COMPONENT PROJECT DESIGN DOCUMENT FORM FOR SMALL-SCALE COMPONENT PROJECT ACTIVITIES (F-CDM-SSC-CPA-DD) Version 02.0

COMPONENT PROJECT ACTIVITIES DESIGN DOCUMENT (CPA-DD)

SECTION A. General description of CPA

A.1. Title of the proposed or registered PoA

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Improved Cook Stove Programme with Carbon Finance (ICF), Nepal

A.2. Title of the CPA

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CPA # 01
Version Number: 7
Date: 08/23/2015

A.3. Description of the CPA

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This Small Scale Component Project Activity (CPA) entitled "CPA # 01" is a component of the SSC Programme of Activities (PoA) "Improved Cook Stove Programme with Carbon Finance (ICF), Nepal". The purpose of this small-scale CDM Programme Activity (CPA) is the dissemination of improved cooking stoves (ICS) in the Far Western Development Region (FWDR) of Nepal. The CPA titled CPA # 01 will aim to replace traditional cooking stoves using non-renewable woody biomass as a fuel with more efficient ICS.

Stoves disseminated under this CPA are rocket ICS serving domestic woody biomass users. These ICS are more efficient in transferring heat from the fuel to the pot, resulting in the reduction of non-renewable biomass (hereinafter referred to as NRB) consumption compared to the traditional biomass-fired stoves currently used by households. Furthermore, the ICS applied in this CPA have been designed not only to increase heat transfer, but also to match the traditional usage and cooking habits of the people in Nepal.

In line with the applied CDM methodology AMS-II.G version 05 Paragraph 1, it is assumed that in the absence of the project activity, the baseline scenario is the use of fossil fuels for meeting similar thermal energy needs. Therefore the replacement of traditional stoves by ICS reduces the amount of greenhouse gases (GHG) emitted into the atmosphere due to the reduction of non-renewable woody biomass used by the ICS.

The proposed CPA # 01 is a voluntary action undertaken by the Coordinating/Managing Entity (CME), SNV Netherlands Development Organisation (SNV), Nepal, a company based in the Netherlands. CPA # 01 is carried out by the Centre for Rural Technology Nepal (CRT/N) as the CPA implementer.

Based on the estimated energy savings, the CPA # 01 will have a maximum energy saving of less than 180 GWh_{th}/year, thus staying within the small-scale threshold. It is envisaged that about 18,000 ICS will be distributed under the CPA# 01 in 2013.

Most households in the FWDR rely on traditional cook stoves (hereinafter referred to also as TCS), such as the 3-stone fire or other conventional types of cook stoves, which lack combustion air supply and flue gas ventilation systems. These unimproved traditional cookstoves have lower efficiency than ICS, thus requiring increased volumes of fuel wood to meet the ongoing cooking needs of the household. The

baseline study on the fuel consumption in the FWDR of Nepal found that the poor households within the region are currently cooking with three main types of traditional stoves: mud stoves (54.49%), three stone fires (26.25%) and odan i.e. metal tripod stove (13.95 %)[1].

ICS, as an improved cooking energy technology, has significant socio-economic and environmental benefits, potentially reaching thousands of rural poor, who are at the bottom of the energy ladder in Nepal. The CPA # 01 promotes commercial distribution of ICS when the end-users may receive the stove at a subsidized price. This approach is appropriate given the socio-economic status of the communities within boundary of the CPA # 01.

It is expected that the CPA will contribute towards the reduction of deforestation and degradation of forests in the FWDR through wide and voluntary participation of the people in adopting the fuel efficient ICS. This will also contribute to the improvement in the quality of life for the targeted population through reduction of drudgery, time and money spent on fuel wood collection and through the reduction of indoor air pollution. Globally, the CPA will benefit the environment by reducing emissions of GHG in the atmosphere. The CPA # 01 will target primarily the rural poor, including women and other marginalized people.

The ICS has major advantages over the traditional stoves. The main features are as below:[2]

Appreciable reduction of smoke in house:
- eye irritation and inhaling of smoke reduced significantly
- babies and small children less affected by smoke
- less soot on clothes, walls and house

Easier and faster to cook:
- no chance of soot falling on the food
- constant feeding with fire sticks not required, saving time for other work
- faster cooking

Fuel efficient:
- less fuel wood consumption and thus less fuel wood collection required
- efficient heat transfer
- more efficient combustion of fuelwood

Safer for users, children and babies:
- less danger for children or babies falling into the fire
- less chance of mattresses, beds and roofs catching fire

Easy to install and repair:
- the bricks can be locally made, no need to purchase materials from afar
- broken parts can be easily repaired or replaced
- easy to replicate
- no hi-tech skill is required for installing ICS

[1] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

[2] Hedeon Household energy Network: Boiling Point. Issue 38: Dissemination of improved stoves in Nepal. http://www.hedon.info/BP38_DisseminationOfImprovedStovesInNepal?bl=y

This CPA is a voluntary action by SNV Netherlands Development Organisation, Nepal (hereafter also called "SNV").

A.4. Entity/individual responsible for CPA
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The CME for the SSC CPA # 01 is the SNV Netherlands Development Organisation, Nepal. The CPA Implementing Entity for CPA # 01 is the Centre for Rural Technology, Nepal (CRT/N). SNV Netherlands Development Organisation, Nepal and Centre for Rural Technology, Nepal (CRT/N) have signed an Agreement for CPA Implementation and Management Under ICF CDM Program of Activities on 25/06/2013.

A.5. Technical description of the CPA
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The CPA promotes appliances involving efficiency improvements in the thermal applications of non–renewable biomass by introducing more efficient biomass fired cooking stoves (ICS). In the CPA # 01 CRT/N will disseminate multiple ICS models. Two examples of the types of ICS which shall be disseminated in the CPA are RS1.1 and RS3.1, described below. The project implementer continues to make modifications to the stove models per user feedback, thus new models of the ICS may be included in the CPA. Product technology specification shall be reviewed upon verification.

Figure A.5.1: ICS in use

The main design improvement is the pre-fabricated metallic or ceramic combustion chamber. This ensures consistent quality and durability of the ICS and will improve the lifespan of the stove with consistent performance in terms of efficiency, reduction of indoor air and emissions, and safety. The metal or ceramic combustion chamber is surrounded by an isolative material (the installers are currently using ash), and then the outer body is constructed in a cube shape. Both stoves have been developed through R&D conducted by CRT/N.

The RS1.1 has a combustion chamber made with 2 mm Mild Steel and outer body made entirely with locally available mud/clay and mud bricks. The diameter of the combustion chamber is 10.8cm.

Figure A.5.2: Technical Design of an RS1.1 Metal Combustion Chamber with Top Plate.

Some technical details RS1.1 stoves are presented below:

Model: RS1.1
Type: Rocket Stove with Metallic Combustion Chamber with Metallic Top Plate
Fuel Type: Firewood
Thermal Efficiency: 23.4%

Pre-Fabricated Metallic Components:

- Combustion Chamber (L-Shape)
- Top Plate (Round) with
  - Pot Rest (chamka) and
  - Load bearing bars and base ring
- Wood Rest/Shelf (Rectangular)

Material Used in the Pre-Fabricated Parts:

- 2 mm Mild Steel Pipe of 10.8 cm diameter for combustion chamber
- 2 mm Mild Steel sheet for top plate and wood rest
- 5 mm Mild Steel sheet for pot rest (4 piece)
- 3*20 mm MS flat for top base ring
- 25*25*3 mm MS angle for load bearing bars

The design of the RS3.1 differs from the RS1.1 as the pre-fabricated combustion chamber is kiln-fired ceramic, and is 9.5cm in diameter. Like the RS1.1, it also has a metal top plate made from 2 mm mild steel.

Figure A.5.3: Technical Design of an RS3.1 Ceramic Combustion Chamber with Top Plate

Some technical details of the RS3.1 are presented below:

Model: RS3.1
Type: Rocket Stove with Ceramic Combustion Chamber with Metallic Top Plate
Fuel Type: Firewood
Thermal Efficiency: 30.1%

Pre-Fabricated Metallic and Ceramic Components:

- Kiln-fired Ceramic Combustion Chamber (L-Shape)
- Top Plate (Round) with
    - Pot Rest (chamka) and
    - Load bearing bars and base ring
- Wood Rest/Shelf (Rectangular)

Material Used in the Pre-Fabricated Parts:

- 20 mm Ceramic Pipe of 9.5 cm diameter for combustion chamber
- (Composition: Red Clay 60%+Coarse Sand 20%+Talc Powder 20%)
- 2 mm Mild Steel sheet for top plate and wood rest
- 5 mm Mild Steel sheet for pot rest (4 piece)
- 3*20 mm MS flat for top base ring
- 25*25*3 mm MS angle for load bearing bars

The RS1.1and RS3.1 stoves will be produced in Nepal. In 2012, two manufacturers were trained to produce these stoves:

- Durga Engineering Works, Dhangadhi Municipality- 4, Chauraha, Kailali District
- Rijwan Engineering Udhyog, Nepalgunj Municipality-14, Industrial Area, Banke District

In 2013, three additional manufacturers were included:

- Asain Metal Udhyog, Amargadhi Municipality-5, Tuphan Danda, Dadeldhura District
- Siddhartha Engineering Works, Nepalgunj Municipality-14, Industrial Area, Banke District
- Jagadamba Engineering Works, Nepalgunj Municipality-5,Ganeshpur, Banke District

Efficiency of RS1.1and RS3.1 stoves

Water Boiling Tests (WBTs) were conducted by CRT/N on the ICS rocket stoves and have demonstrated that the average thermal efficiency of the RS1.1 and RS3.1 is 23.4% and 30.1%, respectively.[3] For ex-ante calculations of CPA #1, a 66.66%/33.33% split in the distribution of two stove models is assumed, based on the CME's intended plans for dissemination.

The minimum technical lifetime of ICS is estimated to be 3 years, but depending on usage conditions the stoves may remain in use for longer. Once the ICS will go out of the operation, it is intended that there will be systems in place within the framework of the PoA to provide households with replacement ICS.

The efficiency of ICS stoves distributed under the CPA # 01 is higher than that of the 3 stone fires and other traditional unimproved stoves used in the baseline scenario in the households of the FWDR. The

[3] WBT test protocols of RS1.1 and RS3.1 cook stoves; CRT/N laboratory

baseline survey conducted in the FWDR[4] demonstrated that semi enclosed traditional mud stoves, 3 stone fires and the odan chulo (metal tripod stoves) are the commonly used stoves throughout the project area. There are no laws, policies, or mandatory requirements in Nepal stipulating the adoption of efficient improved cook-stoves. Thus, it is assumed that the baseline scenario will be continuation of the current scenario, i.e. the usage of the traditional stoves used in the baseline scenario. These conventional devices lack an improved combustion air supply or flue gas ventilation (e.g. a grate or a chimney), thus as per paragraph 12 of the applied UNFCCC methodology AMS-II.G version 05, the default efficiency value of 0.10 will be used.[5] Also, in the past a number of ICS were distributed in the FWDR under other ICS implementation programs. SNV does not intend to disseminate to households which might have had ICS introduced by previous programs, but in some rare cases, ICS distributed by other programs may be discovered in use in the baseline. In order to take into account such rare cases, in line with paragraph 12 of the methodology AMS-II.G version 05, the type of baseline stove in use will be noted at the time of sale and if ICS stoves are in use in the baseline, those project ICS will not be included for emission reduction crediting.

The mass and energy flow of baseline and project scenarios are shown in the following figure A.5.4. After the project implementation, the same amount of thermal energy is supplied after implementation of the CPA with a smaller quantity of woody biomass, owing to the efficiency improvement of the ICS.

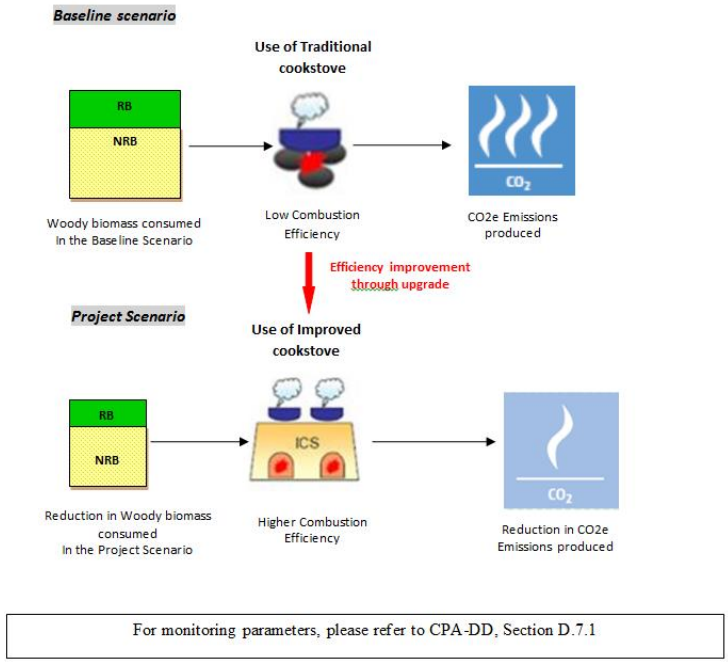

Figure A.5.4: Mass and energy flow of baseline and project scenarios, with the installation of the RS 1.1 or RS 3.1 stoves

SNV as the CME will set up and apply procedures, appropriate records, and documentation control processes to assert legal rights of the carbon credits generated by CPA # 01 and to avoid double counting. Transfer of rights of CERs will be done by end-users signing a User Agreement with Carbon Rights

[4] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region. CDM Baseline Report, Final Report, December 2012.
[5] UNFCCC Methodology AMS II.G version 05.0

Waiver at the time of sale. CRT/N will transfer the information of each ICS sold to the Sales Database, which will ensure that no ICS is counted more than once under the CPA as per the PoA-DD. The Sales Database will also serve as the basis for the calculation of CERs.

A.6. Party(ies)

Name of Party involved (host) indicates a host Party	Private and/or public entity(ies) CPA implementer(s) (as applicable)	Indicate if the Party involved wishes to be considered as CPA implementer (Yes/No)
Federal Democratic Republic of Nepal (host)	Centre for Rural Technology, Nepal (CRT/N)	No

A.7. Geographic reference or other means of identification

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Each ICS in the CPA is uniquely identified by the information in the Sales Database, including the serial number, which uniquely identifies each ICS. ICS disseminated under CPA # 01 may be distributed in any of the 7 districts of the Far Western Development Region (FWDR) of Nepal, namely in the districts Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang, and Bajura.

Geographical references for each district:

District	Latitude	Longitude
Doti	N 29 13.230	E 80 53.857
Dadeldhura	N 29 14.596	E 80 30.044
Baitadi	N 29 31.155	E 80 28.125
Accham	N 29 04.378	E 81 15.611
Darchula	N 29 54.440	E 80 45.783
Bajhang	N 29 47.865	E 81 15.363
Bajura	N 29 38.562	E 81 36.292

Figure A.7.1: Geographical area covered by CPA # 01 – districts Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang & Bajura (in color) in which ICS may be installed.

A.8. Duration of the CPA

A.8.1. Start date of the CPA

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The start date of the CPA # 01 is 23/05/2013, the date of the installation of the first ICS included in the CPA. This is after the start date of PoA- 22/05/2013 – the date of upload to the UNFCCC website for Global Stakeholder Consultation.

A.8.2. Expected operational lifetime of the CPA

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10 years

A.9. Choice of the crediting period and related information

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10 years fixed

A.9.1. Start date of the crediting period

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20/02/2014

A.9.2. Length of the crediting period

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10 years. The length of the crediting period for CPA # 01 is within the PoA crediting period and will not extend beyond the end of the crediting period for PoA.

A.10. Estimated amount of GHG emission reductions

An estimation of emission reductions planned to be achieved by the CPA # 01 is provided in the table below:

Emission reductions during the crediting period	
Years	**Annual GHG emission reductions (in tonnes of CO2e) for each year***
Year 1	41,587
Year 2	41,587
Year 3	41,587
Year 4	41,587
Year 5	41,587
Year 6	41,587
Year 7	41,587
Year 8	41,587
Year 9	41,587
Year 10	41,587
Total number of crediting years	10
Annual average GHG emission reductions over the crediting period	41,587
Total estimated reductions (tonnes of CO2e)	415,874

*As per the small scale methodology AMS-II. G version 05.0 paragraph 20 and paragraph 29 (c), the net to gross adjustment factor of 0.95 has been applied to B_y to account for leakages, thus leakage emissions were already taken into account in the estimation of overall emission reductions (equation 1 Step 1, LAF parameter).

A.11. Public funding of the CPA

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The CPA # 01 will not receive nor make use of any public funding.

A.12. Debundling of small-scale component project activities

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According to the "Guidelines on assessment of debundling for SSC project activities, version 03 (EB 54, Annex 13, par. 10) for determining the occurrence of debundling under a Programme of Activities (PoA)", if each of the independent subsystem/measures included in the CPA of a PoA is not larger than 1% of the small scale threshold defined by the methodology applied, then that CPA of the PoA is

exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity".

Furthermore, the CPA is limited by the small scale threshold of AMS II.G (ver. 05), i.e. the maximum energy savings of the sum of all ICSs implemented under a specific CPA (i.e. CPA # 01) shall not exceed thermal energy savings of 180 GWh_{th}/year (threshold as per clarification request SSC_233; http://cdm.unfccc.int/methodologies/DB/6U8JYO9XTLVZ8LJ7GUBSZP145BIDG2).

Through the ex-ante calculations (provided in Section D.6.3 of this CPA-DD), the annual energy saving per stove is estimated at 0.00963 GWh_{th}/year. This value is significantly smaller than 1.8 GWh_{th}/year (1% of the 180 GWh_{th} threshold for small scale projects). Thus, CPA # 01 is therefore considered as being not a de-bundled component of a large scale activity.

A.13. Confirmation for CPA

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This small-scale CPA # 01 is neither registered as an individual CDM project activity nor part of another registered PoA. All ICS under the CPA # 01 are uniquely identified by their serial numbers recorded in the Sales Database, which ensures no double counting. Therefore no ICS distributed under this CPA # 01 will be part of another single CDM project activity or CPA under another PoA.

At the time of joining the PoA, it has been checked and verified by the CME, through the UNFCCC, Gold Standard and Voluntary Carbon Standard websites that the CPA is neither registered nor intends to register with any of the carbon schemes. Confirmation from the CPA Implementer to the CME that the CPA has/shall not been proposed as an individual CDM project and/or as a part of any other CDM PoA and/or any other mechanism to avail climate change mitigation benefits has been provided through the CPA Implementation Agreement.

SECTION B. Environmental analysis

B.1. Analysis of the environmental impacts

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As per the SSC-PoA, the Environmental Analysis is to be carried out at the PoA level, unless required by the host country. CPA # 01 has already complied with the host country (Nepal) environmental legislation since no requirements on the conducting environmental analysis exists in Nepal with respect to the implementation of ICS projects.

As per the Environment Protection Regulation (EPR 1997 Schedule 1 and Schedule 2) the Improved Cooking Stove project is not enlisted in the project category requiring Environmental Impact Assessment (EIA).[6]

The inefficient burning of solid fuels on an open fire or traditional stove indoors creates a dangerous combination of hundreds of pollutants, primarily carbon monoxide and small particles, but also nitrogen oxides, benzene, butadiene, formaldehyde, poly aromatic hydrocarbons and many other health-damaging chemical. The ICS disseminated under this CPA # 01 will directly benefit the population by reducing indoor air pollution, thus reducing respiratory disease due to toxic fumes. The CPA will also contribute to environmental protection by curbing the rate of deforestation throughout the Far Western Development Region of Nepal. Consequently, the installation of ICS under the CPA will bring only positive effects on the environment.

[6] Environment Protection Rules, 2054 (1997) Published in The Nepal Gazette on 2054.3.12 (June 26, 1997). http://www.lawcommission.com

SECTION C. Local stakeholder comments

C.1. Solicitation of comments from local stakeholders

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Local stakeholder consultation is provided at the PoA level

C.2. Summary of comments received

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Local stakeholder consultation is provided at the PoA level

C.3. Report on consideration of comments received

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Local stakeholder consultation is provided at the PoA level

SECTION D. Eligibility of CPA and Estimation of emissions reductions

D.1. Title and reference of the approved baseline and monitoring methodology(ies) selected:

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The small scale approved baseline and monitoring methodology AMS-II.G, version 05; "Energy efficiency measures in thermal applications of non-renewable biomass" is applied for CPA # 01.

D.2. Application of methodology(ies)

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Applicability Requirement of AMS-II G, Version 05.0	CPA under the PoA	Criteria Met?
This category comprises efficiency improvements in thermal applications of nonrenewable biomass. [7] Examples of applicable technologies and measures include the introduction of high efficiency biomass fired cook stoves or ovens or dryers and/or energy efficiency improvements in existing biomass fired cook stoves or ovens or dryers.	CPA # 01 involves the distribution of energy efficient ICS.	Yes
Single pot or multi pot portable or in-situ cook stoves with specified efficiency of at least 20%.[8] The efficiency of the stoves shall be tested by a national standards body or by an appropriate certifying agent recognized by it. Alternatively, manufacturers' specifications may be used.	ICS with efficiency levels of at least 20% are included in the CPAs as per the technical specification/test results from third party testers using the WBTs. Results of WBTs conducted by CRT/N on the RS1.1 and RS3.1 stoves indicate the average thermal efficiency to be 23.4% and 30.1%, respectively. Any additional ICS models included shall have an efficiency level of at least 20%.	Yes
Project participants are able to show that non-	It has been shown that non-	Yes

[7] SSC methodology AMS II.G, version 5, paragraph 2

[8] SSC methodology AMS II.G, version 5, footnote 2

renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	renewable biomass has been used in Nepal since 31 December 1989, using published literature, official reports or statistics. Refer to Section D.4 of this CPA-DD for details on non-renewability status of the biomass in Nepal and the determination of the non-renewable biomass fraction.	
The project participants shall apply the general guidelines to SSC CDM methodologies	On average each ICS used saves considerably less than 1% (i.e. 1.8 GWh_{th}) of the energy limit for Type II projects using small-scale methodologies. It is estimated ex-ante that one ICS will lead to average energy saving of 0.00963 GWh_{th}/year. The CPA # 01 is of small-scale, since all 18,000 ICS which will be disseminated under CPA # 01 will not exceed the threshold (180 $GWh_{(th)}$) for thermal energy savings (i.e. 17,100 operating stoves multiplied by 0.00963 GWh_{th}/year will result in 164.615 GWh_{th}/year in energy savings).	Yes
Specific criteria expected by the methodology for project activity under PoA: a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage; b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage	As provided for in AMS.II.G Version 05, paragraph 20, option c) was selected to account for leakages and B_{old}[9] has been multiplied by a net to gross adjustment factor of 0.95 to account for the PoA-related leakages, in which case surveys are not required.	Yes

On average, each ICS used saves 0.00963 GWh/year, which is 0.005% of the 180 GWh thermal savings threshold, and considerably less than the energy limit of 1% set for Type II projects using small-scale methodologies. In total, 18,000 ICS distributed under CPA # 01 will lead to average annual energy savings of 164.615 $GWh_{th\,/}$ year (i.e. 17,100 operating stoves * 0.00963). Also the maximum number of stoves under one CPA has been estimated at 18,698 ICS for this CPA #1. This ensures that the total

[9] As per paragraph 31 of the applied methodology AMS-II.G version 05.0, the value of B_{old} (demonstrated in Equation #2, shown in Section D.6.1 of this CPA-DD), has been determined at the PoA level before the registration of the PoA.

energy saving of the CPA does not exceed the threshold limit. Thus, CPA # 01 is therefore considered to be small-scale.

Furthermore, as per the methodology AMS-II.G version 05.0, paragraph 14, "Project participants shall determine the shares of renewable and non-renewable woody biomass in B_{old}." For this PoA, the fraction of non-renewable ($f_{NRB,y}$) to be applied in a component project activity (CPA) has been determined using Option (b) set forth in paragraph 30 of the applied methodology AMS-II.G version 05.0: Use default national values approved by the Board.[10] The national-level default fraction of non-renewable biomass ($f_{NRB,y}$) calculated for Nepal is equal to 86%. This value is approved by UNFCCC[11] and by the Ministry of Environment, Science and Technology of Nepal[12] and will be used for the calculations of Emission Reductions. As the value for $f_{NRB,y}$ is determined through Option (b), monitoring of this parameter will be conducted annually and shall consist of ensuring that the value of $f_{NRB,y}$ is the latest available national default value.

D.3. Sources and GHGs

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As per the methodology, the CPA boundary is the physical, geographical site of the efficient systems using biomass.

Source		Gas	Included?	Justification / Explanation
Baseline	Combustion of non-renewable biomass for cooking in inefficient cook stoves. Emission Factor for combustion of fossil fuels for cooking	CO_2	Yes	Major source of emissions
		CH_4	No	Not included in respect of AMS-II.G
		N_2O	No	Not included in respect of AMS-II.G
Project Activity	Combustion of non-renewable biomass for cooking in efficient cook stoves. Emission Factor for combustion of fossil fuels for cooking.	CO_2	Yes	Major source of emissions
		CH_4	No	Not included in respect of AMS-II.G
		N_2O	No	Not included in respect of AMS-II.G
Leakage	Leakage related to the non-renewable woody biomass saved by the project activity[13]	CO_2	Yes	B_{old} is multiplied by a net to gross adjustment factor of 0.95 to account for the leakages.
	Leakage associated with devices currently being	CO_2	No	The ICS included in the PoA do not

[10] Default values endorsed by designated national authorities and approved by the Board are available at http://cdm.unfccc.int/DNA/fNRB/index.html

[11] UNFCCC: Default values of fraction of Non-renewable biomass. http://cdm.unfccc.int/DNA/fNRB/index.html

[12] Ministry of Environment, Science & Technology of Nepal. Endorsement of default value of Non Renewable Biomass (NRB) for Nepal as 86%. 5, June 2012. http://cdm.unfccc.int/DNA/fNRB/docs/nepal.pdf

[13] As per paragraph 20 of applied methodology AMS-II.G version 05.0

	utilised outside the project boundary and then being transferred to the project activity[14]			include any second-hand equipment but are all exclusively manufactured locally. Thus no currently utilised equipment will be transferred from outside the boundary to the project activity.

The CPA # 01 is located within the geographical boundary of the proposed SSC PoA., i.e. within the districts Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang & Bajura of FWDR of Nepal. This will be confirmed by end users contact information collected at the time of sale, and stored in the CPA ICS Database (please see Section D.5, Eligibility Criteria #1 of this CPA-DD).

Mass and energy flow of baseline and project scenarios are described in section A.5 of this CPA-DD.

D.4. Description of the baseline scenario

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The baseline scenario for the CPA # 01 is identical to the baseline scenario for the PoA, since the geographical boundary of the CPA # 01 is identical to the geographical boundary of the PoA (i.e. the FWDR of Nepal) and the ICS in CPA # 01 will be distributed to the same end-users (households) as in the case of PoA.

Continuous usage of existing wood fuel cookstoves by households will be the most probable scenario in the FWDR of Nepal, in the absence of the project. Among the regions 365,417 households, 90.80% were found to be using fuel wood for cooking.[15] Access to other cookstove technologies in this region is unlikely to increase, mainly due to the high prices for such technologies (such as biogas, LPG, etc.), which prove too expensive for households in this poor region of Nepal. For example, in the 7 selected districts of the CPA # 01 there are only 589 biogas plants compared to the national figure of over 250,000.[16] These 589 plants represent low a penetration rate of 0.28%, demonstrating that access to biogas in the PoA region is very low.

In the framework of CPA # 01 it is envisaged that only traditional unimproved cookstoves that use non-renewable biomass will be replaced. ICS disseminated in the past under other initiatives will be not replaced and the HHs possessing those ICS will be not covered or included by CPA # 01. According to the methodology applied (AMS-II.G, Version 05), it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs (Paragraph 10 of AMS-II.G, Version 05).

The Baseline Report "Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region" prepared by Scott Wilson Nepal Pvt. Ltd in

[14] As per paragraph 21 of applied methodology AMS-II.G version 05.0

[15] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

[16] SNV Programme Implementation Document (PID). Improved Cook Stove Programme with Carbon Finance (ICF), Nepal. June 2012, p.12

December 2012 demonstrated that in the HHs using traditional cookstoves in FWDR, traditional mud stoves (54.49%) were found to dominate the kitchen followed by three stone stoves (26.25%) and odan/metal tripod stoves (13.95%). All of these baseline stove types may be considered unimproved, as they are either a three stone fire or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney. Types of traditional cookstoves used in HHs of the FWDR are depicted in Figure D.4.1. The type of baseline stove (traditional or ICS) replaced will recorded in the CPA ICS Sales database.

a) mud stove

b) metal tripod stove (odan)

c) three-stone fire

Figure D.4.1 Traditional cook-stoves

According to the methodology AMS-II.G, Version 05, §12, for the establishment of efficiency of baseline stoves a default value of 0.10 may be optionally used if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney. Thus, it is assumed ex-ante that the efficiency of traditional cookstoves is equal to 10% (0.10).

Fraction of Non-Renewable Biomass ($f_{NRB,y}$)

Using published country-specific data, it is established that non-renewable biomass has been used since 31 December 1989, within the geographic boundary where the CPA is implemented.

The national-level default fraction of non-renewable biomass ($f_{NRB,y}$) calculated for Nepal is equal to 86%. This value is approved by UNFCCC[17] and by the Ministry of Environment, Science and Technology of Nepal[18] and will be used for the calculations of Emission Reductions.

[17] UNFCCC: Default values of fraction of Non-renewable biomass. http://cdm.unfccc.int/DNA/fNRB/index.html
[18] Ministry of Environment, Science & Technology of Nepal. Endorsement of default value of Non Renewable Biomass (NRB) for Nepal as 86%. 5, June 2012. http://cdm.unfccc.int/DNA/fNRB/docs/nepal.pdf

According to the AMS-II.G version 05, at least 2 of the following indicators must be shown to exist, either through reference to published literature, official reports or statistics, for supporting the use of NRB.

a) 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;

b) 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;

c) Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;

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

As stated in the Baseline Report Study made for the FWDR, the time required to reach forest areas in the FWDR has been increasing. 64.47% of HHs questioned in the survey perceived that the time required to collect required quantity of firewood has increased.[19] Thus, indicator a) is proven to exist.

As stated in the "Energy Sector Synopsis Report" published by the Water and Energy Commission Secretariat of Nepal in July 2010,[20] the forest area in Nepal has been decreasing since 1978, as visible from Figure B.4.2 below.

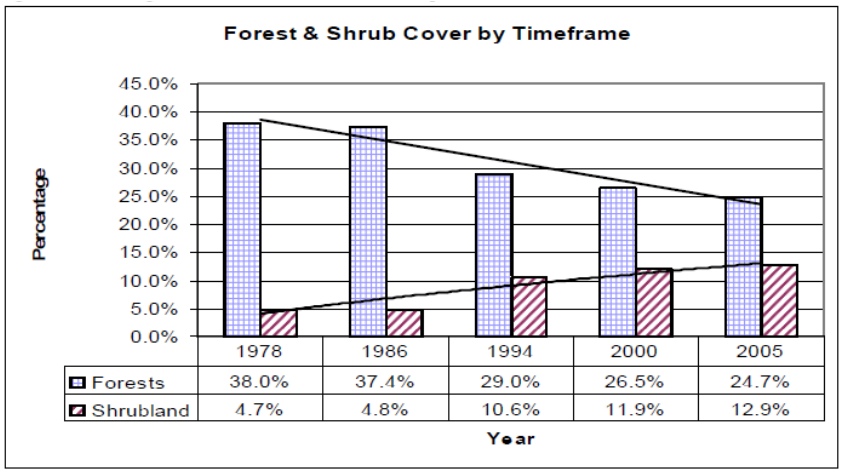

Figure B.4.2. Changes in Forests and Shrubs in Nepal (Source: Figure 2.10, Energy Sector Synopsis Report" published by Water and Energy Commission Secretariat in July 2010)

Furthermore, forest area in Nepal has reduced significantly from 1990 to 2005, according to "Global Forest Resources Assessment 2005" published by FAO.[21]

[19] Scott Wilson Nepal Pvt. Ltd. Preparation of Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012, p.v
[20] http://wecs-neep.com/pdf/WECS_Energy%20Sector%20Synopsis%20Report%202010.pdf
[21] http://www.fao.org/forestry/country/32185/en/npl/

Extent of forest and other wooded land

FRA 2005 categories	Area (1000 hectares)		
	1990	2000	2005
Forest	4,817	3,900	3,636
Other wooded land	1,180	1,753	1,897
Forest and other wooded land	**5,997**	**5,653**	**5,533**
Other land	8,303	8,647	8,767
...of which with tree cover	-	-	-
Total land area	**14,300**	**14,300**	**14,300**
Inland water bodies	418	418	418
Total area of country	**14,718**	**14,718**	**14,718**

Figure B.4.3. Forest area statistics of Nepal (Source: FAO, Global Forest Resources Assessment 2005)

Newest statistics available from Central Bureau of Statistics of Nepal also demonstrate that the usage of fuelwood in Nepal continues to grow (Figure B.4.4).

Residential Sector Energy Consumption

(In '000' GJ)

Fule Type	2005/06	2006/07	2007/08	2008/09
Traditional	323577	331082	338140	344956.2
Agricultural residue	12502	13007	13280	13334.5
Animal dung	21626	22080	22544	23017.4
Fuelwood	289449	295954	302316	308604.3
Commercial				
Petroleum				
Coal	39	27	44	35.1
Electricity	2901	3216	3427	3534.3
Fuel Oil	0	0	0	0
Air Turbine Fuel	0	0	0	0
Gasoline	0	0	0	0
High Speed Diesel	0	0	0	0
Kerosene	6831	6056	4582	2126.6
Light Diesel Oil	0	0	0	0
LPG	2184	2689	2378	3201.4
Non energy	0	0	0	0
Renewables				
Biowaste	0	0	0	0
Biogas	2200	2422	2614	2593.1
Micro Hydro	57	79	91	136
Solar	4	4	4	5.6
Total	**337793**	**345534**	**351280**	**356588.3**

Source : Water and Energy commission

Figure B.4.4 Residential Sector Energy Consumption in Nepal (Source: Central Bureau of Statistics of Nepal. Statistical Pocket Book Nepal 2010[22])

The baseline Study for the FWDR[23] also indicated that the majority of respondents (52.63%) in FWDR believe that the forest cover has declined in their region. Further, 66.67% of the households surveyed ranked household fuel wood collection as the major reason for forest area decrease.

[22] Central Bureau of Statistics of Nepal (2010): Statistical Pocket Book Nepal. http://cbs.gov.np/wp-content/uploads/2012/Pocket%20Book%202010/Chapter03/Chapter_3_3.pdf

[23] Scott Wilson Nepal Pvt. Ltd. Preparation of Emission Reduction Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

Based on the information available above, indicator b) above is proven to exist.

Also, according to the Baseline Study made for the FWDR[24], more than 72% of the respondents reported increases in fuel wood prices, while the rest perceived no reduction in the fuel wood price. Increased fuel wood prices imply declining availability and increased efforts to collect and transport firewood. Fuel wood price also indicates the use of non-renewable biomass in the study area. Thus, indicator c) above is proven to exist.

In summary, three of four indicators exist that indicate that NRB has been used since 31 December 1989, and thus the condition is applicable.

$Q_{biomass}$

The quantity of woody biomass used in the absence of the project activity in tonnes per device is determined based on the survey conducted by Scott Wilson Nepal Pvt Ltd, in December 2012, for the completion of the report titled: "Preparation of emission reduction baseline of the Improved Cookstove Programme in hilly districts of Far Western Development Region." In this survey, a total of 301 households were surveyed with a pre-designed questionnaire. The survey had been conducted in all seven hill districts of the FWDR: Achham, Baitadi, Bajhang, Bajura, Dadeldhura, Darchula and Doti. Two VDCs from each district were surveyed fulfilling the condition of neither adjacent nor administratively adjacent to district head quarter. The distribution of sample households in each VDC is calculated proportionately. Details on the definition of $Q_{biomass}$ are presented in Appendix 4.

Mean fuel consumption per household in the FWDR of Nepal in the baseline was reported at 4.031 tons per year per household. This figure is taken as the $Q_{biomass}$ value for the calculation of baseline emissions and is selected in conservative manner. Compared with $Q_{biomass}$ determined in other studies, the baseline fuel consumption is smaller, and thus is more conservative. For example, the baseline survey report for another PoA CDM project located in Nepal titled "Efficient Fuel Wood Cooking Stoves Project in Foothills and Plains of Central Region of Nepal" found that 4.61 tons of fuelwood is consumed each year by a typical household in the area.[25] Another similar proposed CDM PoA in Nepal titled "Programme to Reduce Non-Renewable Biomass Consumptions through Introduction of High-Efficiency Cook Stoves" found the baseline fuelwood consumption in Nepal to be equal to 5.06 t per household on average.[26] The baseline Study to develop a Clean Development Mechanism or Voluntary Carbon Project for the Biomass Support Programme (NESS, 2010), as cited in the Baseline Report,[27] has found an average wood consumption by HHs of 11.59 kg of biomass fuel each day (i.e. 4.23 tons extrapolated to one year). Thus, a value of 4.031 tonnes of fuelwood per household per year is considered conservative.

D.5. Demonstration of eligibility for a CPA

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[24] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

[25] CDM-SSC-PDD for CDM project Number 4530 "Efficient Fuel Wood Cooking Stoves Project in Foothills and Plains of Central Region of Nepal" registered on May 15th, 2011. p. 67 http://cdm.unfccc.int/Projects/DB/DNV-CUK1298888484.88/view

[26] PoA DD for the CDM project titled "Programme to Reduce Non-Renewable Biomass Consumptions through Introduction of High-Efficiency Cook Stoves" (p. 30); http://cdm.unfccc.int/ProgrammeOfActivities/Validation/DB/NXW8NYFJ1P4SIED5ISBCE7SIJDD42Q/view.html

[27] Scott Wilson Nepal Pvt. Ltd. Report "Preparation of emission reduction baseline of the Improved Cook Stove Programme in Hilly Districts of Far Western Development Region."

In compliance with the "Standard: Demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities," version 03.0 (EB 65, Annex 3), the CPA # 01 is eligible for inclusion in the PoA as demonstrated below:

No.	**Eligibility Criteria for inclusion of CPA in PoA**		**Assessment for CPA # 01**	
	Description	**Conditions to be met**	**Means of proof**	**Conclusion** *(Yes/No)*
1	Boundary and location of the CPA	All CPAs have to be located in Nepal in one or several of the following districts - Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang, and Bajura.	Location and boundary is specified in the specific CPA DD and confirmed through end user contact details contained in the CPA ICS Sales Database.	Yes As listed in PoA DD, the boundary of CPA # 01 matches with the boundary of PoA (i.e. of the FWDR).
2	Avoiding double counting	The CPA includes a means of uniquely identifying the stoves to be distributed and the end-users who will receive stoves. This shall ensure no double counting of stoves within the PoA and ensure that stoves can be identified as belonging to this PoA and not to a PoA managed by any other CME.	In each CPA DD it shall be confirmed that each ICS is installed within the framework of CPA, and that households to which ICS are disseminated do not participate in any other cookstove distribution scheme under CDM. Each ICS sold under the SSC-CPA shall be uniquely marked using an ICS serial number and recorded in the PoA Distribution and Monitoring Database for the full life of the PoA in order to ensure that no double counting will occur. The primary evidence of that will be information stated in User Agreement, as well as information contained in the PoA database. The CPA shall not be proposed as an individual CDM project and/or as a part of any other CDM PoA and/or any other mechanism to avail climate change mitigation benefits. This shall be cross-checked and verified by the CME with the UNFCCC, Gold Standard, and Voluntary Carbon Standard websites.	Yes As this is the first CPA, the CPA Sales Database has been provided showing end user details and stove serial numbers. A copy of the User Agreement/Carbon Rights Waiver is also given to customer and additional copies are held by the CPA Implementer.

			A statement shall be included in the CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another PoA and confirmed by the Partner Organization (PO) implementing the CPA.	
3	Applicability Of Methodology AMS-II. G version 05.0 – Technology type	The ICS uses one of the following fuel types: -non-renewable biomass	Technical specification of ICS provided and CPA ICS Sales Database with confirmation from end user that non-renewable biomass was used in the baseline scenario.	Yes Manufacturer's specifications state that the distributed RS1.1 and RS3.1 stoves use biomass as the fuel. In addition, for each sale the type of baseline stove and baseline fuel is recorded in the CPA ICS Sales Database.
4	Applicability of Methodology AMS-II. G version 05 – Minimum ICS Efficiency/specifications of technology including the level and type of service	Each CPA consists of replacement of conventional firewood cookstoves for biomass fired ICS as defined in section Part II, B.4 of the PoA-DD. Conventional stoves replaced will be any of the types identified in the baseline scenario and as applied by the specific CPA. Stove types replaced and implemented will be defined in the CPA-DD, meaning the appliances involving the efficiency improvements in the thermal applications of non-renewable biomass as per AMS II. G, ver. 5. All types of disseminated ICS shall have a stove efficiency of at least 20% at the time of inclusion.	Conventional stove type replaced shall be demonstrated at time of sale and performance characteristics of project technologies shall be demonstrated through manufacture specifications or by the results of samples of a Water Boiling Test (WBT) performed by qualified professionals.	Yes For each sale, the type of baseline stove replaced is recorded in the CPA ICS Sales Database and only the replacement of conventional, unimproved stoves is included for emission reduction calculations. WBTs of RS1.1 and RS3.1 stoves demonstrate average thermal efficiency of 23.4% and 30.1% respectively. Any additional ICS models included shall have an efficiency level of at least 20%.
5	Start date of the CPA.	The start date of the CPA shall be after the PoA start date, 22/05/2013, the date of	The start date of the CPA will be specified in each CPA-DD and	Yes Start date is the date

		upload to the UNFCCC website for Global Stakeholder Consultation	appropriate proof will be provided (e.g. this could include, but need not be limited to a document showing the stove(s) shipping date(s), document showing date on which local assembly started, sales receipt of ICS to ensure that it is later than the starting date of PoA, or CPA ICS Sales Database records.)	of first installation of ICS eligible for CPA # 01.
6	Applicability of Methodology AMS-II.G version 05.0 - Non Renewable Biomass in Use since December 1989	Each CPA shall demonstrate that non-renewable biomass has been in use since December 1989.	At least two of the factors listed in paragraph 17 of methodology AMS-II.G. Versions 05.0 are shown to exist in CPA. Each CPA shall demonstrate that nonrenewable biomass has been used since 31 December 1989 using published literature, official reports, or statistics.	Yes In Section B.4. of the PoA DD, it is demonstrated that NRB has been in use since December 1989 in the whole region of the FWDR.
7	Additionality of CPAs	Additionality of CPA shall be confirmed in line with the Requirements of "Guidelines for demonstrating additionality of small-scale project activities" as described in Section B.1. of this CDM PoA DD. In each SSC-CPA-DD, it shall be demonstrated that: -The nominal annual energy savings of each ICS is lower than 5% of the applicable limit for Type II small scale CDM project activities i.e. of 180 GWh_{th}. -In each SSC-CPA-DD, it shall be demonstrated that the number of ICS to be distributed in a given CPA multiplied by the nominal energy savings of each ICS in a given CPA per annum is lower than the applicable limit for Type II small scale	The level of energy savings from the individual subsystems and the overall CPA are estimated using an Excel sheet or similar tool; the location of the CPA is defined in the CPA-DD; the end user groups are defined in the CPA-DD. At the time of joining the PoA, the maximum number of stoves required to reach the SSC threshold shall be determined and documented in the CPA-DD. Once the maximum number of appliances under the threshold is reached (or before, as deemed appropriate), the CPA shall be closed and, depending on the circumstances, a new CPA may be included to accommodate any new	Yes The CPA size (total energy savings) is below 180 GWh_{th}/year (see PoA Emissions Reduction spreadsheet with calculation of maximum number of stoves allowed for small-scale threshold for CPA). Energy savings of each ICS is below 5% limit of 180 $GWh_{(th)}$, i.e. 9 GWh_{th}/year. Energy saving of one ICS is estimated as 0.00963 GWh_{th}/year what is less that threshold of 9 GWh_{th}/year. Cf. also calculations presented in Section D.6.3. ICS Sales database confirms that end

		CDM project activities i.e. of 180 GWh_{th}. - The project activities are solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs)	stoves sold. - The CPA ICS Sales Database will confirm end users to be households.	users are households.
8	Official Development Assistance (ODA)	The CPA is either: a) not receiving any funding from Annex I parties; or b) the Annex I party funds do not result in a diversion of ODA.	As stated in Section A.7 of the PoA-DD: The PoA has not and will not receive public funding from Parties included in Annex I. Any CPA that receives public funding from Annex 1 parties will confirm that it does not result in diversion of official development assistance.	Yes The CPA is not receiving any funding from Annex I parties. See Appendix 2 of the CPA-DD
9	End-user group	All CPA shall demonstrate that within the PoA boundary, POs have disseminated and installed ICS to households.	The location and district of end-users will be recorded. Proof documents could include but need not be limited to User Agreements and CPA ICS Sales Database, copy of the CME's contract with the PO, and/or agreements with distributors.	Yes ICS Sales database
10	Sampling	Sampling shall be conducted for ongoing monitoring activities based on the "Standard: Sampling and surveys for CDM project activities and programme of activities" (ver.04.1; Sampling Standard). For each SSC-CPA, the manner in which the SSC-CPA complies with the "Standard: Sampling and surveys for CDM project activities and programme of activities" shall be stated in the SSC-CPA-DD, or in a supporting document that shall be made	The CPA-DD either specifies that: a) sampling will be undertaken as part of the PoA Sampling Plan, and Part II, Section B.7.2 describes how the Sampling Plan is to be applied; or b) if CPA-specific sampling is to be undertaken, a CPA specific Sampling Plan must be provided and meet the requirements of AMS-	Yes CPA Specific-Sampling with 90/10 confidence/ precision level will be applied in line with PoA Sampling Plan, which is contained in the PoA-DD.

		available to the DOE.	II.G. Version 5 and the Sampling Standard. The CPA specific sampling approach shall follow the approach outlined in the PoA Sampling Plan except where the Methodology AMS-II.G and/or the Sampling Standard call for a different approach.	
11	SSC Limit for CPAs	The aggregated scale of the annual energy saving per each CPA shall not exceed the annual 180 GWh_{th} SSC threshold for any year throughout the crediting period. If a CPA exceeds the applicable limit in any year, the claimable emission reductions shall be capped based on the estimated GHG reductions in the CPA-DD.	The maximum number of ICS shall be determined in each CPA-DD depending on the technology used (excel sheet or similar tool shall be provided to show calculated energy savings). If a CPA exceeds the applicable limit in any year, the emission reduction claimed shall be capped based on the estimated GHG reductions in the CPA-DD.	Yes The annual energy savings are not beyond the limits of 180 GWh_{th}/year over the entire crediting period – see Emissions Reduction spreadsheet provided.
12	Contractual agreement	In the case that the CME is not responsible for implementation of the CPA, the organization responsible for CPA implementation, known as the Partner Organization (PO), shall sign a contractual agreement with the CME to participate in the PoA. This agreement: -defines the ownership of the carbon emission reduction rights -covers the PO's distribution and monitoring related responsibilities -confirms that the ICS distributed under the CPA have not and will not be distributed under any other carbon project (CDM project, PoA or voluntary carbon market project) - cedes the ICS owners' rights to the carbon credits generated from CPAs under	Contractual agreement in place between the PO and the CME including the CDM-specific responsibilities of the PO (e.g. in an Annex to the contract)	Yes Contract between the CME and the CRT/N relating to the CDM responsibilities of the CRT/N has been provided

		the PoA to the CME		
13	Exempted from bundling	Each CPA shall demonstrate that it is not a de-bundled component of another project. It shall be demonstrated that annual energy saving achieved by each ICS within each CPA is no larger than 1% of 180 GWh_{th} (SSC threshold), i.e. 1.8 GWh_{th}, during the crediting period and shall demonstrate that ICS are installed in multiple households, in line with Guidelines on assessment of debundling for SSC project activities, Version 3, in order to be exempted from performing a de-bundling check.	Specific energy savings for the applied ICS estimated using Excel sheet or similar tool.	Yes The average energy savings of each ICS to be distributed is only around 9.63 MWh/year or less, which is roughly 0.005 % of the 180 GWh_{th} threshold. See emissions reduction calculations spread sheet
14	CPA crediting period does not exceed lifetime of the PoA	The duration of the crediting period of each CPA to be included in the PoA shall not exceed the end date of the registered PoA. In addition, the start date of the crediting period of a CPA shall be on or after either: a) the date of registration of the PoA, if the corresponding CPA-DD is submitted together with the request for registration; b) the date when the CPA was included in accordance with the Project cycle procedure	CPA-DD shall indicate the duration of the CPA crediting period, either for a single 10 year crediting period or a 7 year renewable crediting period. The final date for which CERs can be credited shall be no later than 28 years after the date of registration of the PoA.	Yes The crediting period for the CPA # 01 starts on 20/02/2014 and lasts till 19/02/2023 (i.e. 10 years fixed). This is within the crediting period of the PoA (22/05/2013 – 21/05/2041)
15	Local Stakeholder Consultation	A Local Stakeholder Consultation (LSC) must be conducted prior to inclusion of the CPA in the PoA. If a LSC has already been done at the PoA level, then the LSC does not need to be done again.	Copy of the report for the LSC that was conducted to determine if the LSC was conducted at the PoA or CPA level.	Yes CPA # 01 boundary matches with the PoA boundaries (i.e. initial SSC CPA is located within the districts Doti, Dadeldhura, Baitadi, Achham, Darchula,

				Bajhang & Bajura of FWDR of Nepal), and the LSC analysis is already done on the PoA level. Thus, the LSC was conducted for FWDR of Nepal as a whole and is presented in the "Stakeholder Consultation Report. Improved Cookstove project in Nepal" dated July 2013 which is available to DOE upon request.
16	Environmental Analysis	An Environmental Analysis must be conducted prior to inclusion of the CPA in the PoA. If the Environmental Analysis has already been done at the PoA level, then the analysis does not need to be done again. Similarly, if an exemption has been obtained from a government agency exempting the CME from having to conduct an Environmental Impacts Assessment for the first CPA, then this shall count for all subsequent CPAs.	If required, a copy of the EIA or exemption that was obtained or relevant government law noting exemption for the project type, either for the PoA or for the particular CPA to be included in the PoA. If neither of these is required, then CPA-DD should indicate whether there has been any environmental analysis undertaken already for the first CPA. If not, then environmental analysis must be undertaken in the CPA-DD.	Yes Cookstoves project are exempted from performing environmental analysis as according to the national legislation of Nepal.[28]

Additionality for CPA

A CPA is considered to be additional provided that:

- The CPA is consistent with the current mandatory laws and regulations in the Host Country at the time of inclusion. The proposed CPA # 01 undertaken by CRT/N, is a voluntary action since no laws or regulation in Nepal obligates the distribution and use of improved cook stoves.
- CDM project standard version 05.0 in §155 states "The coordinating/managing entity shall consider that a full additionality assessment is not required in the context of CPA. Instead, the confirmation of additionality for CPAs should be conducted by means of the eligibility criteria."

[28] Environment Protection Rules, 2054 (1997) Published in The Nepal Gazette on 2054.3.12 (June 26, 1997). http://www.lawcommission.com

Based on the analysis of CPA # 01 and applicability of eligibility criteria for the inclusion of CPA into the PoA, it can be concluded that the CPA # 01 satisfies all criteria for the CPA inclusion in the PoA and thus is considered additional under the PoA.

D.6. Estimation of emission reductions

D.6.1. Explanation of methodological choices

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The emission reductions achieved by the CPA # 01 are calculated ex-ante as per AMS-II G, Version 05 methodology as follows:

Equation # 1

ER_y	$= B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected\_fossilfuel} * N_{y,i}$

Where:

ER_y	Emission reductions during the year y in tCO_{2e}
$B_{y,savings}$	Quantity of woody biomass that is saved in tonnes per device
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass in %. The values are approved by UNFCCC and by national authorities. The national-level default fraction of non-renewable biomass ($f_{NRB,y}$) in Nepal is equal to 86%, and this value is approved by UNFCCC (http://cdm.unfccc.int/DNA/fNRB/index.html) and by Ministry of Science, Technology and Environment (MoEST) of Nepal (http://cdm.unfccc.int/DNA/fNRB/docs/nepal.pdf) and will be used for the purpose of calculations of Emission Reductions.
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO_2/TJ on net basis.
$N_{y,i}$	Number of project devices of type i operating in year y, determined by checking of all devices or a representative sample thereof, at least once every two years (biennial) to determine if they are still operating; those devices that have been replaced by an equivalent in-service device will be counted as operating. The basis for calculation will be ICS Sales Database.

Quantity of woody biomass that is saved by one ICS distributed by the CPA # 01 is estimated using Option 2 (§12, equation 3) of AMS-II G, Version 05 methodology as follows:

Equation # 2

$B_{y,savings}$	$= (B_{old} * (1-\eta_{old}/\eta_{new})$

Where:

$B_{y,savings}$	Quantity of woody biomass, in tonnes, that is saved per device.
B_{old}	Quantity of woody biomass, in tonnes, used in the absence of the project activity per device. B_{old} is determined as the product of the number of appliances in use during the year and the average annual biomass consumption per baseline appliance.
η_{old}	Efficiency of the system being replaced, measured using representative sampling methods (fraction). A default value of 0.10 will be used if the replaced device is a three stone fire, or a conventional device with no

	improved combustion air supply or flue gas ventilation, that is without a grate or a chimney (traditional cookstoves)
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol or manufacturer specifications. Weighted average values will be used for all types of ICS being introduced by the project activity.

It is assumed that in some cases a portion of HHs after distribution of the ICS under CPA # 01 will continue the usage of their old traditional cookstove in parallel with the ICS received. To account for such parallel usage of baseline cookstoves, the methodology AMS-II G, Version 05, § 26 (b) prescribes: "If baseline stoves continue to be used, monitoring shall ensure that the fuel-wood consumption of those stoves is excluded from B_{old}." Thus, B_{old} will be calculated according to Equation 3:

Equation # 3

B_{old}	$= LAF * (Q_{biomass} - (\mu_{old} * f_{old})$

Where:

LAF	Net to gross Adjustment factor (0.95) applied in accordance with paragraph 20 and 29 of AMS-II.G Version 05
$Q_{biomass}$	Average annual biomass consumption per appliance (tonnes/appliance/year). The value of $Q_{biomass}$ is based on the survey data from the Baseline Study on woody biomass consumption conducted in the region[29] and is equal to 4.031 tons fuel wood/appliance/year. $Q_{biomass}$, in line with §20 and §29, is multiplied by a net to gross adjustment factor of 0.95 (LAF) to account for leakages, in which case surveys are not required.
μ_{old}	Average amount of woody biomass consumption that is consumed through the continued use of old stoves (tonnes/appliance/year)
f_{old}	Fraction of end users that are still using their replaced stoves during the monitoring period (established through sampling)

To determine the number of appliances in use in year y ($N_{y,i}$) for ex-ante calculations, Equation # 4 is used. To compensate for the actual operating days for a given stove, $N_{y,i}$ is further adjusted for the proportion of the year during which the stoves are in operation use using the factor $Stove_{year}$ and for the fraction of distributed ICS found to be in operation on monitoring stage of the project (SOF) to adjust for ICS drop-off rates in HHs in line with §22 of applied SSC methodology AMS-II.G Version 05.

Equation # 4

$N_{y,i}$	$= N_{all} * SOF * Stove_{year}$

Where:

N_{all}	Total number of ICS distributed under CPA # 01
SOF	Stove Operation Fraction (SOF) (% of stoves

[29] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

	operating or replaced by equivalent in service appliance). The parameter SOF is applied to meet the requirements of the methodology as outlined in paragraph 16 and will be measured ex post using survey/ user feedback in each monitoring period. For ex-ante calculation, SOF is assumed to be 95%, for ex-post calculations, SOF will be statistically determined on the monitoring stage of the CPA # 01.
$Stove_{year}$	Calculated average stove operation years in the monitoring period (years). If stoves have been operating for 365 days then $Stove_{year}$ = 1.0. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (eg. 180 days= 0.5). For ex ante calculation, $Stove_{year}$ is assumed to be equal to 1 (i.e. 365 days of operation in each year of monitoring period)

In order to demonstrate that the CPA # 01 is below the SSC threshold of 180 $GWh_{(th)}$, the following equation is applied:

Equation #5:

$E_{Saving,appliance}$	$= B_{y,savings} * NCV_{biomass} * T_{GWh/TJ}$

where

Parameter	Unit	Description
$E_{Saving,appliance}$	GWh	Average annual energy saving per one ICS distributed in CPA # 01
$B_{y,savings}$	Tonnes	Weighted average annual quantity of woody biomass that is saved in tonnes per one ICS distributed in CPA # 01
$NCV_{biomass}$	TJ/tone	Net calorific value of the non-renewable biomass that is substituted - 0.015 TJ/tone
$T_{GWh/TJ}$	GWh/TJ	Energy Unit Transformation factor – 0.278

Based on Equation #5 the maximum number of ICS in one CPA will be estimated ex-ante by:

Equation #6:

N_{CPA}	$= SSC_{threshold} / E_{Saving,appliance}$

where

Parameter	Unit	Description
N_{CPA}	Number	Maximum number of ICS to be distributed in one CPA in order for

		CPA to be below SSC threshold of 180 GWh_{th}
$SSC_{threshold}$	GWh_{th}	SSC threshold of 180 GWh_{th}

Based on the Equation #6, the number of ICS to be included in one CPA will be determined.

The future Monitoring Surveys will investigate the extent to which baseline stoves are no longer used, even in a secondary role, in the houses adopting the ICS. If it is found that a portion of kitchens exist in which a traditional stove is still used, even in a secondary role, emission reductions will be adjusted to reflect this parallel usage. The means of accounting for parallel usage is discussed in greater detail in Section D.6.2 of this CPA-DD.

The baseline of the project is determined mainly based on the literature review and the Baseline Study conducted in the boundaries of PoA. According to paragraph 31 of AMS II.G version 05, B_{old} may be determined either at the CPA level before the inclusion of CPA or at the PoA level before the registration of the PoA-DD. Since B_{old} is determined at the PoA level, the value is transferred from the PoA DD and used for this CPA DD.

D.6.2. Data and parameters that are to be reported ex-ante
(Copy this table for each data and parameter.)

Data / Parameter	η_{old}
Unit	Fraction
Description	Efficiency of the system being replaced
Source of data	Default value in AMS-II.G, version 05
Value(s) applied	0.10
Choice of data or Measurement methods and procedures	According to AMS-II.G methodology version 05 §12, if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, (lacking a grate or a chimney) a default value of 0.10 for η_{old} may be optionally used; ICS stoves distributed in one CPA will be disseminated only to households with traditional, unimproved cookstoves in the baseline scenario.
Purpose of data	Calculation of baseline emissions
Additional comment	During ICS dissemination in a CPA # 01, the type of baseline cookstove (traditional or ICS) replaced will be recorded and emission reductions will be accounted only for the cases when ICS will replace traditional, unimproved cookstoves.

Data / Parameter	$Q_{biomass}$
Unit	Tonnes/appliance/year
Description	Average annual biomass consumption per appliance (tonnes/appliance/year)
Source of data	Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction Baseline of the Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012
Value(s) applied	4.031
Choice of data or Measurement methods and procedures	The value of $Q_{biomass}$ is based on the survey data from the Baseline Study on woody biomass consumption conducted in the region[30] and is equal to 4.031 tons fuel wood/appliance/year. The value of $Q_{biomass}$ is fixed ex-ante for the purpose of emission reduction calculation.
Purpose of data	Calculation of baseline emissions
Additional comment	Used for calculation of B_{old} as per paragraph 13 (a) of methodology. $Q_{biomass}$ was established with 90/10 confidence/precision. See Appendix 4 for details.

Data / Parameter	LAF
Unit	Fraction
Description	Net to gross adjustment factor to account for leakages
Source of data	AMS-II.G, version 05.0, §29 (c) and §20
Value(s) applied	0.95
Choice of data or Measurement methods and procedures	AMS-II.G, version 05.0, §29 (c) and §20
Purpose of data	Calculation of baseline emissions
Additional comment	-

[30] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

Data / Parameter	μ_{old}
Unit	Tonnes/appliance/year
Description	The amount of woody biomass consumption that is consumed through the continued use of old stoves
Source of data	Scott Wilson Nepal Pvt. Ltd. Report "Preparation of Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region". September 2012
Value(s) applied	0.43
Choice of data or Measurement methods and procedures	This value is fixed ex-ante with data collected from a ICS baseline survey which measured the fuel used by improved cookstove users as well as user using an ICS as well as a traditional stove. Since the methodology assumes that end-users have a predetermined fuel need and that fuel consumption directly correlates to efficiency of the stove in use, the project proponent is able to calculate the amount of fuel used dual cookstove users (users of traditional and ICS) use on their traditional stove using the following formula: $(ICS\ Average\ Consumption) * nnew = (Dual\ cookstove\ Consumption - uold) * nnew + uold * nold$ $180 * .2 = (198 - uold) * .2 + uold * .1$ μ_{old} =0.43
Purpose of data	Calculation of emission reductions
Additional comments	-

D.6.3. Ex-ante calculation of emission reductions
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Ex ante calculation of emission reductions and leakage emissions expected during the crediting period for CPA # 01 is summarized in this section. Here, example calculations are made solely in order to provide a sample calculation for each equation used, substituting the values used in the equations. The formulas used below are listed in the section D.6.1. of this SSC CPA DD.

Step 1: Determination of Quantity of woody biomass used in the absence of the project activity in tonnes per device (B_{old}):

Equation # 3

B_{old}	= LAF * ($Q_{biomass}$ – (μ_{old} * f_{old})
	= 0.95 * (4.031 – (0.43 * 0.1)
	= 3.788

Where:

LAF	Net to gross Adjustment factor (0.95) applied in accordance with paragraph 20 and 29 of AMS-II.G Version 05.0
$Q_{biomass}$	Average annual biomass consumption per appliance (tonnes/appliance/year). The

	value of $Q_{biomass}$ is based on the Baseline Study on woody biomass consumption conducted in the region[31] and is equal to 4.031 tons fuel wood/appliance/year. $Q_{biomass}$, in line with §20 and §29, is multiplied by a net to gross adjustment factor of 0.95 (LAF) to account for leakages, in which case surveys are not required.
μ_{old}	Average amount of woody biomass consumption that is consumed through the continued use of old stoves (tonnes/appliance/year) = 0.43 t/year
f_{old}	Fraction of end users that are still using their replaced stoves during the monitoring period (established through sampling) = 10%

Step 2: Calculation of annual quantity of woody biomass that is saved in tonnes per device ($B_{y,savings}$):

Equation # 2

$B_{y,savings}$	$= (B_{old} * (1-\eta_{old}/\eta_{new}))$
	$= (3.788 * (1- 0.1/0.256))$
	$= 2.310$

Where:

$B_{y,savings}$	Quantity of woody biomass that is saved in tonnes per device.
B_{old}	Quantity of woody biomass used in the absence of the project activity in tonnes per device. B_{old} is determined as per Step 1 above (Equation # 3).
η_{old}	Efficiency of the system being replaced, measured using representative sampling methods (fraction). A default value of 0.10 will be used if the replaced device is a three stone fire, or a conventional device with no improved combustion air supply or flue gas ventilation, that is without a grate or a chimney (traditional cookstoves)
η_{new}	Efficiency of the system being deployed as part of the project activity (fraction), as determined using the Water Boiling Test (WBT) protocol. Weighted average values will be used for all types of ICS being introduced by the project activity; average efficiency will be calculated through sampling distributed stove types proportionately to the total distribution of each stove type . The RS1.1 and RS3.1 have been shown to have thermal efficiencies of 23.4% and 30.1%, respectively. Assuming a distribution of 66.66% of RS 1.1 and 33.33% of RS 3.1, the mean efficiency of the stove types is 25.63%. The value of $B_{y,savings}$ is calculated based on this overall mean η_{new}, which is used in calculating the final ex-ante ER calculations

Step 3: Determination of average annual energy saving per one ICS distributed in CPA # 01 in GWh ($E_{Saving,appliance}$)

Equation #5:

[31] Scott Wilson Nepal Pvt. Ltd. Preparation of emission reduction Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

$E_{Saving,appliance}$	= $B_{y,savings}$ * $NCV_{biomass}$ * $T_{GWh/TJ}$
	= 2.310 * 0.015 * 0.278
	= 0.00963 GWh/year

where

Parameter	Unit	Description
$E_{Saving,appliance}$	GWh	Average annual energy saving per one ICS distributed in CPA # 01
$B_{y,savings}$	Tonnes	Weighted average annual quantity of woody biomass that is saved in tonnes per one ICS distributed as defined per Step 2 (equation 2) above, weighted by stove models disseminated;
$NCV_{biomass}$	TJ/tone	Net calorific value of the non-renewable biomass that is substituted - 0.015 TJ/tone
$T_{GWh/TJ}$	GWh/TJ	Energy Unit Transformation factor – 0.278

Step 4: Determination of the maximum number of ICS in CPA # 01:

Equation #6:

N_{CPA}	= $SSC_{threshold}$ / $E_{Saving,appliance}$
	= 180 / 0.00963
	= 18,698

where

Parameter	Unit	Description
N_{CPA}	Number	Maximum number of ICS to be distributed in one CPA in order for CPA to be below SSC threshold of 180 GWh_{th}
$SSC_{threshold}$	GWh_{th}	SSC threshold of 180 GWh_{th}
$E_{Saving,appliance}$	GWh	Average annual energy saving per one ICS distributed in a given CPA – determined as per Step 3 (equation #5) above.

Step 5: Determine the number of appliances (ICS) in use in year y ($N_{y,i}$)

Equation # 4

$N_{y,i}$	= N_{all}* SOF * $Stove_{year}$
	= 18,000 * 0.95 * 1
	= 17,100

Where:

N_{all}	Total number of ICS installed. For CPA # 01 it is ex-ante assumed to be equal to 18,000.

SOF	Stove Operation Fraction (SOF) (% of stoves operating or replaced by equivalent in service appliance). The parameter SOF is applied to meet the requirements of the methodology as outlined in its paragraph 16 and will be measured ex post using survey/ user feedback in each monitoring period. The CME will select a sample of stoves from the PoA Distribution and Monitoring Database and visit the households that received these stoves. For ex-ante calculation, SOF is assumed to be 95%, for ex-post calculations, SOF will be statistically determined on the monitoring stage of the CPA # 01.
$Stove_{year}$	Calculated average stove operation years in the monitoring period (years). If stoves have been operating for 365 days then $Stove_{year}$ = 1.0. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (eg. 180 days= 0.5). For ex ante calculation, $Stove_{year}$ is assumed to be equal to 1 (i.e. 365 days of operation in each year of monitoring period)

Step 6: Check whether the number of appliances (ICS) in use in year y ($N_{y,i}$) determined in Step 4 is less than the maximum number of ICS in CPA # 01 ($N_{CPA)}$ determined in Step 5:

$N_{y,i} < N_{CPA}$

Inserting values yields 17,100 < 18,698

Thus, one sample CPA is within the SSC threshold limit of energy saving of 180 GWh_{th} .

In the hypothetical case when the number of appliances (ICS) in use in year y ($N_{y,i}$) determined in Step 4 is more than the maximum number of ICS in CPA # 01 ($N_{CPA),}$ than the number of number of appliances (ICS) included under the CPA #1 shall be reduced to meet the SSC limit.

Step 7: Calculation of emission reductions achieved by CPA # 01

Equation # 1

$ER_{y,}$	= $B_{y,savings}$* $f_{NRB,y}$ *$NCV_{biomass}$ * $EF_{projected\_fossilfuel}$ * $N_{y,i}$
	= 2.310* 0.86 * 0.015 * 81.6 * 17,100
	= 41,587 $tCO2_e$

Where:

$ER_{y,}$	Emission reductions during the year y in tCO_{2e}
$B_{y,savings}$	Quantity of woody biomass that is saved in tonnes per device – calculated as per Step 2
$f_{NRB,y}$	Fraction of woody biomass saved by the project activity in period y that can be established as non-renewable biomass in %. The values are approved by UNFCCC and by national authorities (http://cdm.unfccc.int/DNA/fNRB/index.html). Ex-ante value of 86% is used.
$NCV_{biomass}$	Net calorific value of the non-renewable woody biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne)
$EF_{projected\_fossilfuel}$	Emission factor for the substitution of non-renewable woody biomass by similar consumers. Use a value of 81.6 tCO2/TJ on net basis.

$N_{y,i}$	Number of project devices of type i operating in year y, calculated as per Step 5

D.6.4. Summary of the ex-ante estimates of emission reduction

As result, it is estimated ex-ante that on average CPA # 01 can lead to 41,587 tCO_{2e} emission reduction per year. However, this is only approximation, and exact calculation of emission reduction will be performed on the monitoring stage of the project.

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage* (t CO_2e)	Emission reductions (t CO_2e)
Year 1	41,587	0	0	41,587
Year 2	41,587	0	0	41,587
Year 3	41,587	0	0	41,587
Year 4	41,587	0	0	41,587
Year 5	41,587	0	0	41,587
Year 6	41,587	0	0	41,587
Year 7	41,587	0	0	41,587
Year 8	41,587	0	0	41,587
Year 9	41,587	0	0	41,587
Year 10	41,587	0	0	41,587
Total	**415,874**	0	0	**415,874**
Total number of crediting years	**10**			
Annual average over the crediting period	**41,587**	**0**	**0**	**41,587**

*As per the small scale methodology AMS-II. G version 05.0 paragraph 20 and paragraph 29 (c), the net to gross adjustment factor of 0.95 has been applied to B_y to account for leakages, thus leakage emissions were already taken into account in the estimation of overall emission reductions (equation 1 Step 1, LAF parameter).

D.7. Application of the monitoring methodology and description of the monitoring plan

D.7.1. Data and parameters to be monitored

(Copy this table for each data and parameter.)

Data / Parameter	$E_{Saving,appliance}$
Unit	GWh/year
Description	Average annual energy saving per one ICS distributed for CPA # 01 ($E_{Saving, appliance}$)
Source of data	Calculated from $B_{y,savings}$ and $NCV_{biomass}$ using equation #5
Value(s) applied	0.00963
Measurement methods and procedures	Calculated as product of $B_{y,savings}$ and $NCV_{biomass}$ using equation #5
Monitoring frequency	At least once per monitoring period.
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	Used to verify that the de-bundling requirements are met (each ICS within each CPA is no larger than 1% of 180 GWh_{th} (SSC threshold)), and for the definition of number of ICS to be included in one CPA

Data / Parameter	$f_{NRB,y}$
Unit	Fraction
Description	Fraction of woody biomass saved by the project activity in year y that can be established as non-renewable biomass
Source of data	National value for Nepal approved by UNFCCC (http://cdm.unfccc.int/DNA/fNRB/index.html) and by the Ministry of Environment, Science and Technology of Nepal
Value(s) applied	0.86
Measurement methods and procedures	Official governmental sources on $f_{NRB,y}$ have been used. This is also accepted $f_{NRB,y}$ default value for Nepal.
Monitoring frequency	Yearly
Purpose of data	Calculation of emission reductions
Additional comment	The approach is to use national default value of $f_{NRB,y}$ in line with §30 of AMS-II.G methodology version 05

Data / Parameter	N_{CPA}
Unit	GWh
Description	Maximum number of appliances in one CPA to reach small scale threshold of 180 $GWh_{(th)}$
Source of data	Calculated from the annual energy saving per appliance ($E_{Saving,appliance)}$ per Equation #6
Value(s) applied	18,698
Measurement methods and procedures	Calculated as 180 $GWh_{(th)}$ divided by annual energy saving per appliance in GWh (Equation #6)
Monitoring frequency	Once per monitoring period
QA/QC procedures	-
Purpose of data	Calculation of baseline emissions
Additional comments	Used to verify that the small scale threshold limit of 180 GWh_{th} for a given CPA is not exceeded.

Data / Parameter	$N_{y,i}$
Unit	Number
Description	Number of project devices of type i operating in year y
Source of data	Calculated as per equation # 4
Value(s) applied	17,100
Measurement methods and procedures	Defined by the adjustment of Total number of ICS installed in CPA # 01 to the percentage of stoves operating or replaced by equivalent in service appliance (SOF) and to the average stove operation time years in a given monitoring period
Monitoring frequency	At least once per monitoring period, but no less than biennially.
QA/QC procedures	Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of baseline emissions Calculation of emission reductions
Additional comments	Value of $N_{y,i}$ in CPA # 01 shall be equal or less than value for N_{CPA}

Data / Parameter	N_{all}
Unit	Number
Description	Total number of ICS installed in a given monitoring period in CPA # 01
Source of data	Record of all installations and date of each installation as per ICS serial ID numbers contained in the ICS Sales database. Estimated ex-ante as per equation # 4 to yield $N_{y,i}$ value. After rearranging of equation # 4: $N_{all} = N_{y,i} / (SOF * Stove_{year})$ As result of substitution of values in this equation by ex-ante values, N_{all} = (17,100/(0.95*1) = 18,000
Value(s) applied	18,000
Measurement methods and procedures	ICS sales database. During monitoring, if it is found that more than one ICS is being used per household, the CME will exclude any such additional ICS from the emissions reduction calculations by removing such ICS from the PoA Distribution and Monitoring Database. This way there will be no double counting of emissions reductions.
Monitoring frequency	At least once per monitoring period
QA/QC procedures	Data on total number of ICS installed will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later. The CME will supervise the activities of CRT/N, and provide training, guidelines and distribution templates to facilitate accurate record keeping during the ICS distribution. The CME will also maintain a record of the stove serial numbers supplied by each LPO, and will be able to cross-check these against the ICS sales database(s) it receives back from the CRT/N.
Purpose of data	Calculation of emission reductions
Additional comments	During ICS dissemination in a CPA # 01, the type of baseline cookstove (traditional or ICS) replaced will be recorded and emission reductions will be accounted only for the cases when ICS will replace traditional, unimproved cookstoves.

Data / Parameter	SOF
Unit	Fraction
Description	Stove Operation Fraction – used to determine the share of distributed stoves that are still operating, measured ex-post through survey/ user feedback
Source of data	Survey of end user behavior as part of PoA sampling plan
Value(s) applied	0.95
Measurement methods and procedures	The actual value to be applied for emissions reduction calculations and request for issuance of CERs will be measured ex-post by investigation of the number of ICS installations within the sampled ICS which are operational. If for example 90% of the sample is only found to be operational, then SOF is 90%.
Monitoring frequency	At least once per monitoring period
QA/QC procedures	The CME will provide training, guidelines and monitoring templates to ensure that the PO or another contracted party responsible for monitoring follows appropriate procedures. Data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of emission reductions
Additional comments	-

Data / Parameter	$Stove_{year}$
Unit	Years
Description	Calculated average stove operation years in the monitoring period. If stoves have been operating for 365 days then $Stove_{year} = 1.0$. If less than 365 days, then $Stove_{year}$ is represented as a fraction of 365 (eg. 180 days= 0.5).
Source of data	ICS Sales Database
Value(s) applied	1
Measurement methods and procedures	Each ICS entered into the ICS sales Database will be linked to a distribution date (recorded during distribution in ICS Sales Database). Thus for any monitoring period it is possible to calculate the period of time that the stoves included in the emissions reduction calculations for that period have been operating. In addition, in case installed ICS will reach their estimated lifetime of 3 years, ICS will be checked through ongoing monitoring, and if found to be out of operation, these will be replaced by new ICS.
Monitoring frequency	At least once per monitoring period
QA/QC procedures	CRT/N is responsible for overseeing the collection of data by LPOs during distribution, training the LPOs in correct data recording practices, maintaining an ICS sales Database, and back up of files contained in the Database. Data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of emission reductions
Additional comments	-

Data / Parameter	f_{old}
Unit	Fraction
Description	The fraction of end users that are still using baseline (replaced) stoves.
Source of data	Survey of end user behavior as part of PoA Sampling Plan. As indicated in the Baseline Survey[32], between surveyed HHs in FWDR which has used ICS in the past 10.53% were found still using the traditional stoves in their kitchens.
Value(s) applied	0.1
Measurement methods and procedures	The actual value to be applied for emissions reduction calculations and request for issuance of CERs is measured ex-post by estimation of a representative sample of households using only the deployed ICS, as conducted in line with the PoA Sampling Plan. The survey will be done on the basis of a visual inspection of the household and if necessary an interview with the stove user to confirm whether they are not using a baseline stove. Sampling will estimate the value of this parameter through the monitoring of the fraction of end users not using baseline stoves ($f_{non,old}$), where: $f_{old} = 1 - f_{non,old}$
Monitoring frequency	At least once per monitoring period
QA/QC procedures	The CME will provide training, guidelines and monitoring templates to ensure that the LPO or another contracted party responsible for monitoring follows appropriate procedures for the survey. Data will be collected using the standard procedures and will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of emission reductions.
Additional comments	The actual value for this parameter cannot be known ex-ante. For the purposes of ex-ante emissions reduction estimation a value of 0.1 is assumed, which means that 10% of all end users are assumed to continue using baseline stoves.

[32] Scott Wilson Nepal Pvt. Ltd. Preparation of Baseline for Improved Cook Stoves (ICS) Programme in Hilly Districts of Far Western Development Region. Final Report, December 2012.

Data / Parameter	$\eta_{new,y}$
Unit	Fraction
Description	Efficiency of the device being deployed as part of the project activity in year y
Source of data	Water Boiling Test (WBT)
Value(s) applied	$\eta_{new:}$ 0.256
Measurement methods and procedures	Water Boiling tests (WBTs) of distributed ICS through sampling. WBTs will be carried out for a sample of installed ICSs in operation in line with the PoA Sampling Plan.
Monitoring frequency	Annually, as per AMS II.G version 05.0 §23 (b) or biennially, as per footnote 12.
QA/QC procedures	Sampling and survey to be carried out with 95% confidence interval and a 10% margin of error for cross-CPA sampling. If results show that 95%/10%, the lower bound of 95% confidence interval of this parameter value will be applied to repeating the survey efforts to achieve the 95/10 precision. The WBTs will be conducted by an entity with sufficient expertise in conducting those types of tests. Data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.
Purpose of data	Calculation of project emissions
Additional comments	Upon dissemination, the stove model received by each end user in the CPA will be identified through the serial number of the stoves distributed. The stove model sold to the end user will also be recorded in the CPA Sales Record. In line with the methodology, a weighted average value of the efficiency will be used based on the actual distribution numbers of the different stove types in a single sampling frame. Each WBT conducted during monitoring will be matched with a specific serial ID number of the stove tested. Hence, the stove type (i.e. fuel type and specific laboratory efficiency) can be clearly identified allowing an extrapolation of the results of the sampling to all stoves of the same type, distributed within the CPA # 01. For ex-ante estimation of $\eta_{new,y}$, a 67%/33% split in the distribution of RS1.1 and RS3.1, respectively is assumed based on the CME's intended plans for dissemination.

All monitored data will be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

D.7.2. Description of the monitoring plan

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Prior to the start of the crediting period, the organization of the monitoring team will be established. Clear roles and responsibilities will be assigned to all staff involved in the CDM project. The CME Senior Advisor will coordinate and endorse the overall responsibility for all CDM monitoring of the project, including:

- Develop, approve, execute, and improve the CDM Monitoring/Reporting Procedures;
- Organize seminar to inform and train the monitoring partners to the monitoring procedures;

- Contract third party monitoring partners, if necessary and ensure their capacity to conduct monitoring;
- Communicate and coordinate the monitoring work of CPA Implementing Entity and all monitoring partners;
- Validate all monitoring data and manage and update the PoA Distribution and Monitoring Database, from which representative samples will be drawn for monitoring;
- Calculate and report the emission reductions; and
- Coordinate the DOE work during the verification audit

The following checks will be carried out as part of the overall PoA Sampling Plan, which is outlined in the PoA-DD, Part II, Section B.7.2. The below is simply a description of the approach to be undertaken and does not replace the PoA Sampling Plan.

Check (Parameter)	**Method**	**Frequency required in methodology/envisaged**
Efficiency of project stoves η_{new}	Carrying out WBTs	Annually or biennially
Check if project stoves are operational and in use (SOF)	Observation and interview with end user, asking them to demonstrate that project stoves are still operational and being used.	Annually or biennially
Estimate the proportion of end users that continue to use baseline stoves f_{old}	Observation and if necessary interviews with end users to determine if the baseline stoves are not used. Monitoring the fraction of end users not using baseline stoves ($f_{non,old}$)	Annually or biennially

The results of the checks will be recorded by the individuals conducting the field measurements (referred to in the diagram below simply as "Monitoring Agents"), using the CPA Monitoring Record template provided by the CME. The Monitoring Partner (envisaged to be either a local university, organization or firm with necessary qualifications) is then responsible for ensuring that the data contained in each individual CPA Monitoring Record is provided to the CME. Either the originals of the individual CPA Monitoring Records or scanned copies of each record will also be provided to the CME to prove the authenticity of the data. The CME will maintain archives of past CPA Monitoring Records and make these available during verification.

The CME will cross-check the ex-post monitoring information received from the Monitoring Partner. The data obtained from the ex-post monitoring activities will be kept in the PoA Distribution and Monitoring Database, along with the data obtained during distribution, and will be used for calculating the parameters outlined above, which will feed into emissions reduction calculations and made available to the DOE during verification.

Figure D.7.2.1 below provides a graphical illustration of the ex-post monitoring activities to be carried out in the Monitoring plan.

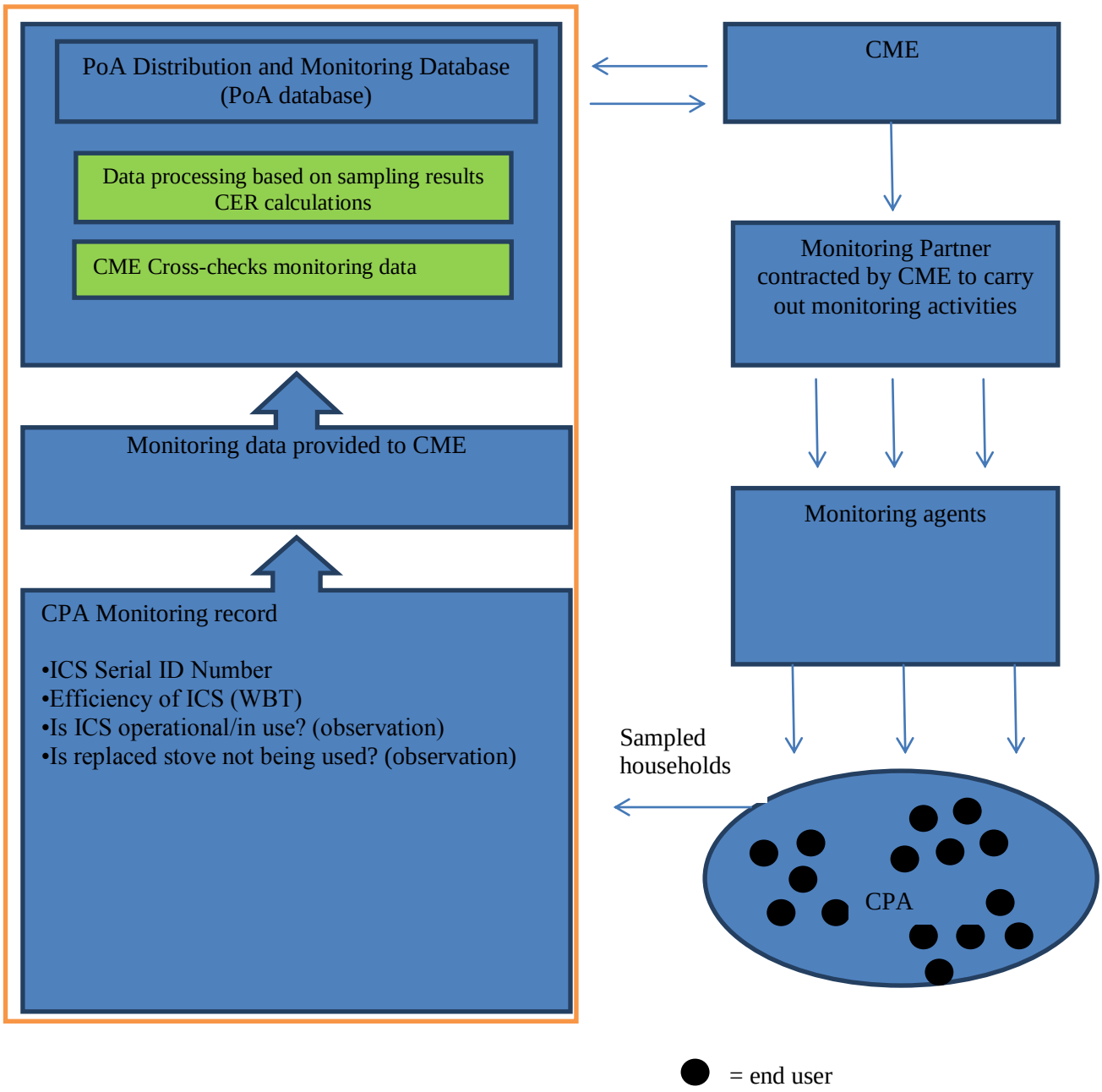

Figure D.7.2.1. Monitoring plan

Sampling Plan application

Step 1: Pre-check for cross-CPA sampling applicability	This CPA is the first CPA to be included in the PoA, and it will form part of a group of similar CPAs which will all involve the distribution of ICS to households in the FWDR. It will be monitored together with these similar CPAs in line with the Sampling Plan that has been developed at the PoA level.
Step 2: Selection of applicable reliability level	This CPA will first be monitored using CPA-

	specific sampling as it is the first CPA. As annual sampling is envisaged, 90/10 confidence/accuracy will be applied.
Step 3: Sample size estimation	The sample sizes can only be estimated once the total population of the CPA group is known for the monitoring period. This will be undertaken during monitoring at the CPA level applying the approach in the PoA Sampling plan. The equations outlined in the PoA Sampling Plan will be applied. For the monitoring of ICS efficiency (η_{new}), the anticipated mean and upper and lower bounds will be applied. A minimum sample size of 30 will be applied as a general principle, as outlined in Annex 5 of the CPA-DD.

Sampling will be undertaken in line with the requirements of methodology AMS-II.G version 5 and the "Standard: Sampling and surveys for CDM project activities and programmes of activities" (EB 65 Report, Annex 2) (the Sampling Standard). The Sampling Standard (paragraph 20, footnote 18) allows for sampling across a group of CPAs, provided the homogeneity of population can be demonstrated, or differences are taken into account in the sample size calculation and 95/10 confidence/precision is applied. Please refer to the PoA Sampling Plan provided in the PoA-DD and Appendix 5 for more detail.

Sales Database

N_{all} is monitored though the ICS Sales Database for CPA # 01, which is maintained electronically by CRT/N to ensure there is no double counting. This information will further be maintained by the CME who may verify the reported sales with the number of stoves produced by the manufacturer. Since the unique code inscribed on the ICS will correspond to its CPA, the occurrence of double counting of same ICS can be avoided.

Monitoring Efficiency of the ICS

In compliance with paragraph 23 (b) of methodology AMS II.G version 05, the efficiency of representative sample of all ICS will be determined by sampling on annual basis, or biennial basis as per footnote 12. In addition, the testing will ensure that the ICSs are still operating at a minimum of the 20% efficiency threshold defined in the methodology AMS II.G version 05, footnote 2 or that they are replaced by an equivalent service stove.

Efficiency monitoring for the CPA # 01 will be the responsibility of CRT/N or an organization with similar expertise with close supervision of the CME.

On an annual or biennial basis, the proxy efficiency (η_{new}) of the project stoves will be determined for disseminated ICS types. The weighted average efficiency of the stoves will be applied as the average proxy efficiency. The average efficiency will be calculated through sampling distributed stove types proportionately to the total distribution of each stove type. The efficiencies of the stoves will be determined using the Water Boiling Test protocol that is internationally accepted.

Monitoring leakage:

Provisions have been made for leakage due to the use of non-renewable woody biomass saved under the project activity.

As stated in paragraph 29 (c) of methodology AMS-II.G, version 05: B_{old} for the CPA # 01 can be multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. The net to gross adjustment factor of 0.95 to account for leakages will be used by the CPA # 01 for accounting leakages.

SECTION E. Approval and authorization

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Letters of approval from host country, Nepal, and Annex I party, United Kingdom, have been received and submitted to the validating DOE.

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Appendix 1: Contact information on entity/individual responsible for the CPA

Organization	Centre For Rural Technology, Nepal
Street/P.O. Box	GPO Box: 3628
Building	Kumaripati
City	Lalitpur
State/Region	Kathmandu
Postcode	3628
Country	Nepal
Telephone	+9771-5537556
Fax	+9771-5537556
E-mail	ganesh@crtnepal.org
Website	www.crtnepal.org
Contact person	Ganesh Ram Shrestha
Title	Executive Director
Salutation	Mr.
Last name	Shrestha
Middle name	Ram
First name	Ganesh
Department	Administration
Mobile	
Direct fax	
Direct tel.	+97 71-5537556
Personal e-mail	

Appendix 2: Affirmation regarding public funding

No public funding has been received for the development or implementation of the SSC- CPA # 01.

Appendix 3: Applicability of the selected methodology(ies)

Not applicable, see Section D.3 of this CPA-DD

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

Please refer to section D.6.2 of this document for details.

Determination of $Q_{biomass}$ value for FWDR with 90/10 confidence/precision level

Sampling Process

Sampling framework defined that the sample size would be 20 from each district and shall cover two VDCs neither adjoining nor the district headquarters. During the implementation stage, the consultants undertook additional review of the sampling process as follows:

a. Sampling approach

It is important that the survey uses multi-stage sampling approach. The two separate sampling tiers were proposed i.e. (a) Selection of VDCs and (b) selection of Households (HHs). The districts are selected as priority basis of the client i.e. seven far western hill districts viz. Achham, Darchula, Dadeldhura, Doti, Bajura, Bajhang, Baitadi. The ToR clearly stated that the selection of VDCs should be done in such a way a way that the VDCs should not be the adjoining ones and outside the district headquarters. As per the conditions, the selected VDCs are shown in **Table 1.2 and Figure 1.1**.

Table 1.1: Sample districts and VDCs

S.N.	Surveyed District	Surveyed VDCs
1	Achham	Mastamandau and Jupu
2	Darchula	Bhagwati and Gwani
3	Dadeldhura	Nawadurga and Alital
4	Doti	Tijali and Banlek
5	Bajura	Barhabis and Bramhatole
6	Bajhang	Rayal and Matela
7	Baitadi	Patan and Siddhapur

Figure 1.1: Survey districts in Map of Nepal

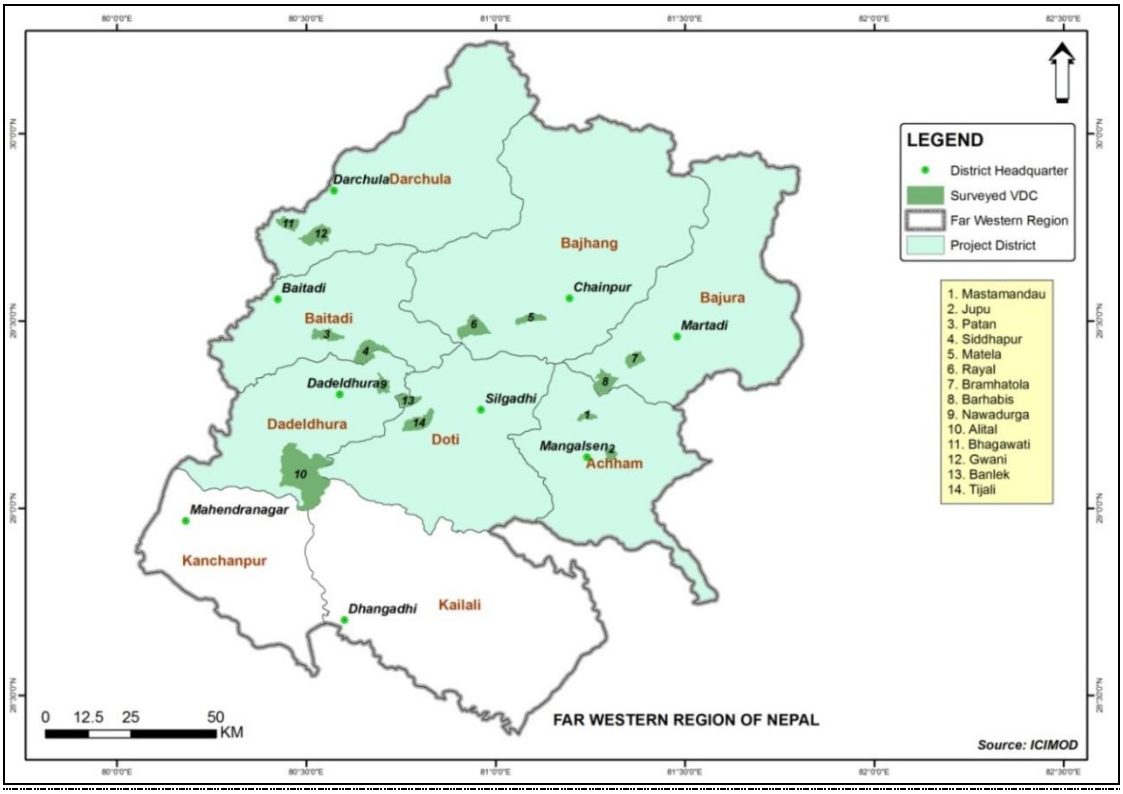

Figure 1.2: Sample VDCs from survey districts

Sample Size

The sample size of this research study was determined by using appropriate statistical formula as mentioned in EB 67 Guideline for Best Practices Examples focusing on Sample Size and Reliability Calculations. The minimum required sample size (n) is:

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

Where,

N	*Total Population HH (2011, CBS) i.e. 252597*
V	*$p(1-p)/p^2$*
n	*Required Sample Size*
p	*Expected proportion of ICS that will be installed i.e. 0.5*
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)*

From the corresponding values of N, V and p, the required sample size was calculated as 301. The district wise distribution of sample households is given below:

Table 1.2: District wise distribution of sample households

S.N.	District	Total Population (CBS 2011)	No. of Samples
1	Achham	50264	59
2	Baitadi	46807	57
3	Bajhang	34787	42
4	Bajura	24874	30
5	Dadeldhu	27649	32
6	Darchula	25802	32
7	Doti	42414	49
	Total	***252597***	***301***

Appendix 5: Further background information on monitoring plan

PoA Sampling Plan: Sample size estimation

The following steps outline the approach for definition of sample size for CPA # 01. Since CPA # 01 is the initial CPA to be included in the PoA, all relevant provisions of PoA sampling plan are applicable also to sampling plan of CPA # 01.

A multi-stage sampling approach will be used with VDCs and households as the first and second stages, respectively. The sample size estimation approach is described below for each of the parameters for the population of 18,000 ICS of CPA # 01 applying 90/10 confidence/precision (for cross- CPA sampling) level. In order to calculate the required sample sizes, estimates for the proportions and the mean values are required. Of the three parameters to be monitored, two are proportions/percentages (SOF and f_{old}) and one is a mean values (η_{new}). For η_{new} the sampling of the second stage will be stratified to account for differences in stove design. Estimates of the distribution each stove design and the standard deviation within and between clusters will be estimated to calculate sample sizes.

For proportional values the sample size will be determined using the following formula[33]:

$$c \geq \frac{\frac{SD_B^2}{\overline{p}^2} \times \frac{M}{M-1} + \frac{1}{\overline{u}} \times \frac{SD_w^2}{\overline{p}^2} \times \frac{(\overline{N}-\overline{u})}{(\overline{N}-1)}}{\frac{0.1^2}{1.645^2} + \frac{1}{M-1} \times \frac{SD_B^2}{\overline{p}^2}}$$

Where:

c	Number of groups that should be sampled
M	Total number of groups in the population
$\overline{u}$	Number of units to be sampled within each group
$\overline{N}$	Average units per group
SD_B^2	Unit variance
SD_W^2	Average of the group variances
p	Overall proportion
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision

In order to calculate SD_B^2 the following formula will be applied, as outlined in EB 75, Annex 8, paragraph 42:

$$SD_B^2 = \frac{\sum_{i-1}^{n}(p_i - \overline{p})^2}{n-1}$$

[33] EB 75, Annex 8, paragraph 41.

Where:

p_i	Proportion of each VDC
$\bar{p}$	The average across all VDCs
n	number of selected administrative clusters (e.g. VDC).

In order to calculate SD_W^2 (the average of the group of variances), the following formula will be applied, as outlined in EB 75, Annex 8, paragraph 42:

$$SD_w^2 = \Sigma (p_i(1-p_i) / n$$

Where p_i is the proportion of each VDC.

Sample size is determined for $\eta_{new,}$ a Mean Value under multistage sampling using:

$$c \geq \frac{\left(\frac{SD_B}{Clustermean}\right)^2 \times \left(\frac{M}{M-1}\right) + \left(\frac{1}{u}\right) \times \left(\frac{SD_W}{Overallmean}\right)^2 \left(\frac{\overline{N}-u}{\overline{N}-1}\right)}{\left(\frac{0.1}{1.645}\right)^2 + \frac{1}{M-1}\left(\frac{SD_B}{Clustermean}\right)^2}$$

Where

c	Number of groups that should be sampled
M	Total number of groups in the population
$\underline{u}$	Number of units to be sampled within each group
$\overline{N}$	Average units per group
SD_B	Standard deviation between groups
SD_W	Average within group standard deviation
Clustermean	The cluster or group mean
Overall mean	The average across all households
1.645	Represents the 90% confidence required
0.1	Represents the 10% relative precision

The number of units to be sampled within each group, will be stratified so that sampling within each group will be proportionate to the distribution of each stove type in the total population
$u_i = (g_i/N)*u$

Where

u_i	Number of units of stove type i to be sampled from within each group
g_i	Size of the i^{th} group
u	Number of units to be sampled from within each group
N	Population total

The Clustermean will be calculated similarly to how one would calculate the mean for stratified samples, as sampling from within each cluster will be stratified by stove type.

$$mean = \frac{(g_a \times m_a) + (g_b \times m_b) + (g_c \times m_c) + \ldots + (g_k \times m_k)}{N}$$

Where

mean	Mean within cluster
g_i	Size of the i^{th} group
m_i	The mean of each strata (stove type)
N	Population total

In order to calculate SD_w, the standard deviation within groups, the project proponent will use the equation found below and outlined in EB 75 Annex 8 for calculating the standard deviation of stratified samples, as sampling within groups will be stratified.

$$SD = \sqrt{\frac{(g_a \times SD_a^2) + (g_b \times SD_b^2) + (g_c \times SD_c^2) + \ldots + (g_k \times SD_k^2)}{N}}$$

Where

SD_i	Standard Deviation of the i^{th} group
g_i	Size of the i^{th} group
N	Population total

The precision and expected variance is established in accordance with the recommended values by UNFCCC[34], namely 90% precision and 10% expected variance.

In order to establish the sample size (the number of groups to be sampled) using the above formulas, the following parameters must be known:

- the total number of groups in the population: established at CPA level using the CPA database to determine in which geographical areas ICS units have been distributed, 336 VDCs;
- the average units per group: the CPA database will be used to identify the average number of units (ICS units) within each group (geographical areas), 446 households with ICS per VDC
- $\overline{u}$: Number of units to be sampled within each group (e.g.in each village), 25
- an estimate of the proportion or mean value in question, and the standard deviation between and within clusters

The sample size calculation will be automated in an Excel spreadsheet so that different $\overline{u}$ values (the number of units to be sampled in each group) can be used and the effect that this has on the number of groups to be sampled can be observed.[35] The number of ICS units to sample in each region ($\overline{u}$) and the number of villages to be visited (c) will therefore be established at CPA level.

[34] Standard: Sampling and Surveys for CDM Project Activities and Programme of Activities, Version 04.1.
[35] In accordance with EB 75, Annex 8, paragraph 45.

If the sample size calculation returns a value of less than 30 samples in total (i.e. the number of groups (c) multiplied by the number of ICS units within each group ($\overline{u}$)), then the student's t-distribution shall be used.[36]

The calculation of the required sample sizes is illustrated below for 90/10 level of confidence and precision.

η_{new}:

The stove models manufactured and installed in the project are very similar in design, but small differences in the design may influence efficiency. Thus the project proponent has decided to stratify sampling to account for differences in the efficiency of each stove design. The project proponent will still use a multi-stage approach but will stratify the sampling within the second stage of this multi-stage approach to accont for differences in efficiencies between stove designs. The Overall mean value for η_{new} is calculated, per the equation 60 in EB 75 Annex 8, for stratified sampling[37], as the total number of samples will be proportionate to the distribution of each stove design. Stove efficiencies from lab tests of the RS1.1 and RS3.1 stove designs and estimates of the dissemination of each stove type were used to estimate the overall mean using the equation mentioned above. .Since the same number of WBTs will be conducted in each VDC the Clustermean will be the same as the Overallmean. The Standard Deviation SD_B within clusters is estimated using the standard deviation equation for stratified sampling,[38] as the sampling within clusters will be stratified. This value is derived using estimations of the number of each type of stove distributed and the estimated standard deviation of the efficiency of each stove design, as per lab tests. To estimate the standard deviation between clusters SD_w the project proponent used a "rule of thumb" estimation assuming that no cluster will have one single stove type, and thus the average efficiency of each cluster will always be within the efficiencies of each individual stove design. Therefore the project proponent conservatively estimated the maximum cluster mean would be the efficiency of RS3.1 and the minimum would be that of the RS1.1 design.

Rocket Stove with metallic combustion chamber and metallic top plate (RS1.1)

IWA Performance Metrics	units	Test 1 Value	Test 2 Value	Test 3 Value	Average Value	Std Dev Value	COV Value
High Power Thermal Efficiency	%	23.4%	23.0%	23.7%	23.4%	0.3%	1%

Test Results

Rocket Stove with kiln fired ceramic combustion chamber (D-9.5 cm) with metallic top plate (RS3.1)

IWA Performance Metrics	units	Test 1 Value	Test 2 Value	Test 3 Value	Average Value	StdDev Value	COV Value
High Power Thermal Efficiency	%	30.1%	29.9%	30.4%	30.1%	0.2%	1%

[36] Standard: Sampling and Surveys for CDM project activities and Programmes of Activities (EB74, Annex 6, paragraph 12).
[37] Equation 60 in EB 75 Annex 8
[38] Equation 62 in EB 75 Annex 8

$$c \geq \left(\frac{\left(\frac{0.0168}{0.25630}\right)^2 * \left(\frac{336}{(336-1)}\right) + \left(\frac{1}{15}\right) * \left(\frac{0.0032}{0.2563}\right)^2 * \frac{(54-15)}{(54-1)}}{\left(\frac{.1}{1.645}\right)^2 + \left(\frac{1}{336-1}\right) * \left(\frac{.0168}{.25360}\right)^2} = 1.16 \right)$$

$$uR3.1 = 15 * .33 = 5$$

$$uR1.1 = 15 * .67 = 10$$

Thus the sample size calculations predict that 2 VDCs should be sampled and 15 stoves should be sampled within each VDC, of which 10 will be RS1.1 model and 5 will be RS 3.1 model.

SOF:

The project proponent used data from a study on improved cookstoves in Nepal[39] to estimate sample sizes as the project currently does not have sufficient aging stoves in place to conduct pilot studies to estimate attrition. The project proponent conservatively assumed that all damaged and sometimes used stoves reported in the study were classified as not in operation. Standard deviations came from district level data, which is conservative as the Standard Deviation of VDCs should be less as it is more likely that usage patterns will be similar between VDCs which are closer in distance.

Table 12: Present condition of ICS

District	Appearance of ICS, %			Frequency
	Clean	Dirty	Damage	
Baglung	89.7	5.1	5.1	39
Dailekh	89.5	7.9	2.6	38
Dhankuta	82.5	10.0	7.5	40
Doti	76.7	18.6	4.7	43
Ilam	90.5	9.5	-	42
Nuwakot	80.4	17.4	2.2	46
Okhaldhunga	92.5	7.5	-	40
Palpa	79.5	12.8	7.7	39
Salyan	100.0	-	-	32
Sindhupalchowk	90.7	1.9	7.4	54
Syangja	91.3	2.2	6.5	46
Udayapur	86.0	9.3	4.7	43
Overall	**87.3**	**8.6**	**4.2**	**502**

Source: Field Survey, 2006

[40]

[39] *Final Report on Technical Quality Monitoring of Improved Cooking Stoves.* Alternative Energy Promotion Center (AEPC). 2006

[40] *Final Report on Technical Quality Monitoring of Improved Cooking Stoves.* Alternative Energy Promotion Center (AEPC). 2006 Page 14

Table 13: Operation of ICS

District	Regular	Sometimes	Frequency
Baglung	94.9	5.1	39
Dailekh	89.5	10.5	38
Dhankuta	90.0	10.0	40
Doti	88.4	11.6	43
Ilam	92.9	7.1	42
Nuwakot	87.0	13.0	46
Okhaldhunga	85.0	15.0	40
Palpa	87.2	12.8	39
Salyan	100.0	-	32
Sindhupalchowk	92.6	7.4	54
Syangja	95.7	4.3	46
Udayapur	81.4	18.6	43
Overall	**90.2**	**9.8**	**502**

Source: Field Survey, 2006

[41]

$$n \geq \left(\frac{\left(\frac{0.0038}{0.86}\right)^2 * \left(\frac{336}{(336-1)}\right) + \left(\frac{1}{25}\right) * \left(\frac{0.1248}{0.90}\right)^2 * \frac{(54-25)}{(54-1)}}{\left(\frac{.1}{1.645}\right)^2 + \left(\frac{1}{336-1}\right) * \left(\frac{.0038}{.86}\right)^2} = 2.35 \right)$$

Thus the sample size calculations predict that 3 VDCs may be sampled, assuming that 25 stoves are sampled within each VDC. The parameter 'u' is the number of stoves sampled in each VDC, which may vary as demonstrated in the sample size calculation.

f_{old}:

Based on the following data from a pilot study the sample size calculation of f_{old} is as follows:

[41] *Final Report on Technical Quality Monitoring of Improved Cooking Stoves.* Alternative Energy Promotion Center (AEPC). 2006. Page 15

VDC	Percent of Household who have dismantled their old tradtional stove
Banlek	100%
Alital	100%
Nawadurga	100%
Bharabise	83%
Bhramtola	100%
Jupu	100%
Masatamandu	100%
Gwani	67%
Bhagwati	60%
Patan	100%
Siddhapur	100%
Ryala	80%
Matela	80%
Rayal	100%
Tipali	80%

$$n \geq \left(\frac{\left(\frac{0168}{0.25630}\right)^2 * \left(\frac{336}{(336-1)}\right) + \left(\frac{1}{15}\right) * \left(\frac{0.1739}{0.90}\right)^2 * \frac{(54-15)}{(54-1)}}{\left(\frac{.1}{1.645}\right)^2 + \left(\frac{1}{336-1}\right) * \left(\frac{.0193}{.90}\right)^2} = 7.63 \right)$$

Thus the sample size calculations predict that 8 VDCs may be sampled, assuming that 25 stoves are sampled within each VDC. The parameter 'u' is the number of stoves sampled in each VDC, which may vary as demonstrated in the sample size calculation.

History of the document

Version	Date	Nature of revision(s)
02.0	EB 66 13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the component project design document form for small-scale component project activities" (EB 66, Annex 17).
01	EB33, Annex44 27 July 2007	Initial adoption.
Decision Class: Regulatory **Document Type:** Form **Business Function:** Registration		