



Programme of activities design document form
(Version 09.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title of the PoA	Dissemination of Induction Cook Stoves in Nepal
Version number of the PoA-DD	0.0
Completion date of the PoA-DD	XX/XX/XXXX
Coordinating/managing entity	Value Network Ventures Advisory Services Pte. Ltd.
Host Parties	Nepal
Applied methodologies and standardized baselines	Proposed methodology "Consolidated methodology for Induction and electric cook stoves and cooking applications for thermal use by the user"
Sectoral scopes	Sectoral Scopes: Sectoral Scope 1 – Energy Industries (renewable- / non-renewable sources)

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

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The overall objective of the PoA is to disseminate Induction cookstoves (electric cooking appliances) in Nepal. The Induction cook stoves(electric cooking appliances) can be considered as Improved Cook Stoves (ICS) and are disseminated to the poor households who are earlier using traditional less efficient cook stoves, in Nepal where the grid connection/ availability is good and the existing grid comprises of more than 70% from renewable generation viz. Hydro Power plants. In addition, the PoA will also involve disseminating Induction cook stoves to household users/ institutions who are connected to mini grid (100 % renewable energy source like hydro/solar etc) and also individual household/ institution having individual renewable energy sources (viz. solar).

Each household utilizes grid electricity/ mini- grid/ individual renewable energy systems to run the Induction cook stoves/ electric cook stoves or electrical cooking appliances for cooking purpose and heating water. This leads to reduction of greenhouse gas emissions by displacing conventionally used non-renewable biomass with renewable or less GHG intensive energy or grid.

Nepal is a mountainous country challenged by its inherent topography and socio-economic conditions. It ranks 145 on the Human Development Index (HDI) and nearly one-fourth of its population live below poverty line. Besides the absolute economic poverty, people of Nepal also live poor when it comes to the use of modern energy services for household cooking purposes. Most of the household energy consumption is catered by the solid biomass which remains at the most rudimentary stage in the energy ladder. Firewood is the unanimous primary fuel in most of the rural Nepal irrespective of the geography or the social class to which the households belong to. Contribution of firewood in total energy consumption of Nepal in fiscal year 2015/16 stood at 71.2% (MoF, 2017). Moreover, Nepal's residential sector energy consumption is pre-dominated by solid biomass including firewood. Approximately 4.03 million households use solid biomass based cook stoves to sustain their cooking energy requirement and the big share of this solid biomass is consumed using traditional techniques; i.e. less efficient stoves.

All induction cook stoves dissemination will be implemented through an innovative concession programme that harnesses private sector finance, including international capital and expertise, to extend access to affordable energy services. In the concession financing model, the country is divided into 10 concessions, grouping a number of localities for which an international bidding process has been used to select the concessionaires.

Pre project Scenario:

Household survey was conducted to assess the baseline fuel and quantity used. As per the Survey, non-renewable biomass (firewood) was the main fuel used to suffice domestic needs. Usage of inefficient firewood leads to indoor pollution and land use patterns have been showing a decrease in forest land cover and increase in degraded land. Increasing pressure from human and livestock population and indiscriminate and illegal exploitation of forest resources are among factors that have lead to further intensification of the problem. A trend of forests turning into open scrubs has been observed. Degradation of forest lands has exacerbated the already existing problem of desertification. There is a need to maintain adequate forest cover in the state to mitigate climate change effects.

The PoA is a voluntary action undertaken by VNV Advisory Services Pte. Ltd.

Project activity will contribute towards sustainable development by replacing firewood with less GHG intensive grid electricity.

Health: The smoke from cooking with a three stone fire or charcoal stove exceeds the toxicity of smoking hundreds of cigarettes per day. Induction cook stoves provided under the PoA electricity without any flame.

Environment: The inefficient use of biomass for cooking creates a huge wood deficit in Nepal. In other words, the demand for biomass can not be met by sustainable sources. This results in deforestation. Deforestation has significant negative local and global impacts such as lack of fuelwood supply or erosion which are mitigated by the PoA.

Economics: Rural Nepal households spend hours every day searching for suitable firewood. Urban Nepal buy charcoal, a non-sustainable fuel with limited supply that increases in price regularly as demand increases. The PoA, by avoiding these constraints, enables households to spend their scarce resources for more productive activities.

A.2. Physical/geographical boundary of PoA

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The geographical boundary of the PoA will be Nepal. The PoA can include ICS in all 75 districts of Nepal.

Host Country - Federal Democratic Republic of Nepal



A.3. Technologies/measures

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The project will promote Induction or electric cook stoves and electric cooking appliances e.g. Electric Rice cooker etc. which is an improved stove design developed by reputed companies. An induction cooktop uses an electromagnetic field to heat up a pan while leaving the cooking surface cool to the touch and without heating up the kitchen.

A schematic of an induction cookstove can be seen in Figure 1. installed at a house. An Induction cook stove i.e. ICS provides efficient cooking while creating good heat in the combustion chamber to allow the complete combustion of the solid biomass.



Fig 1. Induction Cook stove and Electricity use meter

The efficiency of the Induction cook stoves varies from 56 % to 86% depending upon the type and brand.

Brand	Type	Model	Efficiency	Leakage Current
Philips	Induction	HD 4929/01	83.13%	0.023A
Bajaj	Induction	Bajaj Popular Smart	86.23%	0.042A
Baltra	Induction	BIC-106	85.55%	0.015A
CG	Induction	CG-IC15A01	83.62%	0.038A
Surya	Induction	A8	Display faulty and the cooktop is not working	
Braj Tech	Infrared	FH-T3	60.46%	0.092A
Frendz	Infrared	SF-670	56.46%	0.083A

Fig. 2. Efficiency of Induction cook stoves

A.4. Coordinating/managing entity

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The CME is the Value Network Ventures Advisory Services Pte. Ltd., also referred to as “VNV”.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Nepal (host Party)	Value Network Ventures Advisory Services Pte. Ltd.	No

A.6. Public funding of PoA

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No public funding is involved in this PoA

SECTION B. Management system

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(a) Roles and responsibilities of personnel involved in the process of inclusion of CPAs, and their competencies;

VNV is the Coordinating / Managing Entity (CME) for the PoA and is overall in charge for operational and management arrangements for the implementation of the PoA.

VNV or an entity assigned by VNV shall have the following responsibilities with respect to the implementation of the PoA:

- Creating PoA documentation (PoA-DD and CPA-DD forms)
- Drafting of specific CPA-DDs
- Check for compliance of CPAs with inclusion eligibility criteria
- Obtaining Letter of Authorization from host country
- Coordinating and communicating with the validating/verifying DoE and the EB
- Drafting monitoring reports for all CPAs in accordance with the methodology outlined in the PoA-DD
- Requesting the UNFCCC to issue CERs into a registry account of the CER buyer(s)

All these tasks are performed by a trained and qualified CDM Manager or assigned to a qualified third party.

The qualifications and competencies of the CDM Manager or third party are reviewed on a regular basis.

(b) Training and capacity development for personnel

The CME, the CPA implementing body or an entity assigned by the CME shall conduct training and capacity building exercises for its own personnel based on any identified needs to ensure that continuous improvements of the PoA management system are taking place.

(c) Technical review of inclusion of CPAs

The CPA-DD are drafted by the CDM manager or by an assigned third party. Before CPA-DDs are forwarded to the DOE they are checked internally by a third person for consistency and if the eligibility criteria for CPA inclusion as specified in the registered PoA-DD are fulfilled

(d) Avoidance of double counting

In each CPA-DD it will be stated that the CPA has not been and will not be registered either as a single CDM project activity or as a CPA under another PoA. By checking the data from the record keeping system for each CPA under the PoA it is ensured that no CPA which has been registered as a CDM Project Activity or included into another PoA can be included in this PoA.

To ensure this the record keeping system will cover the following information:

- Name and ID of the CPA
- Type of appliance (ICS type) deployed
- Name and contact details of the registered IE's for the CPA
- Start of CPA crediting period
- CERs issued per verification period

(e) Documentation control process for each CPA under the PoA

The CME will keep electronic files for each CPA under the PoA, which contains the following information per CPA4:

- Name and ID of the CPA
- Type of appliance (ICS type) deployed
- Name and contact details of the registered IE's for the CPA
- Unique customer ID of all customers belonging to the CPA
- Start of CPA crediting period
- CERs issued per verification period

This database will be updated as per the progress of the CPA.

(f) Continuous improvements of the PoA management system

The CME will organize meetings with staff to review the performance of the PoA management system on a semi-annual basis to identify issues that needs to be addressed in order to obtain

continuous improvements of the PoA management system. The minutes of the meeting will be kept on file for record.

(g) Other relevant elements

Awareness and agreement of those operating a CPA on PoA subscription Agreements with Implementing Entities will ensure that all parties involved in implementing the CPAs are aware and agree that the CPAs are subscribed to the PoA. At the user level, households are informed that their activity is being subscribed to the PoA and acknowledge that they cede all rights on the CERs to the CME. Thus users are informed that the ICS is given to them due to CDM revenues stemming from emission reductions from using the ICS.

SECTION C. Demonstration of additionality of PoA

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This PoA has singular kind of technology. As per paragraph 126 of PS for PoA (ver. 02), the CME indicated this PoA as a type III. And as per paragraph 13 of Methodological tool 19: Demonstration of additionality of microscale project activities (version 09.0), each units aim to achieve emission reductions at a scale of no more than 20 ktCO₂e per year and the geographical location of all CPAs under this PoA is the least developed countries, Nepal.

Therefore, this PoA is additional because it satisfies all conditions in tool 19. And each of the CPA satisfies the condition to qualify as a micro scale CDM unit, and then CME is not required to demonstrate additionality of PoA. As per paragraph 15 of tool 19, if each of the units contained in the CPA satisfies the condition to qualify as a 'microscale CDM unit', the CME is not required to demonstrate compliance of the CPA with the microscale thresholds at the aggregate level of the CPA.

Below diagram is the process of microscale additionality test for Type III project activities. And CME conclude that PoA is additional based on this process.

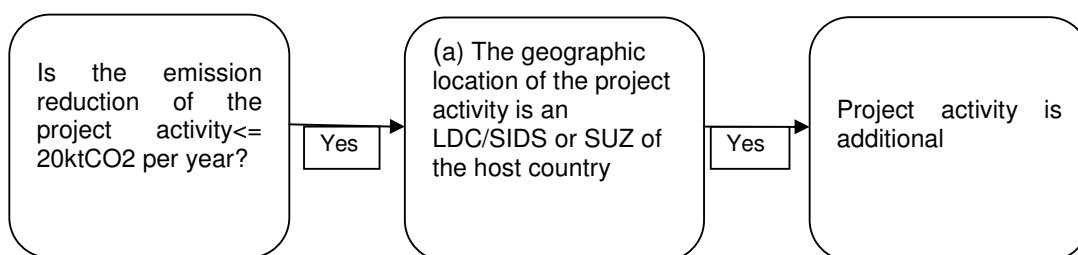


Figure 3: Microscale additionality test process for this PoA

Further, the Guideline says in paragraph 14, that “ For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term ‘project activities’ in paragraphs 4, and 11 to 13 above shall be read as ‘units’.” Criteria 11 in section K below, as well as the required evidence, ensures that this condition is met.

Paragraph 15 further notes that, “If each of the units contained in the CPA satisfies the condition to qualify as a ‘microscale CDM unit’, then the coordinating/managing entity is not required to demonstrate compliance of the CPA with the microscale or small-scale thresholds at the aggregate level of the CPA. In such cases, the requirements related to de-bundling stated in paragraph 6 above do not apply.”

Also, as per para 4 “A project activity with more than one component, where each component meets the microscale threshold, is eligible as microscale CDM project activity. The sum of the size of components of a project activity belonging to the same type (i.e. installed capacity for Type I, energy savings for Type II and emission reductions for Type III) shall not exceed the microscale thresholds for the respective type.” Given that this PoA is covered entirely by a Type III methodology, this condition is not necessary for this PoA.

Paragraph 16 of the Guidance notes that, “Microscale CDM project activities shall demonstrate that they are not a de-bundled component of a small-scale (SSC) CDM project activity by applying the criteria in the methodological tool “TOOL20: Assessment of de-bundling for SSC project activities”, for example by suitably considering microscale thresholds in the place of SSC thresholds (EB 62, para 48). In the case of bundled projects, microscale CDM project activity refers to individual projects within the bundle and requirement under paragraph 10 of the TOOL20 is not applicable”.

D.1. Start date of PoA

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Date of sending prior consideration or date of publishing at UNFCCC for GSC.

D.2. Duration of PoA

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28 years

SECTION D. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

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Environmental analysis as per requirements of the CDM modalities and procedures is undertaken at PoA level.

As there will be no variation in the stove technology at CPA level and no negative impacts are expected from the implementation of the ICS project, Environmental Analysis will not be required at CPA level.

E.2. Analysis of environmental impacts

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There are no major impacts on the environment due to the installation of the ICS. The local ecology is not likely to get impacted by this type of programme activity. The programme activity included under this PoA helps in reducing the consumption of the firewood thus reducing the pressure on forest, reduces indoor air pollution and benefits with the use of dung cakes as fuel farmyard manure thus having positive environmental impacts

E.3. Environmental impact assessment

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As per the Environment Protection Act dated 30 January 1997 and Environment Protection Rules dated 26 June 1997, 12 sectors are required to undertake environmental impact assessment studies. It should be noted here that Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) are not regulatory requirement in Nepal for installation of the ICS at the individual household level.

SECTION E. Local stakeholder consultation

F.1. Level at which local stakeholder consultation is undertaken

>> [not conducted yet - to be completed later]

F.2. Modalities for local stakeholder consultation

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[not conducted yet - to be completed later]

F.3. Summary of comments received

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[not conducted yet - to be completed later]

F.4. Consideration of comments received

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[not conducted yet - to be completed later]

SECTION F. Approval and authorization

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[not received yet - to be completed later]

PART II. Generic component project activity (CPA)**SECTION G. Description of generic CPA****H.1. Title of generic CPA**

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Dissemination of Induction Cook Stoves In Nepal – CPA- X

H.2. Reference number of generic CPA

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CPA 001

H.3. Purpose and general description of generic CPA

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This CPA includes households targeted for dissemination of Induction cookstoves.

The main objective/goal of the CPAs is to promote dissemination of Induction cookstoves (ICS) with replacement of existing Traditional Cooking Stoves (TCS) to the existing TCS users in Nepal. The project activity will contribute towards improving livelihoods of the rural households through improved access to energy services from the improved cooking stoves. The use of high efficient improve cooking stoves would lead to zero or very less consumption of fuel-wood which would thus reduce the emission from the stove. The project will also contribute towards decreasing deforestation and also improvement in the quality of life of the targeted group through reduction of drudgery, time and money spent on fuel wood collection and throughout improvement of the indoor environment. This CPA will be implemented and maintained by VNV.

H.4. Technologies/measures

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Please refer to section A.3

SECTION H. Application of methodologies and standardized baselines**I.1. References to methodologies and standardized baselines**

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The approved methodologies used are:

- Proposed methodology “consolidated methodology for rural electrification”

Using simplified baseline and monitoring methodology for a typical SSC-CPA within the proposed PoA is made with reference to the following:

- Paragraph 28 of “Simplified modalities and procedures for small-scale clean development mechanism project activities”
- “General guidelines for SSC CDM methodologies” Version 21.0**

Additionality for a typical SSC-CPA under the proposed PoA is demonstrated with reference to the following:

- Guideline: Demonstrating additionality of microscale project activities” (version 05).

The choice of methodologies is justified in the next section.

I.2. Applicability of methodologies and standardized baselines

>> a) Demonstration of how the applicability conditions are met in accordance with the approved methodology and the PoA.

The tables below list each of the applicability conditions for the relevant approved methodology and explain how these are met by this CPA.

Table 9. Applicability conditions for methodology

Applicability Conditions	Applicability to this CPA
This methodology comprises of activities to displace the use of non-renewable biomass for cooking by introducing renewable energy or less GHG intensive technologies to households/ communities/ institutions ¹ . Examples of these technologies include, but are not limited to electric cooking appliances such as induction cook stoves, hot plates, heating coils, pressure cookers, rice cookers, multi cookers solar electric cookers etc.	CPA XXX includes dissemination of Induction cook stoves which will be using current energy mix grid, renewable mini grid and individual renewable energy sources to household communities /institutions that are using traditional cook stoves based on the use of non-renewable biomass.
Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	The non-renewable biomass has been used in the country since 1989. This is evident from EB 67 annex 22, that has affirmed the fraction of non-renewable biomass for Nepal.
The methodology is applicable to electric cooking appliances displacing use of non-renewable biomass	The CPA XXX disseminate Induction cook stoves (an electric cooking appliance) which will be displacing use of non-renewable biomass by renewable energy.
Project participants or coordinating and managing entities shall describe in the PDD/PoA-DD how the double counting of emission reductions has been addressed (e.g. between end users, distributors and producers of stoves).	Each of the project devices i.e. Induction cook stoves will be bearing unique serial numbers. This technology is exclusive to this new type of cook stoves and not available to previously registered CDM projects. Hence, there is no possibility of double counting of the cookstoves. Any double counting due to discontinuation of existing CDM project is also addressed through a robust management system.
Project participants or coordinating and managing entities shall demonstrate that the electric cooking appliances are designed, constructed and operated to the requirements (e.g. with regard to safety) of a relevant national or local standard or comparable literature. Latest guidelines issued by a relevant national authority or an international organisation may also be used.	All relevant national and international standards are specified in the concession contract for this CPA.
In cases where this methodology is combined with “AMS-I.F.: Renewable electricity generation	AMS I F is not used in this PoA.

¹ Institutions such as schools, prisons and hospitals.

<p>for captive use and mini-grid”, the project proponent shall separately demonstrate the additionality of each of the component (i.e supply of renewable energy to the households (Type I) and use of induction cook stoves/ electric cook stoves (Type III)). Furthermore, while combining the two components applicable requirements on start date and prior clean development mechanism (CDM) consideration shall be met in accordance with the CDM project standard and CDM project cycle procedures.</p>	
<p>Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO₂ equivalent annually.</p>	<p>The CPA is a type III category CPA. The General Guidelines for SSC methodologies, version 22.1 dated 15 April 2016, paragraph 4.17 states the following: In the case of CPAs solely composed of “microscale CDM units”, the coordinating/managing entity is not required to demonstrate compliance with the small scale CDM thresholds at the aggregate level of the CPA.</p> <p>In such cases: a) The definition of ‘microscale CDM units’ provided under section “5.1 Application of microscale thresholds at unit level for CPAs” of the methodological tool “Demonstration of additionality of microscale project activities” shall apply; b) 95/10 precision shall be applied for sampling surveys in accordance with the standard for “Sampling and surveys for CDM project activities and programmes of activities”.</p> <p>Further section 6 of the Tool: Demonstration of additionality of microscale project activities, version 9, mentions the following: For CPAs applying microscale thresholds at the unit level rather than at the aggregate level of the CPA, the term ‘project activities’ in paragraphs 4 and 11 to 13 above shall be read as ‘units’. If each of the units contained in the CPA satisfies the condition to qualify as a ‘microscale CDM unit’, then the coordinating/managing entity is not required to demonstrate compliance of the CPA with the microscale or small-scale thresholds at the aggregate level of the CPA. In such cases, the requirements related to de-bundling stated in paragraph 6 above do not apply.</p> <p>Para 13 of the aforesaid Tool refers to emission reductions at a scale of no more than 20 ktCO₂e per year and the distributed units are reducing not more than 3 tCO₂ per year.</p> <p>Furthermore, the criteria for demonstrating additionality shall render only those units eligible under the CPA whose annual emission reduction is limited to 3 tCO₂ per annum. Thus, all units will remain under the micro-scale limit throughout the year</p> <p>Thus, compliance with the requirement of</p>

	methodology is not required as per aforesaid and para 120(m) of Standard: CDM project standard for programmes of activities, version 2.0
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I.3. Application of multiple methodologies

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Not applicable

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

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The project boundary is the physical, geographical site of the use of biomass or the renewable energy. In the project activity, the project boundary becomes the place of operation of the Induction cookstoves distributed under CPAs implemented as part of the PoA.

(a) The project boundary is the physical, geographical site of the use of biomass or the renewable energy.

(b) For project activities involving national or regional grids, the spatial extent of the project boundary includes all power plants within the host country physically connected through transmission and distribution lines to the national or regional grid.

(c) For project activities involving mini-grids, the spatial extent of the project boundary includes all power plants connected through transmission and/or distribution lines to the mini-grid which is being built or extended through the project activity.

(d) For all project types, the spatial extent of the project boundary also includes the physical sites of the end-use consumers served by the project activity.

(e) For projects involving multiple technologies (e.g. grid extension and stand alone system), the project boundary includes all of the relevant locations from the previous three paragraphs.

	Source	GHG	Included?	Justification/Explanation
Baseline	Source 1- Combustion of non-renewable biomass	CO ₂	Yes	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required
	Source 2 -Combustion of non-renewable biomass	CO ₂	Yes	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required
	Source 3- Combustion of non-renewable biomass	CO ₂	Yes	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required
Project activity	Source 1 – for Type I (Existing Grid connected)	CO ₂	Yes	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required
	Source 2 – for Type II (Renewable Mini grid)	CO ₂	No	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required
	Source 3 – Type III (Individual renewable system)	CO ₂	No	Major source of emission
		CH ₄	No	Not required
		N ₂ O	No	Not required

I.5. Establishment and description of baseline scenario

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The baseline scenario is continued use of non-renewable biomass for cooking. Majority of households in the project districts use firewood to meet their cooking needs. The use of firewood for cooking purposes in Saptari, Siraha, Dhanusha, Mahottari, Sarlahi, Bara, Parsa and Rautahat districts are around 34.04%, 36.6%, 42.5%, 56.35%, 64.5%, 67.23%, 65.75% and 54.25% respectively. The use of other fossil fuels like kerosene and LPG is insignificant. Research indicates that use of firewood has a low sensitivity to economic determinants.

For all project system, the project type is classified into 3 types –

- a) Type I – Household user / institution connected to/using mixed national/regional grid (renewable & fossil fuel based) for running electric cooking appliances
- b) Type II - Household user / institution connected to/using mini grid (100% renewable grid) for running electric cooking appliances
- c) Type III - Household user / institution using only individual renewable energy generation systems for running electric cooking appliances

Project participants shall provide an ex-ante estimate of the number of Household user / institution that will fall into each group, based on business plans or other similar project documents. During project implementation, the exact number of Household user / institution will be recorded as part of the monitoring plan. As example of the consumer numbers if presented in Table 1.

Table 1. Reporting of consumer numbers by type and project technology/measure

Type	Project technology/measure		
	Mixed national/regional grid connected	Mini Grid(100% renewable grid)	Individual energy systems renewable generation
I	[XX]	NA	NA
II	NA	[XX]	NA
III	NA	NA	[XX]

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

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Step 1. Classification of project type –

The methodology requires that all of the household/ institution in the CPA be classified according to their current project technology/measure, as indicated in section I.5. The Table below show the breakdown of household/ institution for this CPA.

Table XX. Reporting of household/ institution numbers by type and project technology/measure [to be completed for each CPA].

Type	Project technology/measure		
	Mixed national/regional grid connected	Mini Grid(100% renewable grid)	Individual energy systems renewable generation
I	[XX]	N/A	N/A
II	N/A	[XX]	N/A
III	N/A	N/A	[XX]

Baseline emissions for Type I, Type II & Type III would be calculated as:

Equation (1)

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Where:

BE_y	=	Baseline emissions during the year y in t CO ₂ e
B_y	=	Quantity of woody biomass that is substituted or displaced in tonnes
$f_{NRB,y}$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (fNRB) ²
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)
$EF_{projected_fossil_fuel}$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers.

For the emission factor for the substitution of non-renewable woody biomass by similar consumers, the default regional values in table 1 below may be used.

Table 1. Region-wise³ default values of the fossil fuel emission factor (CO₂ and non-CO₂ GHG emissions)

	Fossil fuel emission factor (t CO ₂ e/TJ) incl. CH ₄ and N ₂ O emissions
Middle East and North Africa	63.9
East Asia and the Pacific	85.7
Europe and Central Asia	57.8
Latin America and the Caribbean	68.6
South Asia	64.4
Sub-Saharan Africa	73.2

The value of fNRB shall be calculated using either of the following two options:

- (a) **Ex ante:** the fNRB value is determined once at the validation stage, thus no monitoring and recalculation of the fNRB value during the crediting period is required;⁴

² Default values endorsed by designated national authorities and approved by the Board are available at < <https://cdm.unfccc.int/DNA/fNRB/index.html> >.

³ Refer to Appendix 1 for the definition of the regions which is primarily based on the “developing regions” classification used by the United Nations Development Programme but tailored to the purpose of this CDM methodology (Retrieved on 27.11.19 from <http://hdr.undp.org/en/content/developing-regions>).

⁴ The ex ante value may not be changed until the end of the crediting period, even if the default national value applied previously as endorsed by the DNA at the time of validation may have expired before the end the crediting period.

(b) **Ex post:** the fNRB_y value is determined for the year “y” in the crediting period, requiring the fNRB value to be updated annually, following a consistent calculation procedure throughout the crediting period.

B_y is determined by using one of the following options:

- (a) Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year);

Equation (2)

$$B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y})$$

Where:

N_{HH}	=	Number of households in the project activity, number
$BC_{BL,HH,y}$	=	Average annual consumption of woody biomass per household before the start of the project activity, tonnes/household/year
$BC_{PJ,HH,y}$	=	If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per household in the pre-project devices during the project activity, tonnes/household/year

- (b) Calculated as the product of the number of persons served per household multiplied by the number of households and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

Equation (3)

$$B_y = N_{HH} \times N_{p,HH} \times (BC_{BL,PP,y} - BC_{PJ,PP,y})$$

Where:

$N_{p,HH}$	=	Average number of persons served per household, number
$BC_{BL,PP,y}$	=	Average annual consumption of woody biomass per person before the start of the project activity, tonnes/person/year
$BC_{PJ,PP,y}$	=	If it is found that pre-project devices were not completely displaced but continue to be used to some extent, average annual consumption of woody biomass per person in the pre-project devices during the project activity, tonnes/person/year

- (c) Calculated as the product of the number of persons served per institution⁵ multiplied by the number of institutions and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

⁵ Institutions such as schools, prisons and hospitals.

Equation (4)

$$B_y = \sum_i N_{p,i,y,t} \times N_{i,t} \times (BC_{BL,FP,y} - BC_{BJ,FP,y})$$

Where:

$N_{p,i,y,t}$ = Average number of persons served per institution in year y, number

$N_{i,t}$ = Number of institutions type i prior to project implementation, number

Where charcoal is used as the fuel by baseline (old) devices, the quantity of woody biomass shall be determined by using a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis).⁶ Alternatively, credible local conversion factors determined from a field study or literature may be applied.

Leakage emissions (LEy) (related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered: The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity, then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

Project Emission

The following sources of project emissions shall be considered as applicable

(a) CO₂ emissions from electricity consumption by the project activity using the latest version of "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation", including the consumption of electricity for any processing of feedstock

The project emission of the project in year y (PE_y) shall be calculated as follows

$$PE_y = PE_{EC,y} \quad \text{Equation (5)}$$

Where:

PE_y = Project emissions in year y (tCO₂/yr)

$PE_{EC,y}$ = Project emissions from electricity consumption in year y (tCO₂/yr)

For Type II & Type III, $PE_y = 0$

For Type I, the project emission from electricity consumption will be calculated as

⁶ Refer to: <<http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>>. The term 'wet basis' assumes that the wood is 'air-dried' as is specified in the IPCC default table.

$$PE_{EC,y} = EC_{PJ,i,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y})$$

Equation (6)

Where,

$EC_{PJ,i,y}$ = Quantity of electricity consumed by the electric cooking appliance i in the project scenario in year y (MWh/yr)

$EF_{EL,j,y}$ = CO₂ emission factor for electricity generation for source j in year y (t CO₂/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y . Consider a 10% default value.

The quantity of electricity consumed by electric cooking appliances is determined as per the following:

$$EC_{PJ,i,y} = N_{HH,y} \times EC_{AVG,y}$$

Equation (7)

Where

$N_{HH,y}$ = Total number of households/institution in year (nos.)

$EC_{AVG,y}$ = Average consumption of electricity by electric cooking appliance(s) in year y per household/institution (MWh/y)

The electricity consumption by the electric cooking appliance(s) for Type I is determined by following two options –

Option 1 - $EC_{AVG,y}$ is either determined by a custom built-ins attachment measuring the average electricity consumption of the electric cooking appliance(s) from a representative sample of households/institutions. Annual checks that of a sample of electric cooking appliance, done with a statistically significant sample of households/institutions. Electricity consumption is recorded on a sample basis to determine the annual average electricity consumptions.

Use 90/10 or 95/10 precision for annual or biennial checks.

Option 2 - $EC_{AVG,y}$ is determined as a product of the rated capacity of the electric cooking appliance and the utilization hours:

$$EC_{AVG,y} = EC_{i,j} \times t_{y,i,j}$$

Where is

$EC_{i,j}$ = Rated capacity of the electric cooking appliances (Watts)

$t_{y,i,j}$ = Number of hours of utilization of the electric cooking appliances during the year y (hrs).

A default value of 7 hours of daily utilization of electric cooking appliance can be used or Number of hours of utilization ($t_{y,i,j}$) shall be estimated at least once every two years (annually or biennially). The biennial survey shall follow a 90/95 per cent confidence interval and a 10 per cent margin of error in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities.

$EF_{EL,j,y}$ is determined following the procedures outlined in “TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation” for determination of the emission factor for electricity generation.

Emission Reduction

The emission reductions of the project in year y (ER_y) are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Equation (8)

Where:

ER_y = The emission reductions of the project in year y (t CO₂e/yr)

BE_y = Baselines emissions of the project in year y (t CO₂e/yr)

PE_y = The project emission of the project in year y(t CO₂e/yr)

LE_y = Leakage emissions for the project in year y (t CO₂e/yr)

I.6.2. Data and parameters fixed ex ante

(Copy this table for each piece of data and parameter.)

Data/Parameter	η_{pre}
Data unit	(i) Default 0.1 or 0.2 (please see details below); (ii) Establish prior to start of implementation based on survey
Description	Efficiency of pre-project device
Source of data	-
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	Efficiency of pre - project device, which is a three-stone fire using firewood (not charcoal), or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney; for other types of devices, a default value of 0.2 may be optionally used. Use weighted average values (taking the amount of woody biomass consumed by each device as the weighting factor) if more than one type of device is being replaced
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$BC_{\text{BL,HH,y}}$
Data unit	tonnes/household/year
Description	Average annual consumption of woody biomass per household before the start of the project activity
Source of data	-
Value(s) applied	
Choice of data or Measurement methods and procedures	Determined ex ante using one of the following options: (a) $N_{\text{p,HH}}$ times $BC_{\text{BL,PP,y}}$; or (b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities;” or (c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines”, which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$N_{\text{p,HH}}$
Data unit	number
Description	Average number of persons served per household prior to project implementation
Source of data	Established ex ante prior to project implementation based on records of households served by the project
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	-
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$BC_{\text{BL,PP,y}}$
----------------	-----------------------

Data unit	tonnes/person/year
Description	Average annual consumption of woody biomass per person before the start of the project activity
Source of data	-
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	Determined ex ante using one of the following options: (a) A default value of 0.5 tonnes/person per year ⁷ ; (b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities;” (c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines,” which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$f_{NRB,y}$
Data unit	-
Description	Fraction of woody biomass saved by the project activity during year y that can be established as non-renewable biomass
Source of data	-
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	As per “TOOL30: Calculation of the fraction of non-renewable biomass”
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$NCV_{biomass}$
Data unit	TJ/tonne
Description	Net calorific value of the non-renewable woody biomass, briquettes or charcoal used in baseline devices
Source of data	-
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	IPCC default for wood fuel, 0.0156 TJ/tonne, based on the gross weight of the wood that is ‘air-dried’ may be used if fuel used in project device is also woody biomass. If briquette is used as project fuel, NCV shall be measured annually
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	$EF_{EL,j,y}$
Data unit	tCO ₂ /MWh
Description	Emission factor for electricity generation for source j in year y
Source of data	Utility or government records or official publications
Value(s) applied	[XX]

⁷ Refer to “Annex 5 - Information note on the rationale for default factors used in AMS-I.E. and AMS-II.G.” of the SSC WG 42 meeting report.

Choice of data or Measurement methods and procedures	As per Tool05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation; The determination of the emission factors for electricity generation ($EF_{EL,i,y}$) in the project scenario depends on which scenario (A, B or C), as described in Section 2.2, paragraph 5 that applies to the source of electricity consumption that would be displaced in the baseline by electricity generated in the project:
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

Data/Parameter	EC_{i,j}
Data unit	Watts
Description	Rated capacity of electric cooking appliance as per manufacturer specification (W)
Source of data	-
Value(s) applied	[XX]
Choice of data or Measurement methods and procedures	As per manufacturer specification
Purpose of data	Baseline emission calculation
Additional comment	Fixed at the time of validation

I.6.3. Modalities for ex ante calculation of emission reductions

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[Note – although this is a generic CPA form, we include below some example calculations based on the Nepal PoA to illustrate the application of the methodology]

The first CPA will provide 20000 households with Induction cook stoves with access to the existing national/regional grid, 2000 households with access to a renewable mini-grid, and 2000 households with individual renewable systems (Solar PV system). For all the households users are served by the traditional old cook stoves (three stone cook stoves or existing less efficient cook stoves) using non-renewable biomasses.

Step – 1 Classification of households

The following assumptions to derive the number of consumers in each Type

- Grid connection induction cook stoves user
- Mini- grid connected induction cook stoves user
- Individual renewable energy (solar PV) connected induction cook stoves user

The resulting consumer numbers in each Type, are shown below.

Project technology/measure			
Type	Mixed national/regional grid connected	Mini Grid(100% renewable grid)	Individual renewable energy generation systems

I	20000	N/A	N/A
II	N/A	2000	N/A
III	N/A	N/A	2000

All the devices i.e. Induction cook stoves included in this project are having rated capacity of 2000 Watts or 2 KW system.

Total no of systems = 20,000+2000+2000
= 24,000 nos

Baseline emissions for Type I, Type II & Type III would be calculated as:

Equation (2)

$$BE_y = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossil_fuel}$$

Where:

BE_y = Baseline emissions during the year y in t CO₂e

B_y = Quantity of woody biomass that is substituted or displaced in tonnes

$f_{NRB,y}$ = Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (f_{NRB})⁸

$NCV_{biomass}$ = Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.0156 TJ/tonne)

$EF_{projected_fossil_fuel}$ = Emission factor for the substitution of non-renewable woody biomass by similar consumers.

Now,

B_y is calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year)

$$B_y = N_{HH} \times (BC_{BL,HH,y} - BC_{PJ,HH,y})$$

So,

$$N_{HH} = 20000 + 2000 + 2000 = 24,000$$

$$BC_{BL,HH,y} = 3.5 \text{ tonnes/household/year}$$

$BC_{PJ,HH,y} = 0$ (since it is assume that the pre project devices are completely dismantled and are not in use any more)

Thus

$$B_y = 24,000 \times (3.5 - 0) \\ = 84,000 \text{ tonnes}$$

$$f_{NRB} = 86\% \text{ for Nepal}$$

⁸ Default values endorsed by designated national authorities and approved by the Board are available at < <https://cdm.unfccc.int/DNA/fNRB/index.html> >.

$$NCV_{\text{biomass}} = 0.0156 \text{ TJ/tonne}$$

$$EF_{\text{project_fossil fuel}} = 64.4 \text{ tCO}_2\text{e/TJ (fro South Asia region as per table 1)}$$

Taking leakage adjustment factor of 0.95,

$$\begin{aligned} \text{Hence } BE_y &= 84,000 \times 86\% \times 0.0156 \times 64.4 \times 0.95 \\ &= 68,946 \text{ tCO}_2\text{e} \end{aligned}$$

Now project emission calculations

$$PE_y = PE_{EC,y}$$

Where:

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

$$PE_{EC,y} = \text{Project emissions from electricity consumption in year } y \text{ (tCO}_2\text{yr)}$$

For Type II & Type III, $PE_y = 0$

For Type I, the project emission from electricity consumption will be calculated as

$$PE_{EC,y} = EC_{PJ,i,y} \times EF_{EL,j,y} \times (1 + TDL_{j,y}) \quad \text{Equation (6)}$$

Where,

$EC_{PJ,i,y}$ = Quantity of electricity consumed by the electric cooking appliance i in the project scenario in year y (MWh/yr)

$EF_{EL,j,y}$ = CO₂ emission factor for electricity generation for source j in year y (t CO₂/MWh)

$TDL_{j,y}$ = Average technical transmission and distribution losses for providing electricity to source j in year y . Consider a 10% default value.

Now,

The quantity of electricity consumed by electric cooking appliances is determined as per the following:

$$EC_{PJ,i,y} = N_{HH,y} \times EC_{AVG,y} \quad \text{Equation (7)}$$

Where

$N_{HH,y}$ = Total number of households/institution in year (nos.) = 20,000

$EC_{AVG,y}$ = Average consumption of electricity by electric cooking appliance(s) in year y per household / institution (MWh/y)

= 5.621 MWh/y (assuming this value is arrived based on sample monitoring of the devices installed with energy meters)

$$EC_{AVG,y} = EC_{i,j} \times t_{y,i,j}$$

Where is

$EC_{i,j}$ = Rated capacity of the electric cooking appliances (Watts) = 2000 watts

$t_{y,i,j}$ = Number of hours of utilization of the electric cooking appliances during the year y (hrs). A default value of 7 hours of daily utilization of electric cooking appliance is used.

$$= 7 \times 365$$

$$= 2555\text{hrs}$$

Thus,

$$\begin{aligned} EC_{AVG,y} &= 2000 \times 2555 \\ &= 5.11 \text{ MWh/y} \end{aligned}$$

$$\begin{aligned} \text{So, } EC_{PJ,i,y} &= 20000 \times 5.11 \\ &= 102200 \text{ MWh/y} \end{aligned}$$

Now, $EF_{grid,y} = 0.00304 \text{ tCO}_2/\text{MWh}$ (<https://ecometrica.com/assets/Electricity-specific-emission-factors-for-grid-electricity.pdf>)

Thus,

$$\begin{aligned} PE_{EC,y} &= 112420 \times 0.00304 * (1 + 10\%) \\ &= 341.76 \text{ tCO}_2/\text{y} \end{aligned}$$

Emission Reduction

The emission reductions of the project in year y (ER_y) are calculated as follows:

$$\begin{aligned} ER_y &= BE_y - PE_y - LE_y \\ &= 68,946 - 341.76 - 0 \\ &= 68,604 \text{ tCO}_2 \end{aligned}$$

I.7. Monitoring plan

I.7.1. Data and parameters to be monitored

(Copy this table for each piece of data or parameter.)

Data/Parameter	$N_{y,i,j}$
Data unit	No units
Description	Number of electric cooking appliances of type i (Type I, Type II, Type III) and batch j operating during year y
Source of data	-
Value(s) applied	[XX]
Measurement methods and procedures	Measured directly or based on a representative sample. Sampling standard shall be used for determining the sample size to achieve 90/10 confidence precision. A discount shall be applied based on the percentage of devices operational as determined by the sample survey, e.g. if survey shows that 10% of the devices is non-operating, an adjustment factor of 0.9 shall be applied to number of project devices commissioned in a particular batch. Separate samples shall be taken for each batch
Monitoring frequency	Annual/biennial
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	N_{HH}
Data unit	Number
Description	Number of households in the project activity in year y
Source of data	-
Value(s) applied	[XX]
Measurement methods and procedures	Established ex ante prior to start of the project activity
Monitoring frequency	-
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	Date of commissioning of project device of type i
Data unit	Date
Description	Actual date of commissioning of the project device.
Source of data	Internal records
Value(s) applied	[XX]
Measurement methods and procedures	Fixed and recorded at the time of commissioning/distribution
Monitoring frequency	-
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	Date of commissioning of batch j
Data unit	Date

Description	To establish the date of commissioning, the Project Participant may opt to group the devices in “batches” and the latest date of commissioning of a device within the batch shall be used as the date of commissioning for the entire batch
Source of data	Internal records
Value(s) applied	[xx]
Measurement methods and procedures	Fixed and recorded at the time of commissioning/distribution of the last project device in the batch
Monitoring frequency	-
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$EC_{AVG,y}$
Data unit	MWh/yr
Description	Average consumption of electricity by electric cooking appliance(s) in year y per household/institution (MWh/y) (for Type I only)
Source of data	Either Option 1 or Option 2 as mentioned below
Value(s) applied	[xx]
Measurement methods and procedures	<p>The average electricity consumption is either determined by -</p> <p>Option 1 - a custom built-ins attachment measuring the average electricity consumption of the electric cooking appliance(s) from a representative sample of households/institutions. Annual checks that of a sample of electric cooking appliance, done with a statistically significant sample of households/institutions. Electricity consumption is recorded on a sample basis to determine the annual average electricity consumptions. Use 90/10 or 95/10 precision for annual or biennial checks.</p> <p>Option 2 - $EC_{AVG,y}$ is determined as a product of the rated capacity of the electric cooking appliance and the utilization hours:</p> $EC_{AVG,y} = EC_{i,j} \times t_{y,i,j}$ <p>Where is</p> <p>$EC_{i,j}$ = Rated capacity of the electric cooking appliances (Watts)</p> <p>$t_{y,i,j}$ = Number of hours of utilization of the electric cooking appliances during the year y (hrs).</p> <p>A default value of 7 hours of daily utilization of electric cooking appliance can be used or</p> <p>Number of hours of utilization ($t_{y,i,j}$) shall be estimated at least once every two years (annually or biennially). The biennial survey shall follow a 90/95 per cent confidence interval and a 10 per cent margin of error in accordance with the “Standard for sampling and surveys for CDM project activities and programme of activities.</p>
Monitoring frequency	Annual
QA/QC procedures	Custom built-ins attachment measuring the average electricity consumption of the electric cooking appliance(s) shall be in conformity with industry standard and calibrated according to relevant requirements.
Purpose of data	Project emission calculation
Additional comment	-

Data/Parameter	$t_{y,i,j}$
Data unit	Number of hours
Description	Number of hours of utilization of the electric cooking application i during the year y
Source of data	-
Value(s) applied	[xx]
Measurement methods and procedures	The number of utilization hours shall be estimated at least once every two years (annually or biennially). The biennial survey shall follow a 90/95 per cent confidence interval and a 10 per cent margin of error in accordance with the "Standard for sampling and surveys for CDM project activities and programme of activities". The average number of utilization hours of monitored sampled households/institution are then multiplied by annual number of days or number of days in the monitoring period to determine the number of hours of utilization of the electric cooking application i during the year y.
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$BC_{PJHH,y}$
Data unit	tonnes/household/year
Description	Average annual consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
Source of data	Surveys
Value(s) applied	[xx]
Measurement methods and procedures	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial)
Monitoring frequency	At least once every two years (biennial)
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$BC_{PJPP,y}$
Data unit	tonnes/person/year
Description	Average annual consumption of woody biomass per person in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
Source of data	Surveys
Value(s) applied	[XX]
Measurement methods and procedures	survey undertaken as per "Standard: Sampling and surveys for CDM project activities and programme of activities".
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$N_{p,t,y,t}$
Data unit	Number
Description	Average number of persons served per institution
Source of data	-
Value(s) applied	[XX]
Measurement methods and procedures	Average number of persons served per institution shall be based on survey undertaken as per "Standard: Sampling and surveys for CDM project activities and programme of activities". This parameter shall be monitored every year. If the monitoring period is shorter or longer than one year, the result may be extrapolated for the monitoring period
Monitoring frequency	Monitored annually ex post
QA/QC procedures	-
Purpose of data	Baseline emission calculation
Additional comment	-

Data/Parameter	$EG_{LS_FF,y}$
Data unit	MWh/yr
Description	Quantity of net electricity supplied by renewable power plant in year y (for type II)
Source of data	Power production record of plant
Value(s) applied	[XX]
Measurement methods and procedures	This is applicable for 100% renewable grid This parameter is applicable to projects where renewable grid-connected power plants are deployed to power the electric cooking appliances, e.g. solar PV mini grid systems
Monitoring frequency	Annual
QA/QC procedures	-
Purpose of data	-
Additional comment	-

I.7.2. Sampling plan

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(a) Sampling Approach:

- i. **Objectives and reliability requirements:** The objective of the sampling plan is to achieve unbiased and reliable estimates of the proportion or the mean value of the key variables over the crediting period. As per the sampling and survey standard (EB 94 annex 2, version 7, para 10) in case "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 and 95/10 for large scale project activities." The methodology applied for the project requires the project proponent achieving 95 percent confidence interval and a 10 percent margin of error while for annual inspection 90 per cent confidence interval and a 10 per cent margin of error shall be achieved for the sampled parameters. Since it is small scale project and CME has opted for the annual inspection, the survey will be conducted to achieve the confidence/precision of 90/10 and

this is in accordance with the requirements set out as per methodology and sampling standard. The table below provides the monitoring parameters that will be monitored annually:

Parameter	Type	Description
$N_{y,i,j}$	Proportional parameter	Number of electric cooking appliances of type i (Type I, Type II, Type III) and batch j operating during year y
$EC_{AVG,y}$	Mean value parameter	Average consumption of electricity by electric cooking appliance(s) in year y per household/institution (MWh/y) (for Type I only)
$BC_{PJ,HH,y}$	Proportional parameter	Average annual consumption of woody biomass per household in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
$BC_{PJ,PP,y}$	Proportional parameter	Average annual consumption of woody biomass per person in the pre-project devices during the project activity, if it is found that pre-project devices were not completely displaced but continue to be used to some extent
$N_{p,I,y,t}$	Proportional parameter	Average number of persons served per institution
$t_{y,i,j}$	Mean value parameter	Number of hours of utilization of the electric cooking application i during the year y

- ii. **Target Population:** The target population for different parameters discussed in the table above are given below:
- For the proportional parameter; the target population is the ICS users listed in the project database.
 - For the mean value parameter; the target population is the total number of operational ICS for which the emission reductions will be accounted for the monitoring period in question. The mean value parameter, unless and otherwise required by the estimated number of samples (if it is greater than the sample estimate for the proportional parameter) will be the subset of the operational ICS as identified during the annual monitoring surveys.
- iii. **Sampling frame:** All the households availed with the improved cooking stoves by the project will be the sampling frame.
- iv. **Sampling Method:** A simple random sampling will be adopted for estimating the sample size for the monitoring surveys. Simple random sampling is suited to populations that are homogenous (EB 94 annex 02). From the population of ICS, the random numbers will be assigned for each ICS using excel function and the sample ICS will be extracted accordingly. The schema of the sampling method is given below:
- v. **Sample Size:** The calculation of the required sample size for each parameter will be calculated at 90/10 confidence/precision as required for the annual monitoring. The sample size is determined using the Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0 (EB86, Annex 4)⁹. As required by AMS II.G Ver 10, for annual surveys, the level of precision of 10% and a confidence level of 90% will

⁹Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0 (EB 86, Annex 4)

be assessed for the monitoring parameters; efficiency of ICS, number of ICS in operation and displacement of traditional stoves.

The minimum sample size to determine number of ICS in operation and displacement of traditional stoves using the procedure outlined in para 12 of appendix 1, EB 86 Annex 4, Guidelines for Sampling and Surveys for CDM Project activities and Programme of Activities Ver. 4.0.

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(1-p)}$$

Where:

n= Sample size

N = Total number of ICS of type *i* installed under the project

p = expected proportion (0.5)¹⁰

1.645 = represents the 90% confidence required

0.1 = represents the 10% relative precision (0.1x0.5=0.05 = 5% points either side of p)

Substituting the values of “N” in equation above, the sample size will be deducted.

(b) Data:

(i) Field Measurements:

1. Checking of a representative sample of each type of ICS installed every year to ensure that they are still operating.
2. Determination of the efficiency of a representative sample of each type of ICS either using field measurement or other approach given in the methodology.
3. The replaced low efficiency appliances are disposed of and not used within the boundary
4. The survey will be conducted annually with the objective to target 10 percent precision and to achieve 90 percent confidence.

(ii) Quality Assurance/Quality Control:

A survey questionnaire will be prepared to seek responses of operating status (yes or no) of ICS units by ICS using households. The survey will be performed by the project developer. During the survey, in order to anticipate any low response rate and answers bias, 10% oversampling will be applied.

(iii) Analysis:

1. Checking of a representative sample of ICS installed every year to ensure that they are still operating
2. Determination of the efficiency of a representative sample of all devices
3. The replaced low efficiency appliances are disposed of and not used within the boundary;

The project developer will collect, compile and analyze the data to derive the number of ICS disseminated, the percentage of ICS in operation, displacement of traditional cooking stove lamps by ICS users. The developer will prepare “monitoring report” based on the survey report.

¹⁰The expected proportion has been taken as 0.5 for the first monitoring period. For the successive monitoring periods, the sample size will be deducted in accordance with the monitoring results of the first monitoring period.

The data collected will be compiled in Excel sheets and/or other software and analyzed to derive the percentage of IDES in operation and the efficiency of the ICS installed by households. The values of efficiency of ICS disseminated are used for emission reductions calculation.

(c) Implementation:

The survey questionnaire will be prepared, pre-tested and field personnel will be trained in conducting the survey to ensure the quality of data collected and the survey will be carried out once a year. The schedule for implementing the sampling effort shall be defined prior to the field activity.

I.7.3. Other elements of monitoring plan

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All the CPAs will follow the same monitoring methodology as described in this PoA-DD. The CME oversees the monitoring process.

[to be completed later]

SECTION I. Crediting period type and duration

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Renewable crediting

Duration – 28 years

SECTION J. Eligibility criteria for inclusion of CPAs

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No.	Eligibility criterion - Category	Eligibility criterion - Required condition	Supporting evidence for inclusion
1	Boundary and location of CPA	The CPA is located within Nepal	Location and boundary is specified in the CPA-DD, which limits area to Nepal, as shown in section A.2 of the CPA DD, Host Party: Nepal. Evidence: Statement of CME that CPA location and boundary is within Nepal
2	No double counting of CPA	The CPA is exclusively bound to this PoA. Confirmation that the activity has not been and will not be registered either as a single CDM project or as a CPA under another PoA. The unique installations are all identified and recorded in the CME database.	A description of the unique identifier and stipulation that GPS coordinates will be collected for fixed installations, along with adherence to the CME Manual in section B of the PoA DD. Evidence: check on UNFCCC website; date of access XX/XX/XX CME database to show records with identification of each unique installation, as part of installation reports available at verification.
3	Technology requirements	The CPA consists of grid connected induction cooking systems, mini-grid connected and individual renewable energy powered induction cook stoves.	Evidence: applicable standards/specifications in tendering documents or concession contracts. Installation reports during verification

4	Start date of CPA	Each CPA will prove that the start date of the CPA is on or after the start date of the PoA, or state that the CPA is pursuing retroactive crediting. The start date of the CPA is the date on which construction, implementation, or real action concerning the CPA	Starting date as stated in the CPA-DD is after PoA start date. Starting date is mentioned in section A.4.2.1 as XX/XX/XX Evidence: UNFCCC website (for date of submission of prior consideration for PoA); Statement from the CME that no connections were made prior to XX/XX/XXXX
5	Compliance with methodology	Each CPA will apply the CDM methodology "Consolidated	Evidence: See declaration and evidence from the CME that the CPA meets all the relevant applicability conditions in section B.2 above
6	Additionality of CPAs	Additionality is demonstrated by meeting the requirements for applying microscale guidelines	Nepal is an LDC, and criteria 1 of this table verifies this. The second condition is size of CPA being less than 20 ktCO ₂ emissions reductions. Evidence: Spreadsheet calculating capacity and emissions reduction (Annex to CPA DD)
7	Local stakeholders and environmental analysis	Stakeholder consultation done at PoA level, and no formal EIAs are required for induction cook stove dissemination under Nepalese law.	Evidence: report on stakeholder consultation in PoA DD section F. Reference to regulations, and reference to Environmental and Social Management Framework
8	Non-diversion of ODA in case of public funding	The CME and CPA operator shall confirm that in case of public funding there shall not be a diversion of Official Development Assistance.	Evidence: Statement from donors shown in Annex X
9	Target group	The target group for the CPA must be households and institutions.	Evidence: Of the XX facilities that comprise the CPA, only X of them are household / institutions.
10	Sampling requirements	CPA DD should specify and justify the sample size to be used for monitoring	Section I.7.2 justifies the sample size and explains the sampling procedures.
11	Each CPA qualify the micro scale thresholds, each of the units contained in the CPA aims to achieve emission reductions at a scale of no more than 20 kt CO ₂ e per year.	Each CPA qualify the micro scale thresholds, each of the units contained in the CPA aims to achieve emission reductions at a scale of no more than 20 kt CO ₂ e per year.	Estimated emission calculation sheet for each CPA.
12	De-bundling check	Each CPA consists solely of units that qualify the micro-scale CDM units, so as per methodological tool 19: Demonstration of additionality of microscale project activity de-bundling check is not required.	Confirmation that CPA consists solely of units that qualify the micro-scale CDM units in each CPA-DD.

Appendix 1. Contact information of coordinating/managing entity and project participants

Coordinating/managing entity and/or project participants	<input checked="checked" type="checkbox"/> Coordinating/managing entity <input type="checkbox"/> Project participant
Organization name	Value Network Ventures Advisory Services Pte. Ltd.
Country	India
Address	41/1, Church Street, Reyyan Towers, Bangalore, Karnataka, 560001, India
Telephone	+91 98450 17165
Fax	+9180 4242 9905
E-mail	contact@vnvadvisory.com
Website	www.vnvadvisory.com
Contact person	Mr. Sandeep Roy Choudhury

Appendix 2. Affirmation regarding public funding

To be filled later

Appendix 3. Applicability of methodologies and standardized baselines

To be filled later

Appendix 4. Further background information on ex ante calculation of emission reductions

To be filled later

Appendix 5. Further background information on monitoring plan

To be filled later

Appendix 6. Summary report of comments received from local stakeholders

To be filled later

Appendix 7. Summary of post-registration changes

N/A

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Make editorial improvements.

<i>Version</i>	<i>Date</i>	<i>Description</i>
08.1	28 June 2017	Revision to: <ul style="list-style-type: none"> • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms; • Make editorial improvement.
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: <ul style="list-style-type: none"> • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
04.1	5 August 2014	Editorial revision to correct the document information table.
04.0	25 June 2014	Revision to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.
03.0	3 December 2012	EB 70 Revision to reflect changes to the <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (EB 70, Annex 6).

<i>Version</i>	<i>Date</i>	<i>Description</i>
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.
Decision Class: Regulatory Document Type: Form Business Function: Registration Keywords: programme of activities, project design document		