VPA reduces exposure to indoor air pollutants and smoke levels, further reducing incidence of respiratory illness compared to cooking on traditional biomass stoves using solid biomass fuel.	Not required
Principle 4.1 Sites of Cultural and Historical Heritage			
1. Does the Project Area include sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture?	No	Not relevant	Not required
Principle 4.2 Forced Eviction and Displacement			

1. Does the Project require or cause the physical or economic relocation of peoples (temporary or permanent, full or partial)?	No	Not relevant	Not required
Principle 4.3 Land Tenure and Other Rights			
1. Does the Project require any change, or have any uncertainties related to land tenure arrangements and/or access rights, usage rights or land ownership?	No	Not relevant	Not required
Principle 5. Corruption			
1. The Project shall not involve, be complicit in or inadvertently contribute to or reinforce corruption or corrupt Projects	No	The CME does not promote/ or is complicit in direct or indirect corruption.	Not required
Principle 6.1 Labour Rights			
1. The 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	No	The VPA does not involve any forced labour and the CME/VPA Implementer ensures that all employment is in compliance with local labour regulations and laws.	Not required

2. Workers shall be able to establish and join labour organisations	No	The CME puts no constraints / limitation on employees to form a union.	Not required
3. Working agreements with all individual workers shall be documented and implemented and include: a. Working hours (must not exceed 48 hours per week on a regular basis), AND b. Duties and tasks, AND c. Remuneration (must include provision for payment of overtime), AND d. Modalities on health insurance, AND e. Modalities on termination of the contract with provision for voluntary resignation by employee, AND f. Provision for annual leave of not less than 10 days per year, not including sick and casual leave.	No	The CME's policies and employment contracts are compliant with the requirement	Not required
4. No child labour is allowed (Exceptions for children working on their families' property requires an Expert Stakeholder opinion)	No	The CME does not promote / or is complicit in child labour	Not required
5. The Project Developer shall ensure the use of appropriate equipment, training of workers,	No	Not relevant	Not required

documentation and reporting of accidents and incidents, and emergency preparedness and response measures			
Principle 6.2 Negative Economic Consequences			
1. Does the project cause negative economic consequences during and after project implementation?	No	No negative economic consequences are deemed applicable	Not required
Principle 7.1 Emissions			
1. Will the Project increase greenhouse gas emissions over the Baseline Scenario?	No	The VPA reduces GHG emissions relative to baseline scenario	Not required
Principle 7.2 Energy Supply			
1. Will the Project use energy from a local grid or power supply (i.e., not connected to a national or regional grid) or fuel resource (such as wood, biomass) that provides for other local users?	No	The project will reduce fuel resource consumption instead	Not required
Principle 8.1 Impact on Natural Water Patterns/Flows			
1. Will the Project affect the natural or pre-existing pattern of watercourses, ground-water and/or the watershed(s) such as high seasonal flow variability,	No	Not applicable	Not required

flooding potential, lack of aquatic connectivity or water scarcity?			
Principle 8.2 Erosion and/or Water Body Instability			
1. Could the Project directly or indirectly cause additional erosion and/or water body instability or disrupt the natural pattern of erosion?	No	The VPA shall result in reduction in demand of biomass fuel in the region putting less pressure of forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.	Not required
Principle 9.1 Landscape Modification and Soil			
1. Does the Project involve the use of land and soil for production of crops or other products?	No	Not applicable	Not required
Principle 9.2 Vulnerability to Natural Disaster			
1. Will the Project be susceptible to or lead to increased vulnerability to wind, earthquakes, subsidence, landslides, erosion, flooding, drought or other extreme climatic conditions?	No	Not applicable	Not required
Principle 9.3 Genetic Resources			

1. Could the Project be negatively impacted by or involve genetically modified organisms or GMOs (e.g., contamination, collection and/or harvesting, commercial development, or take place in facilities or farms that include GMOs in their processes and production)?	No	Not applicable	Not required
Principle 9.4 Release of pollutants			
1. Could the Project potentially result in the release of pollutants to the environment?	No	Not applicable	Not required
Principle 9.5 Hazardous and Non-hazardous Waste			
1. Will the Project involve the manufacture, trade, release, and/ or use of hazardous and non-hazardous chemicals and/or materials?	No	Not applicable	Not required
Principle 9.6 Pesticides & Fertilisers			
1. Will the Project involve the application of pesticides and/or fertilisers?	No	Not applicable	Not required
Principle 9.7 Harvesting of Forests			
1. Will the Project involve the harvesting of forests?	No	The VPA does not involve harvesting of forests. The VPA shall result in reduction in	Not required

		demand of biomass fuel in the region putting less pressure of forests for deforestation and will hence indirectly avoid erosion associated with tree cutting/ felling.	
Principle 9.8 Food			
1. Does the Project modify the quantity or nutritional quality of food available such as through crop regime alteration or export or economic incentives?	No	Not applicable	Not required
Principle 9.9 Animal husbandry			
1. Will the Project involve animal husbandry?	No	Not applicable	Not required
Principle 9.10 High Conservation Value Areas and Critical Habitats			
1. Does the Project physically affect or alter largely intact or High Conservation Value (HCV) ecosystems, critical habitats, landscapes, key biodiversity areas or sites identified?	No	Not applicable	Not required
Principle 9.11 Endangered Species			

Are there any endangered species identified as potentially being present within the Project boundary (including those that may route through the area)? AND/OR Does the Project potentially impact other areas where endangered species may be present through transboundary affects?	No	Not applicable	Not required

APPENDIX 2- CONTACT INFORMATION OF VPA IMPLEMENTER

Organization name	Micro Energy Credits Corporation Private Limited
Registration number with relevant authority	
Street/P.O. Box	Main Varthur Road, Whitefield, India
Building	22A Waterwoods
City	Bangalore
State/Region	Karnataka
Postcode	
Country	India
Telephone	+91-8076844056 +91 9884273950
E-mail	sriskandh@microenergycredits.com
Website	www.microenergycredits.com
Contact person	Sriskandh Subramanian
Title	Mr
Salutation	Chief Sustainability Officer
Last name	Subramanian
Middle name	-
First name	Sriskandh
Department	-
Mobile	-
Direct tel.	+91-8076844056

Personal e-mail	sriskandh@microenergycredits.com

APPENDIX 3-SUMMARY OF APPROVED DESIGN CHANGES

NA

Revision History

Version	Date	Remarks
1.0	01/04/2021	Initial adoption