Monitoring report form for CDM programme of activities

(version 01.0)

Complete this form in accordance with the Attachment "Instructions for filling out the monitoring report form for CDM programme of activities" at the end of this form.

MONITORING REPORT		
Title of the programme of activities (PoA)	Improved Cook Stove Programme with Carbon Finance (ICF), Nepal	
UNFCCC reference number of the PoA	9811	
Version number(s) of the PoA-DD(s) applicable to this monitoring report	6	
Coordinating/managing entity (CME)	SNV Netherlands Development Organisation (SNV), Nepal	
Version number of this monitoring report	4	
Completion date of this monitoring report	31/07/2017	
Monitoring period number and dates covered by this monitoring report	**CPA # 01, CPA # 02:** - Monitoring Period: 2 - Dates: 02/04/2015 -01/04/2017 (First and last days included) **CPA # 03:** - Monitoring Period: 1 - Dates: 02/04/2015 - 01/04/2017 (First and last days included)	
Monitoring report number for this monitoring period	1 of 1	
Host Party(ies)	Host Party(ies) of the PoA	Is this a host Party to a specific-case CPA covered in this monitoring report?(yes/no)
	Federal Democratic Republic of Nepal	No
Sectoral scope(s)	Sectoral scope 3: Energy demand	
Selected methodology(ies)	AMS-II.G, version 05.0	
Selected standardized baseline(s)	N/A	
Total amount of GHG emission reductions or net GHG removals by sinks for all specific-case-case CPAs in the PoA covered in this monitoring report	GHG emission reductions or net GHG removals by sinks reported up to 31 December 2012	GHG emission reductions or net GHG removals by sinks reported from 1 January 2013 onwards
	0	82,144

PART I - Programme of activities

SECTION A. Description of PoA

A.1. Brief description of the PoA

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The goal of the Improved Cook Stove (ICS) Programme for Nepal (hereafter the "Program" or "PoA") CDM SSC PoA project is to disseminate improved cookstoves (ICS) to households in the Far Western Development Region (FWDR) of Nepal. Starting with pilot implementation in 2012, the program intends to disseminate ICS to up to 150,000 households within seven chosen districts of the FWDR, namely in the districts Doti, Dadeldura, Baitadi, Achham, Darchula, Bajura, and Bajhang.

The FWDR is the poorest region in Nepal, with a 45.6% poverty rate as compared to the national average of 25.16%, according to the 2010-2011 Census of Nepal.[1] The majority of communities are rural and some lack direct road access. This combination of factors drives the high reliance on fuel wood as the primary source of cooking fuel. Despite high prevalence of biogas throughout Nepal, the average penetration rates of biogas and LPG throughout the project boundary is less than 2% each and access to kerosene is also very limited[2] mostly due to high fuel prices.

Most households in FWDR rely on traditional cookstoves (hereinafter referred also as TCS), such as the 3-stone fire cook stove or other conventional unimproved cookstoves, which lack combustion air supply and flue gas ventilation systems. These unimproved TCS have lower efficiency than ICS, thus requiring larger amounts of fuel wood to meet the on-going cooking needs of the household. The baseline study on the fuel usage in households in FWDR of Nepal conducted for the PoA has found that the poor households in FWDR are cooking currently with three main types of traditional stoves: mud stoves (54.49%), three stone stoves (26.25%), and *odan*, i.e. tripod stove (13.95%)[7].

The PoA aims to significantly reduce fuel wood consumption of low income Nepalese households by providing them with affordable improved cooking stoves in replacement of their low–efficiency, unimproved traditional stoves. The ICS disseminated by the PoA are more efficient than existing traditional cookstoves, facilitating a reduction is the quantity of wood fuel that each household must consume to meet their cooking needs. Thus, the PoA achieves a reduction in the emissions of greenhouse gases and 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 PoA promotes commercial distribution of ICS where the end-users may receive the stove at a subsidized price. This approach is appropriate given the socio-economic status of the communities within the PoA boundary.

It is the goal of the PoA to also contribute to the reduction of deforestation and degradation of forests in the FWDR through wide and voluntary participation of the people in adopting fuel efficient stoves. This contributes to improvement in quality of life of the targeted people through reduction of drudgery, time, and money spent on fuel wood collection and through the reduction of indoor air pollution. Globally, the PoA benefits the environment by reducing emissions of GHG in the atmosphere. The PoA targets primarily the rural poor, including women and other marginalized people.

[1] 2010-2011 Census of Nepal

[2] 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.

A.1.1. Generic CPA(s)

Title, identification/reference number and/or version number of the generic CPA(s) of the PoA	Sectoral scope(s)	Applied methodology(ies) or combination of methodologies and/or standardized baseline(s)
Generic CPA 01: Household ICS in FWDR [Only generic CPA in registered, PoA-DD]	Sectoral scope 3: Energy demand	AMS-II.G, version 05.0

A.1.2. Specific-case CPA(s) covered in this monitoring report

Reference number of the specific-case CPA included in the PoA as of the end of this monitoring period	Title, identification/ reference number and version number of the generic CPA to which the specific-case CPA applies	Crediting period dates of the specific-case CPA	Is this specific-case CPA covered in this monitoring report? (yes/no)
9811-0001	Generic CPA **01:** Household ICS in FWDR	19/12/2013 - 18/12/2023	Yes
9811-0002	Generic CPA **01:** Household ICS in FWDR	19/12/2014 - 18/12/2024	Yes
9811-0003	Generic CPA **01:** Household ICS in FWDR	19/12/2014 - 18/12/2024	Yes

A.2. Contact information of the coordinating/managing entity (CME) and/or responsible persons(s)/entity(ies)

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SECTION B. Implementation of PoA

B.1. Implementation of the management system of the PoA

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(a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

The Coordinating Managing Entity (CME) of this PoA is SNV Netherlands Development Organisation (SNV), Nepal. SNV is a non-profit, international development organisation, present on the ground in

developing countries for over 50 years, and operating in 36 countries in Africa, Asia, Latin America, and the Balkans. SNV is dedicated to providing access for the poor to affordable energy and clean fuel, and has a long successful history in renewable energy projects, especially in biogas. In Nepal, SNV is actively engaged in the renewable energy sector and has a strong track record of renewable energy project implementation. In the PoA, SNV leverages its international expertise to exposing the programme to potential donors and climate investors and carbon buyers.

SNV responsibilities, as CME, include(d):

- overseeing validation and registration of PoA-DD and CPA-DDs, through service agreements with CDM consultants and hiring of DOE;
- ensuring that proposed CPA(s) are in compliance with PoA eligibility criteria;
- communicating with the DNA of Nepal and the CDM Executive Board;
- hiring consultant(s) for regular CDM monitoring and reporting;
- finding CERs buyers; and
- management and distribution of CERs revenues.

To implement this ICS programme, SNV works with CPA Implementing Entities. The first CPA Implementing Entity that SNV has selected is the Centre for Rural Technology Nepal (CRT/N), which implements CPA # 01, CPA # 02, and CPA # 03. CRT/N is one of the leading national NGOs in Nepal working to disseminate appropriate renewable technologies. CRT/N has a proven track record in ICS programme implementation, and serves as Local Capacity Builder (LCB) for the PoA. CRT/N implements the CPAs in partnership with defined local stakeholders. In addition, CRT/N is responsible for the selection and training of PoA personnel, such as stove promoters, and is also responsible for stove design and distribution through the district level partners. The structure of the arrangement is such that CRT/N plays a role as a partner for overall management of the PoA. It does not however pre-empt SNV's rights to work with other CPA Implementing Entities or other partners in the program and it does not automatically construe a regular or long-term partnership between SNV and CRT/N.

While the management structure of the PoA and CPAs remains the same, as of February 2016 regular operations by the CPA Implementer and other implementing partners stopped due to funding constraints. No new or replacement ICS have been installed since November 2015 (see Table 10). The database and all project records were moved to RDSC's office in Doti, from the ICF Regional Office in Dadeldhura. SNV intends to restart sales and distribution of ICS under the PoA by the Fall of 2017. The following sections describe the roles and responsibilities of each project partner when the project activites are in full operation and ICS are being installed. Prior to restart of sales and distribution, SNV will ensure that all project partners are trained to implement required roles and responsibilities.

The main responsibilities of CRT/N as the CPA Implementing Entity for included CPAs to date are:

- capacity development of local implementing partners, including training of ICS promoters and other personnel, quality assurance and monitoring through the local partners;
- technology selection, improvement, and field testing;
- selection of local partners;
- mobilization of and coordination with local government bodies like District Development Committees (DDCs), Village Development Committees (VDCs), etc.;
- overall program information management including data collection, documentation and database management for quality assurance and monitoring as well as for CDM monitoring and reporting;
- support for overall program management, including periodic reporting on progress, issues, and recommendations; and
- preparation of periodic progress report to AEPC deriving data from the CPA ICS Sales Database providing ICS installation related information to AEPC for the national ICS Database.

CRT/N leverages a strong network of local organizations in their dissemination strategy, including:

- *Pre-qualified manufacturers:* metal or ceramic accessory manufacturers are provided with the specifications for the stove accessories and necessary training in fabrication. Through February 2016, CRT/N worked with four pre-qualified manufacturers of ICS, all of whom are trained (a) at the start of the program, (b) upon inclusion of a new stove model, and (c) annually as a refresher.
- *Local Partner Organizations (LPO):* LPOs are based in local communities in the Program area. LPOs receive the combustion chambers from the pre-qualified manufacturers and oversee training the local 'stove promoters' who install the ICS in households and provide ongoing service to end-users. Through February 2016, CRT/N worked with 13 LPOs across the 7 districts, which employed a total of 688 stove promoters to implement the project activities. Each LPO remains active in their respective district working on different programs, which helps to retain the institutional memory at local level. About half of the trained promoters remain active with the LPOs; the same structure can be used as soon as the program continues implementation, planned for the Fall of 2017.
- *Regional Partner Organizations (RPO):* RPOs are responsible for Programmatic monitoring and QA/QC of installations. CRT/N currently works with Rural Development Service Centre (RDSC) as the primary RPO. In addition to programmatic monitoring, they conduct technical training and have taken on management of LPOs in several districts under supervision of SNV and CRT/N, to build capacity to continue ICS installation at the close of the programme. The last annual monitoring occurred on May-June 2015 before operations were put on hold in February 2016, until RDSC conducted monitoring for verification in March 2017.

In addition, SNV cooperates with the Alternate Energy Promotion Centre (AEPC), the governmental body charged with oversight of alternative or renewable energy sector in Nepal. AEPC's main responsibilities associated with the SNV Program include:

- overall facilitation, coordination, and policy guidance to ensure that the Program runs in tandem with the national policies and programs;
- overall supervision of the Program, approval of the general Program modality and district selection based on recommendation from SNV; and
- coordination with relevant government agencies at national or sub-national level.

AEPC provides the link between the PoA and other ICS programs to ensure that the strategies are well aligned. In order to secure the mutual commitment to the Program, the project partners have signed agreements or contracts that stipulate the terms of the collaboration with SNV and delegate the rights on coordination and management rights of PoA to SNV.

Figure 1: Organisational structure of PoA below demonstrates the existing relationship between the various partners.

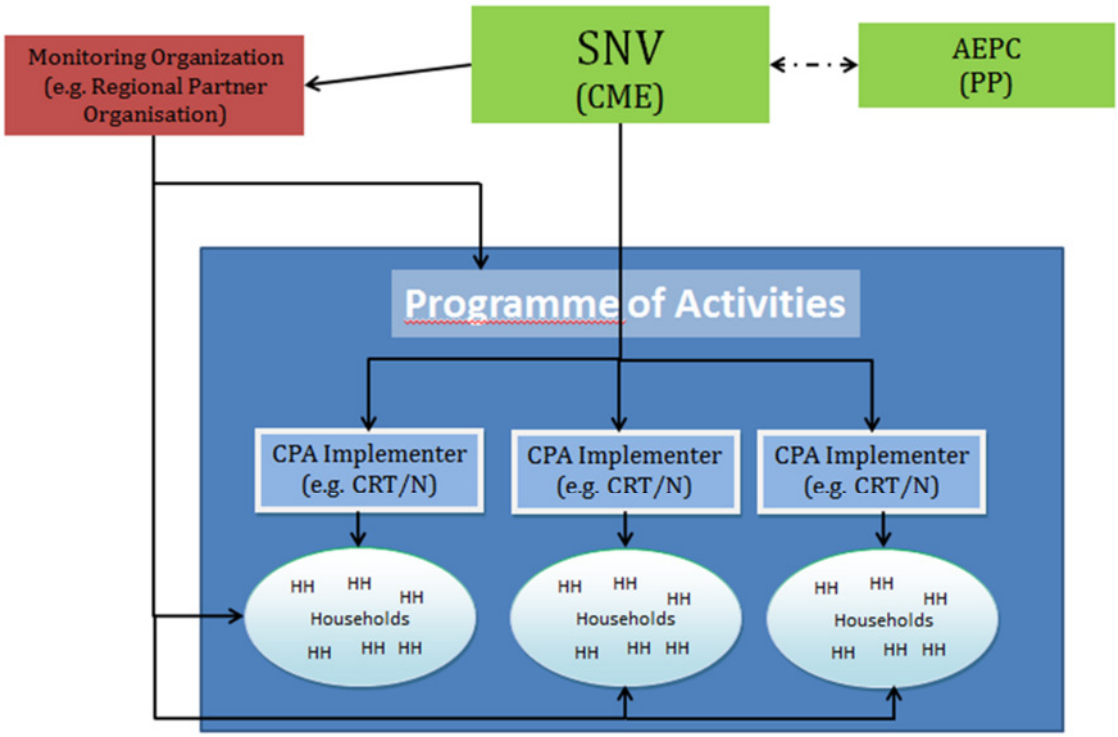

Figure 1: Organisational structure of PoA

SNV is responsible for overall programme management and appointed a DOE for CDM Validation (Tuv-Rhineland) and for the first and second verification (Tuv-Nord). As CME, SNV is also responsible for the inclusion of CPAs in the PoA, as well as for ensuring, either directly or through project partners, that end-users sign the Sales Agreement, transferring all rights to CERs to the CME.

For the overall management of the programme there is an established national level Programme Unit at SNV in Nepal led by the Project Leader. The SNV Programme Unit is supported by a Programme Unit of CRT/N. The Unit is responsible for overall programme management, quality control, and physical spot checks as well as making corrective actions at national, sub-national, and district level. The national Unit manages the regional support units of SNV and CPA Implementing Entity, which is responsible for technical aspects of the programme. Since the program was put on hold in Februrary 2016, the full regional and district level support structures have not been operating, but upon restarting the program, anticipated in Fall of 2017, the same structure will be implemented. Regional support units are responsible for promotion, training, CDM monitoring, data management, quality control, and providing after sales services in the form of stove repair and replacement. District support units are responsible for smooth operation of the PoA activities in respective districts, technical support to LPOs, and monitoring along with coordination with district line agencies. The District Support Units also provide technical assistance to LPOs, cross-check sales and installation records, and collect the hard-copy Sales Agreements and Installation Completion Receipts from the LPOs to bring to the national unit monthly.

LPOs distribute and install ICS through stove promoters. LPOs identify stove promoters for training and capacity development, with priority given to women and people belonging to poorer sections. LPOs train the selected promoters in construction of built-on-site model stove and its repair and maintenance. The trained promoters install the stoves in individual households in the project area based on demand from the users. Through February 2016, each LPO had at least two dedicated staff for ICS whose focus was on training and supervising the development of new ICS promoters as well as supervising the collection of user data and guarantee after sales services to the users.

(b) Records of arrangements for training and capacity development for personnel;

The CME trained all PoA partner organizations on the following topics:

i. Details of the data to be recorded in the CPA ICS Sales Database
ii. Sales Agreement and/or invoicing processes (including how to ensure unique identification of each Improved Cook Stove (ICS) through the serial numbers and how to record the other required details, procedures to ensure that end-users transfer their title to the CERs to the CME etc.)
iii. Details of where to send copies of the project documentation
iv. Monitoring procedures
v. Procedures for dealing with a change in serial number, address of the ICS owner, etc.

Records of trainings are held in RDSC office in Doti including the date, training agenda, and a list of participants. All information will be provided to the DOE upon request.

(c) A procedure for technical review of inclusion of CPAs;

The CME shall ensure that all CPAs included under the PoA meet the eligibility criteria outlined in section B.2 of the PoA-DD. To date, two CPAs were included in the PoA, following the lead CPA included at the time of registration. As CPA # 02 and CPA # 03 were identical to CPA # 01, no issues were raised in the review of the documentation by the Project Leader of SNV.

(d) A procedure to avoid double counting (e.g. to avoid the case of including a new CPA that has already been registered either as a CDM project activity or as a CPA of another PoA)

Procedures to assert legal rights of the carbon credits generated, to avoid double counting, andto ensure appropriate records and documentation control processes occur for each CPA under the PoA have been implemented as described in this section below.

The operation of the ICS is carried out by the user, and training on how to use and maintain the ICS is given by the LPOs, through the stove promoters. The ICS are tracked according to the monitoring plan and procedures, by its unique Serial ID ('Stove No.') to verify that it was sold as part of the PoA and to confirm which are still in use, so the appropriate emission reductions are claimed.

Before the sale of the ICS, the user is informed that CDM finance is being used to fund the ICS, and the user agrees to transfer the rights to the emission reductions to the CME, and to cooperate with the LPO and the CME for monitoring purposes as per the Sales Agreement. The Sales Agreement specifically identifying the PoA comprises all the obligations of both parties and provisions regarding the transfer of CERs ownership and benefits. By signing the Sales Agreement, the ICS user certifies that the ICS distributed is not included in another CPA nor is it in the process of inclusion under another PoA. It also ensures that ICS users are aware of and have agreed that their activity is being subscribed to the PoA and that they cannot sell the Emissions Reduction under another PoA.

The Sales Agreement and Installation Completion Receipt collectively contain the following information:

- Name of PoA
- Name of customer and contact details (address & phone number if applicable)
- Confirmation of future ICS usage (in households for heating/cooking purposes)
- Name of the district and region
- Date & location of ICS purchase
- Information on the type of cookstove model installed
- Unique identification number of the cookstove installed
- Information on the type of cookstove replaced and baseline fuel
- Name of seller/distributor
- Name of installer of ICS
- Signatures of buyer, seller/distributor and/or installer
- Transference of CERs from buyer to CME

Two unique numbers are assigned to each stove: 'ICF Code' and 'Stove No.', also known as the serial number. 'ICF Code' starts with 'ICF' referring to the program name, followed by six digits. ICS are numbered

in order of installation, regardless of manufacturer. The 'Stove No.' is the serial number engraved in the top plate of the ICS. The first three letters are 'ICF' indicating that the stove is part of the ICF PoA. The second three letters are the acronym corresponding to the manufacturer for that specific stove, facilitating cross-checking with manufacturer records. The five digit numeric code is unique to each manufacturer, assigned in order of stoves produced.

Detailed information on the collection of ICS and user information, entry into the PoA Distribution and Monitoring Database, and measures taken to maintain the accuracy of the database are described in Part II, Section F.

(e) Records and documentation control process for each CPA under the PoA;

For every ICS sold in the project activities, the following records are kept which provide end user information and other inventory data:

- Sales Agreement
- Installation Completion Receipt

The Sales Agreement and Installation Completion Receipt forms are completed with the household by the local stove promoter, which installs the stove and trains the end-user, and the Local Partner Organization (LPO) in the village. The LPO submits this documentation to CRT/N, the CPA implementer. CRT/N uses this documentation to input ICS and user information in the CPA ICS Sales Database and keeps the records for internal check and review by the CME and CRT/N and external audits. The information in the CPA ICS Sales Database is transferred to the CME and aggregated with all CPAs in the PoA Distribution and Monitoring Database, as demonstrated in Figure 2 below.

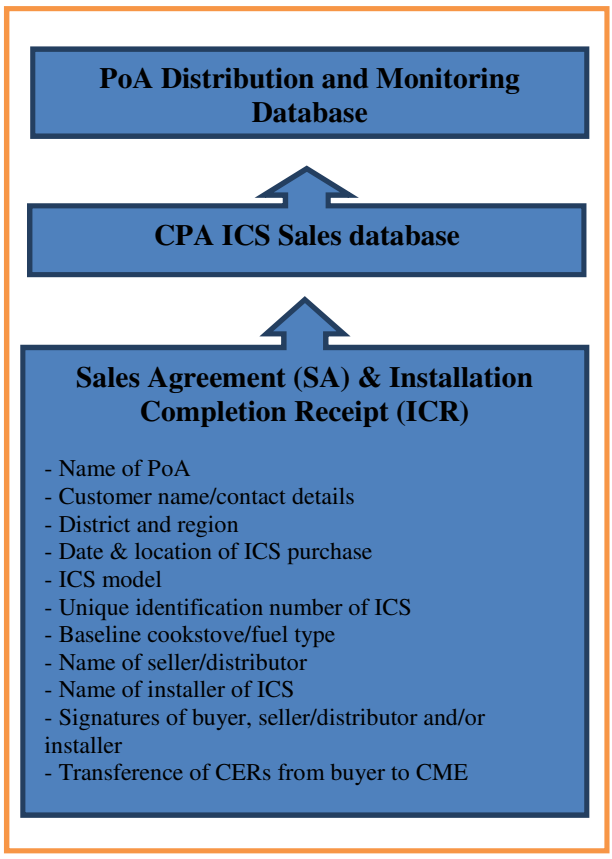

Figure 2: Data transfer

SNV provides guidance on record keeping while providing quality control through supervision and spot checks. SNV further ensures that no LPO is conducting a similar activity as a stand-alone CDM project activity or as another CPA within another PoA.

Through February 2016 and when distribution of ICS starts again, the CPA Implementing Entity meets monthly with all project partners to report progress, and prepares annual reports summarizing ICS Sales Data, together with results of annual monitoring surveys. SNV supports the process of data collection by analysis of annual reports and co-operation with regard to preparation of annual reports for submission to the verifying DOE.

All data collected will be kept for the whole crediting period of each CPA and an additional two years.

(f) Measures for continuous improvements of the PoA management system;

SNV holds periodic meetings of PoA partners to discuss:

- Review of the previous monitoring period and the latest developments,
- Recurring issues related to the inclusion process,
- Comments provided by the members of the CPA inclusion technical reviewers and CME,
- Feedback from the CPA POs, and
- Potential improvements to be implemented for the next period.

SNV, in close consultation with POs, continually works to improve the effectiveness of the PoA management system through the use of the quality policy, quality objectives, audit results, data analysis, and corrective and preventive actions with an appropriate management review system.

No major changes to the management system have been implemented to date. Following verification of the first monitoring period, SNV and CRT/N implemented a number of improvements to processes, summarized below:

- Data Security: improved filing procedures for and back-up records of Sales Agreements and Installation Completion Receipts. Demonstrated on site, ICF number printed on both Sales Agreement and Installation Completion Receipt, filed together in filing cabinets labelled with ICF number range for easier access.
- Database: improved data cleaning measures to spot inaccuracies and internal audits, system for tracking replacement ICS and linking new ICS to replaced, and inclusion of CDM Usage Survey monitoring records. Internal audit report provided in ANNEX 14 - SNV Internal Audit Report, linking of replacement ICS and new ICS demonstrated on site in database and in ANNEX 10 - Detailed Customer Database; CDM Usage Survey monitoring records from 2015 and 2017 included in ANNEX 10 - Detailed Customer Database.
- User feedback: SNV led the project partners in developing an improved mechanism for receiving feedback from users. The district energy units were trained further on how the overall program operates and what their role is in satisfyin the need and suggestion from user and different stakeholders. Promoters provided feedback to LPOs in regular meetings; DTC collects that feedback and presents them in regular monthly meetings with CRT/N. Further, additional grievance process books were placed in DDC/Energy unit and at the offices of RDSC & CRT/N to provide more opportunity for users to register any feedback. Documentation of these improvements is not available at time of verification, but shall be presented at next verification.
- Internal audits: SNV conducts internal audits periodically while the program was operating, and conducted a further database internal audit in preparation for the second verification. Internal audit report provided in ANNEX 14 - SNV Internal Audit Report.

B.2. Implementation of single sampling plan(s)

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(a) List of CPAs to which the single sampling was applied

A single sampling plan was applied to CPA # 01, CPA # 02, and CPA # 03.

(b) Description of implemented single sampling design

The following section demonstrates the application of the sampling design laid out in the PoA-DD, as applied to cross-sampling of CPA # 01, CPA # 02, and CPA # 03.

i. Objectives and reliability requirements

The objective of sampling is to obtain a reliable estimate of the parameters *SOF*, f_{old}, and η_{new}, which are monitored through sampling over the course of the crediting period to meet the indicated confidence/precision levels.

Step 1 in applying the Sampling Plan is to determine if cross-CPA sampling shall be applied. The design documents for CPA # 01, CPA # 02, and CPA # 03 state that each CPA is eligible for cross-CPA sampling. The CPAs are homogenous, distributing the same ICS types (RS1.1 and RS1.3), in the same region (7 districts of FWDR), to the same end-users (households) replacing traditional stoves. Therefore, cross-CPA sampling is applied.

Parameter	Description of parameter	Confidence/precision level (frequency of sampling)

$\eta_{new,y}$	The thermal efficiency of the ICS distributed (%)[3]	Cross-CPA sampling: - 95/10 annual or biennial confidence/precision level
SOF	The Stove Operating Fraction, i.e. the fraction (up to 1.0) of users using the ICS	
f_{old}	The fraction of stove users still using baseline (replaced) stoves (up to 1.0)	

Step 2 in applying the Sampling Plan is to select the applicable reliability level. According to the Sampling Standard, 95/10 reliability is to be applied whenever sampling occurs across a group of CPAs; this is the most stringent and thus is applied.

In cases where the required level of precision is not able to be achieved, the lower or upper bound of the applicable confidence interval of the parameter value is used, whichever is more conservative, as is allowed by the methodology AMS-II.G version 05.0. As demonstrated in following section, this is applied for parameters *SOF* and f_{old}.

ii. Target population

The overall target population for sampling is all ICS distributed under CPA # 01, CPA # 02, and CPA # 03. The ICS to be sampled were drawn from the list of individual ICS installations contained in the PoA Distribution and Monitoring Database, which is maintained by the CME. Each ICS is assigned to a CPA in the PoA Distribution and Monitoring Database and linked to an end user; the premises of selected ICS end-users were visited during monitoring.

iii. Sample Method

The CME selected a sample of ICS to monitor from the PoA Distribution and Monitoring Database, containing the population of CPA # 01, CPA # 02, and CPA # 03, using multi-stage sampling in line with the Guideline: Sampling and Surveys for CDM Project Activities and Programme of Activities, version 03.0 (EB 75, Annex 8). Multistage sampling is a more complex form of cluster sampling and involves sampling from a number of groups (known as primary sampling units), and then going on to sample units within each group (known as secondary sampling units). The primary sampling unit is Village Development Committee (VDC)[4] and the secondary sampling unit is the ICS.

For all parameters, the primary unit or VDC is randomly selected by "probability proportional to size"-sampling, i.e. VDCs with a higher number of appliances deployed have a higher chance to be selected than those with a smaller number of appliances.For sampling *SOF* and f_{old}, ICS are selected randomly within each VDC using a random number generator. For sampling $\eta_{new,}$ units in the secondary sampling unit, i.e. the ICS, were selected proportionally to the total distribution of each stove type, similar to a stratified sampling

[3] As per the SSC methodology AMS II.G, footnote 12, "biennial monitoring (i.e. monitoring once every two years) may be chosen, if the project proponents are able to demonstrate that the efficiency of the cook stove does not drop significantly as compared to the initial efficiency of the new device, over a time period of two years of typical usage." Test reports certify that the efficiency of stoves included in PoA will not decrease significantly over the period of use. If biennial monitoring is selected, confidence/precision would meet 95/10.

[4] A village development committee (VDC) in Nepal is the lower administrative part of its local development ministry. Each district has several VDCs, similar to municipalities but with greater public-government interaction and administration. There are 3,913 village development committees in Nepal. A VDC is further divided into wards, the number depending on the population of the district. [Source: http://mofald.gov.np/mld/uploadedFiles/allFiles/LSGA_1999_Eng.pdf]

approach(See **ANNEX 9** - Survey Sample Selection).

The CME hired a third party consultant to conduct the sample size calculations and select samples for all monitored parameters (See **ANNEX 8** - Sample Size Calculation). SNV hired the RPO, RDSC, to conduct the Usage Survey by visiting the end user premises where the selected ICS are located to conduct a sufficient number of surveys for monitored parameters, *SOF* and f_{old} according to the estimated sample size (See **ANNEX 3** - Usage Survey Report). SNV hired third party contractor, Rural Energy Testing Station (RETS), to conduct sampling for monitored parameter η_{new} by visiting sampled ICS and conducting a sufficient number of water boiling tests (WBTs) according to the estimated sample size (See **ANNEX 6** - WBT Report).

iv. Sample size

Step 3 in applying the Sampling Plan is estimating the sample size. The required sample size was calculated for each parameter to be sampled across CPA # 01, CPA # 02, and CPA # 03. To calculate the required sample size for each parameter, the CME requires a range of information relating to the group of CPAs. The required information and its sources are outlined in Table 1 below.

Table 1: Information Required for Sample Size Estimation

Information required for sample size estimation	Source of information
Parameter definition (units and whether mean or proportion/percentage)	AMS-II.G version 05.0 and Monitoring Plan in PoA-DD and CPA-DDs
Confidence/precision level required	AMS-II.G version 05.0, Sampling Standard 95/10 Confidence Precision level required for Cross-CPA sampling
Population size (total number of each type of ICS within sampling frame)	PoA Distribution and Monitoring Database
Expected value of parameter	See Table 2 below
Expected standard deviation	See Table 2 below
Equations for sample size estimation	Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities

Table 2 below summarizes the definition, source, expected value, and calculated sample size for each parameter, applying the 95/10 confidence/precision level requirement for cross-CPA sampling, using equations demonstrated below.

Table 2: Sample Size Calculation Approach

Para-meter	Description	Sampling Approach	Expected Value	Data used for estimated values	VDCs to sample	Samples per VDC	Total Calculated Samples
SOF	The Stove Operating Fraction. Percent of distributed stoves in operation	Proportional Value	0.84	Source: First monitoring period Usage Survey	6	25	150
f_{old}	The fraction of stove users still using baseline (replaced) stoves	Proportional Value	0.68	Source: First monitoring period Usage Survey	38	25	950
η_{new}	The thermal efficiency of the ICS distributed (%)	Mean Value	0.28	Source: First monitoring period WBT results.	3	4	12

Source: **ANNEX 8** - Sample Size Calculation

Table 2 provides the calculated sample sizes, as demonstrated in **ANNEX 8** - Sample Size Calculation. The applied sample sizes differ for each parameter. As evidenced above, the calculation for f_{old} based on the Usage Survey results from the first monitoring period resulted in an infeasible sample size of 950.This high value is because (a) the unit variance (between VDC) was high in the previous monitoring period and (b) the average proportion was close to 50%, which causes the sample size to increase for proportional values. As a result, the sample for the Usage Survey was based on the sample size calculation for *SOF*, with the conservative approach of taking the upper bound of the confidence interval for f_{old} in case the calculated parameter value from the survey results did not meet the required 95/10 confidence/precision requirement.

However, in order to address the higher sample size calculatd for f_{old} and an expectation that the usage rate may be lower given that the project had not distributed new stoves since December 2015, samples for an additional 6 VDCs, for a total of 12 VDCs (same as first monitoring period), were drawn to conduct the Usage Survey.The interim usage survey results from the first 6 VDCs indicated that more sampling would be required to meet the 95/10 confidence/precision requirement for both *SOF* and f_{old}, thus all 12 VDCs were monitored. In total, the sample size for *SOF* was 448, exceeding the required sample size of 150, and the sample size for f_{old} was 250.

The sample size for f_{old} was smaller because only households using their ICF may be surveyed regarding their continuous usage of a TCS. This provides further evidence for the infeasibility of meeting the calculated sample size of 950. With 448 households surveyed, the sample size for fold was only 250 (55.8%). To reach 950 samples for fold, a total of 1702 households would have to be surveyed. This would require at least 8 months of surveying and significantly more resources to conduct. While the number of samples for f_{old} was lower than the calculated value of 950, the effect, if any, is conservative on the calculation of emission reductions for this monitoring period. Without reaching the sample size to meet the required confidence/precision level, the upper bound of the confidence interval was applied for the value of f_{old}, which results in a decrease in emission reductions.

The sample size for η_{new} was also adjusted to meet the required minimum of 30 samples. As such, 12 ICS were sampled in each VDC, for a total of 36 samples.

The equations for sample size estimation of each parameter follow, from Guidelines for Sampling and Surveys for CDM Project Activities and Programme of Activities (EB75A08, v 03.0), also referencing Sandard: Sampling and surveys for CDM project activities and programme of activities (EB50-A30-STAN, Version 04.1).Demonstration of calculations is provided in **ANNEX 8 -** Sample Size Calculation.

The sample size for proportional values *SOF* and f_{old} were determined using the following formula[5]:

$$c \geq \frac{\frac{SD_B^2}{\bar{p}^2} \times \frac{M}{M-1} + \frac{1}{\bar{u}} \times \frac{SD_w^2}{\bar{p}^2} \times \frac{(\bar{N}-\bar{u})}{(\bar{N}-1)}}{\frac{0.1^2}{1.96^2} + \frac{1}{M-1}\frac{SD_B^2}{\bar{p}^2}}$$

Where:

c	Number of groups that should be sampled
M	Total number of groups in the population
$\bar{u}$	Number of units to be sampled within each group
$\bar{N}$	Average units per group
SD_B^2	Unit variance
SD_W^2	Average of the group variances
$\bar{p}$	Overall proportion.
1.96	Represents the 95% confidence required
0.1	Represents the 10% relative precision

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

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

Where:

p_i	Proportion for each administrative cluster (e.g. VDCs)
$\bar{p}$	The average proportion across all administrative clusters (e.g. 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 is 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 administrative cluster (e.g. VDCs)

Sample size is determined for mean value η_{new} under multistage sampling (based on EB 75, Annex 8, paragraph 177) using following equation:

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

$$c \geq \frac{\left(\frac{SD_B}{Clustermean}\right)^2 \times \left(\frac{M}{M-1}\right) + \left(\frac{1}{u}\right) \times \left(\frac{SD_w}{Overallmean}\right)^2 \left(\frac{\overline{N}-u}{\overline{N}-1}\right)}{\left(\frac{0.1}{1.96}\right)^2 + \frac{1}{M-1}\left(\frac{SD_B}{Clustermean}\right)^2}$$

Where

c	Number of groups that should be sampled
M	Total number of groups in the population
u	Number of units to be sampled within each group
$\overline{N}$	Average units per group
SD_B	Standard deviation between administrative clusters (e.g. VDCs)
SD_W	Average within administrative cluster (e.g. VDCs) standard deviation
Clustermean	The cluster or administrative cluster (e.g. VDCs) mean
Overall mean	The average across all households
1.96	Represents the 95% confidence required
0.1	Represents the 10% relative precision

The number of units to be sampled within each group is stratified so that sampling within each group is 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 is calculated similarly to how one would calculate the mean for stratified samples, as sampling from within each cluster is stratified by stove type (EB 75, Annex 8, pargraph 151).

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

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 uses the equation found below and outlined in EB 75 Annex 8, paragraph 153 for calculating the standard deviation of stratified samples, as sampling within groups is 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[6], namely 95% 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 ICS Sales Database to determine in which geographical areas ICS units have been distributed;
- the average units per group: the CPA ICS Sales Database is used to identify the average number of units (ICS units) within each group (geographical areas); and,
- an estimate of the proportion or mean value in question, and the standard deviation between and within clusters
- The number of units distributed
- $\overline{u}$: Number of units to be sampled within each group (e.g. in each VDC);

The sample size calculations are automated in **ANNEX 8** - Sample Size Calculation 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.[7] The number of ICS units to sample in each region ($\overline{u}$) and the number of administrative clusters to be visited (c) is therefore be established at CPA level.

v. Sampling Frame

The Sampling Frame is the total population of the PoA, which entails all ICS installed in CPA # 01, CPA # 02, and CPA # 03 as cross-CPA sampling is employed.

(c) Collected data

Data for parameters monitored through sampling is collected either through the Usage Survey or WBTs.

Usage Survey:
The Usage Survey was conducted to determine values for the following parameters via ex-post sampling:

- *SOF* - Stove Operation Fraction, the fraction of stoves operating or replaced by equivalent in service appliance.
- f_{old} - Fraction of end users that are still using their replaced stoves during the monitoring period

SNV contracted RDSC to conduct the Usage Survey. A detailed description of the Usage Survey including methods used is included in **ANNEX 3** - Usage Survey Report. Overall, surveyors visited a total of 448 households of the samples from CPA # 01, CPA # 02, and CPA # 03 which agreed to take the survey.

WBT:

[6] Standard: Sampling and surveys for CDM project activities and programmes of activities, version 04.1.
[7] In accordance with EB 75, Annex 8, paragraph 86.

The monitored parameter η_{new}, efficiency of project ICS, was determined through WBTs, conducted on a sample of ICS installed in CPA # 01, CPA # 02, and CPA # 03. A detailed description of the WBT efforts is included in **ANNEX 6 -** WBT Report.

SNV hired the Renewable Energy Testing Station (RETS) under the Nepal Academy for Science and Technology (NAST) to conduct the WBTs. RETS is the entity that conducts testing for Nepal's National ICF programme and has extensive experience in WBTs in field and laboratory settings. RETS conducted surveys on a total of 36 ICS.

(d) Analysis of the collected data

Usage Survey:

Usage Survey results for both *SOF* and f_{old} were analyzed using the Hansen Hurwitz Estimator to take into account probability proportional to size sampling for the primary unit; and with equations to take into account multi-stage sampling with an unbiased estimator due to replacement in sampling. Analysis approach and equations used are presented in **ANNEX 4** - Usage Survey Data Analysis.

As demonstrated in Table 3 below, the value determined for *SOF* did not meet required 95/10 confidence/precision level, therefore the lower bound of the confidence interval was conservatively applied.

Table 3: SOF Usage Survey Results

Parameter	SOF Value	Explanation
N	257	Total VDCs (primary sampling unit)
N	12	Sampled VDCs
M	48810	Total ICS (secondary sampling unit)
$\sum m_i$	448	Total sampled ICS
T	250	Total sampled ICS found in use
M	0.0051	Mean response
$\hat{T}_p$	26694	Total estimated ICS in use
$\hat{\mu}_p$	0.5469	Overall mean proportion
^Var($\hat{\mu}_p$)	0.0051	Variance of overall mean proportion
SE ($\hat{\mu}_p$)	0.071	Standard Error of overall mean proportion
Lower 95% CI	**0.407**	Lower bound of 95% Confidence Interval
Upper 95% CI	0.687	Upper bound of 95% Confidence Interval
95% CI	0.279	95% Confidence Interval
Precision	25.55%	Level of precision at 95% confidence interval
Meets 95/10?	No	Cross-CPA Confidence/Precision requirement

Reference: **ANNEX 4** - Usage Survey Data Analysis, Worksheet '1. SOF'

As demonstrated in Table 4 below, the value determined for f_{old} did not meet required 95/10 confidence/precision level, therefore the upper bound of the confidence interval was conservatively applied.

Table 4: f_{old} Usage Survey Results

Parameter	f_{old} Value	Explanation
N	257	Total VDCs (primary sampling unit)
N	12	Sampled VDCs
M	26694	Total ICS in use (SOF=1)
$\sum m_i$	250	Total sampled ICS where SOF=1
T	157	Total sampled ICS with TCS found in use
M	0.0032	Mean response
$\hat{T}_p$	17202	Total estimated ICS with TCS in use
$\hat{\mu}_p$	0.6444	Overall mean proportion
$\hat{Var}(\hat{\mu}_p)$	0.0013	Variance of overall mean proportion
SE ($\hat{\mu}_p$)	0.037	Standard Error of overall mean proportion
Lower 95% CI	0.573	Lower bound of 95% Confidence Interval
Upper 95% CI	**0.716**	Upper bound of 95% Confidence Interval
95% CI	0.143	95% Confidence Interval
Precision	11.10%	Level of precision at 95% confidence interval
Meets 95/10?	No	Cross-CPA Confidence/Precision requirement

Reference: **ANNEX 4** - Usage Survey Data Analysis, Worksheet '2. fold'

WBT:

WBT results were analyzed according to stratified sampling techniques. As demonstrated in Table 5 below, the value determined for the monitored parameter η_{new} met required 95/10 confidence/precision levels.

Table 5: η_{new} Sampling Results

Parameter	g	n (g)	m_i	Std Dev	Std Error	95% Confidence Interval*	Precision	Meets 95/10 Rqmt?
η_{new}	**Overall**	36	23.44	2.33	0.39	1.52	3.25%	Yes
$\eta_{new, RS1.1}$	RS1.1	9	24.95	2.53	0.84	3.31	6.64%	Yes
$\eta_{new, RS1.3}$	RS1.3	27	22.94	2.26	0.43	1.70	3.71%	Yes

Reference: **ANNEX 7** - WBT Data Analysis, Worksheet '1. Analysis'

The applied value for η_{new} is derived from the actual credited population of each stove type by taking a weighted average value of the efficiencies of RS1.1 and RS1.3, per the following equation:

$$\eta_{new} = \frac{(\eta_{new,RS1.1} * N_{RS1.1}) + (\eta_{new,RS1.3} * N_{RS1.3})}{N}$$

Applied values are demonstrated in Table 6 below..

Table 6: η_{new} Applied Results

Parameter	G	N (population)	m_i
η_{new}	**Overall**	48810	23.44
$\eta_{new, RS1.1}$	RS1.1	12077	24.95
$\eta_{new, RS1.3}$	RS1.3	36733	22.94

Reference: **ANNEX 7** - WBT Data Analysis, Worksheet 'Analysis'

(e) Demonstration of whether the required confidence/precision has been met

As demonstrated in section (d) above, the required confidence/precision level of 95/10 has been met for parameter η_{new}. It was not met for parameters *SOF* and f_{old}, therefore the lower bound of the confidence interval for *SOF* and the upper bound of the confidence interval for f_{old} are conservatively applied for the parameter values.

(f) Demonstration of whether the samples were randomly selected and are representative of the population

The selection of samples is demonstrated in **ANNEX 9** - Survey Sample Selection, precisely following the sampling plan laid out in the PoA-DD. Samples were randomly selected and are representative of the population.

SECTION C. Post-registration changes to the PoA (including the generic CPA(s))

C.1. Corrections

>>
N/A

C.2. Inclusion of a monitoring plan to the registered PoA-DD (including its generic CPA-DD(s)), if a monitoring plan was not included at the time of registration

>>
N/A

C.3. Permanent changes to the monitoring plan as described in the registered PoA-DD, applied methodology, or applied standardized baseline

>>
N/A

C.4. Changes to the programme design of the registered PoA-DD (including corresponding changes to project design of the generic CPA-DD(s)) and updates to the eligibility criteria for inclusion of specific-case CPAs in the PoA

>>
N/A

C.5. Types of changes specific to afforestation and reforestation activities

>>
N/A

PART II - Specific-case component project activity(ies)

SECTION D. Description of specific-case CPA(s)

>>

D.1. Brief description of implemented specific-case CPA(s)

>>

This Monitoring Report is applicable to CPA # 01, CPA # 02, and CPA # 03. The CPAs are homogenous specific-case CPAs, implemented in the same project boundary and technology/measures, and under the same generic CPA as identified in section A.1.1 of Part 1. Therefore the following sections apply to CPA # 01, CPA# 02, and CPA# 03 as a group of specific-case CPAs.

(a) Purpose of the specific-case CPAs and the measures taken for GHG emissions reductions

The Small Scale Component Project Activities (CPAs) entitled "CPA # 01", "CPA # 02", and "CPA # 03" are components of the SSC Programme of Activities (PoA) 9811 "Improved Cook Stove Programme with Carbon Finance (ICF), Nepal". The purpose of these small-scale CPAs is the dissemination of improved cooking stoves (ICS) in the Far Western Development Region (FWDR) of Nepal. CPA # 01, CPA # 02, and CPA # 03 aim to replace traditional cooking stoves using non-renewable woody biomass as a fuel with more efficient ICS that use the same fuel.

In line with the applied CDM methodology AMS-II.G version 05.0 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, CPA # 02, and CPA # 03 are voluntary actions undertaken by the Coordinating/Managing Entity (CME), SNV Netherlands Development Organisation (SNV), Nepal, a company based in the Netherlands. CPA # 01, CPA # 02, and CPA # 03 are implemented by the Centre for Rural Technology Nepal (CRT/N) as the CPA implementer.

(b) Description of the installed technology and equipment, including information requested by the eligibility criteria

Stoves disseminated under these CPAs are rocket ICS serving domestic woody biomass users. These ICS are more efficient in transferring heat from the fuel to the pot than the TCS, 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 these CPAs have been designed not only to increase heat transfer, but also to match the traditional usage and cooking habits of the people in Nepal.

ICS, as an improved cooking energy technology, have significant socio-economic and environmental benefits. The CPAs target primarily the rural poor, including women and other marginalized people, and aim to reach thousands of rural poor, who are at the bottom of the energy ladder in Nepal. CPA # 01, CPA # 02, and CPA # 03 promote 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, CPA # 02, and CPA # 03.

The ICS has major advantages over the traditional stoves. The main features of the ICS are as below:[8]

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

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

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

The main design improvement of all ICS types compared to the TCS is the pre-fabricated metallic (RS1.1, RS1.3) combustion chamber. This ensures consistent quality and durability of the ICS and improves the lifespan of the stove with consistent performance in terms of efficiency, reduction of indoor air and emissions, and safety. The metal 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. All three stove models have been developed through ongoing research and development conducted by CRT/N in Nepal.

RS1.1

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.

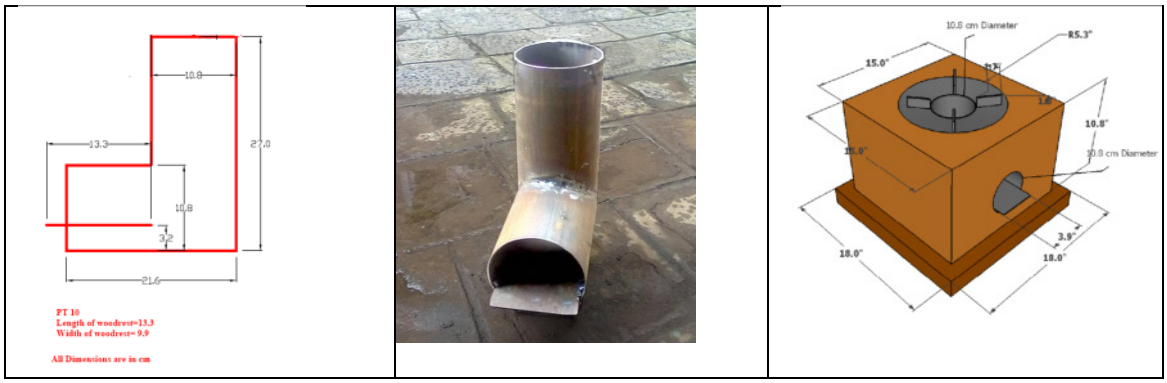

Figure 3: RS1.1 Technical Design

RS1.1 Technical Details

Type: Rocket Stove with Metallic Combustion Chamber with Metallic Top Plate
Fuel Type: Firewood
Thermal Efficiency (see η_{new} parameter box): 24.95%

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 mild steel flat for top base ring
- 25*25*3 mm mild steel angle for load bearing bars

RS 1.3

The RS1.3 is the next iteration of the RS1.1 model, with changes made in response to user feedback and field testing. The primary changes from the RS1.1 model are the change to the combustion chamber to be cylindrical with a rectangular metal fuel chamber and grate, rather than the 'L-shaped' combustion chamber which also served as the fuel chamber in the RS1.1. These improvements were made in response to user feedback that they wanted a larger opening to put fuel in. CRT/N and the Regional Cookstoves Testing and Knowledge Center (RTKC), a GACC-approved stove lab, adjusted the design per feedback and conducted extensive testing to ensure the changes had no negative impacts on ICS effectiveness, thermal efficiency, and emissions.

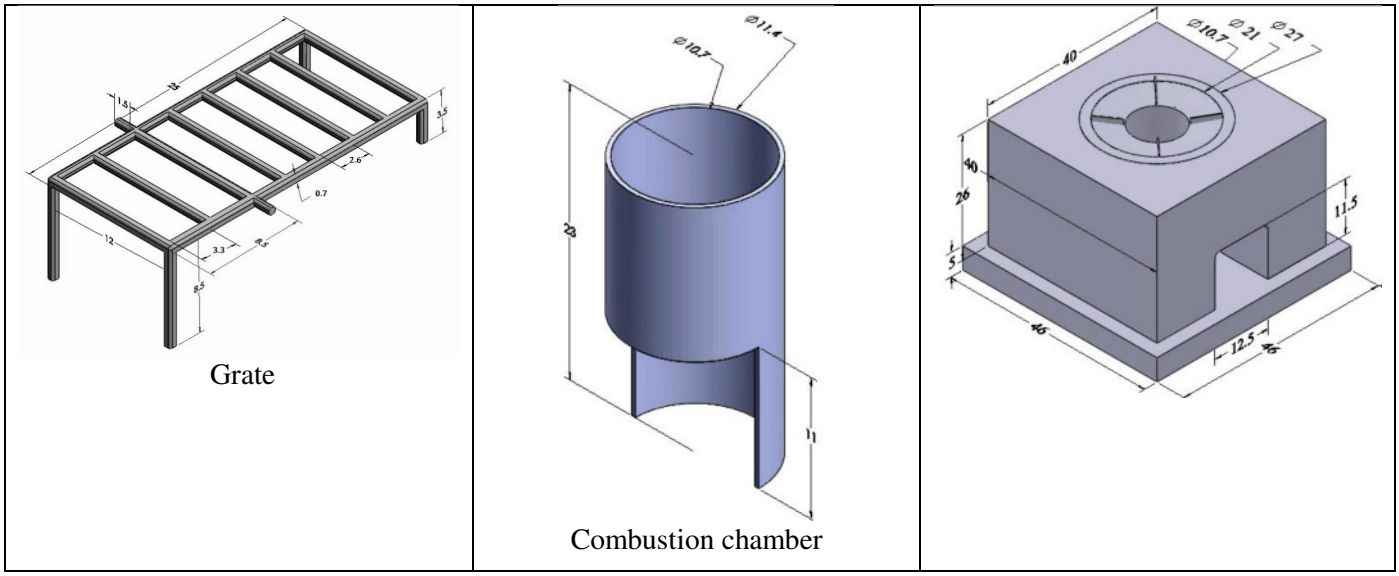

Figure 4: RS1.3 Technical Design

RS1.3 Technical Details:

Type: One pot-hole fixed type rocket stove with metallic chambers and top plate
Fuel Type: Firewood
Thermal Efficiency (see η_{new} parameter box):22.94%

Pre-Fabricated Metallic Components:

- Combustion Chamber (circular)
- Fuel chamber (rectangular)
- Top Plate (Round) with
  - Pot Rest (chamka)
  - Load bearing bars and base ring
- Grate (rectangular)

Material Used in the Pre-Fabricated Parts:

- 3.4 mm mild steel pipe of 10.7 cm inner diameter for combustion chamber
- 2 mm mild steel sheet for fuel chamber
- 2 mm mild steel sheet for top plate
- 5 mm mild steel sheet for pot rest (4 pieces)
- 3*20 mm mild steel flat for top base ring
- 25*25*3 mm mild steel angle for load bearing bars
- 7 mm mild steel rod for grate

The RS1.1 and RS1.3 stoves are produced in Nepal by four Nepali manufacturers. The manufacturer can be identified for each ICS by the 3-letter code at the start of the serial number, shown in Table 7 below. CRT/N managed training for all manufacturers on fabrication of the combustion chambers used in the rocket stove per the technical specification of the program.

Table 7: ICF Program Stove Manufacturers

Manufacturer Name	Location	Serial Number Code
Durga Engineering Works	Dhangadhi Municipality- 4, Chauraha, Kailali District	DEW
Rijwan Engineering Udhyog	Nepalgunj Municipality-14, Industrial Area, Banke District	REU
Asain Metal Udhyog	Amargadhi Municipality-5, Tuphan Danda, Dadeldhura District	AMU
Siddhartha Engineering Works	Nepalgunj Municipality-14, Industrial Area, Banke District	SEW

The minimum technical lifetime of ICS is estimated to be three years, but depending on usage conditions, the stoves may remain in use for longer. In 2014, the program became the first ICS program in the country to provide a warranty for the ICS for a year of use, confirmed by all product manufacturers. Once the ICS go out of the operation, there are systems in place within the framework of the PoA to provide households with replacement ICS. Each user household is given the contact information of their local stove promoter and the Local Partner Organization affiliated with the project to ensure they can request a replacement stove when needed. Once the program begins installing ICS again, expected in fall of 2017, this warranty and replacement provision will continue to be implemented.

To date, 14 ICS have been replaced at the request of the user. When a replacement ICS is installed, the serial number for the ICS it is replacing is included in the record in the database. For crediting purposes, the original ICS is credited from the date of the first installation of an ICS in the user's house and the new replacement ICS is not credited. This ensures that no double counting occurs for replacements. This approach is demonstrated through use of the 'Applied Installation Date for Crediting' column in the database (see **ANNEX 2** - ER Calculations Issuance 2 and **ANNEX 10** - Detailed Customer Database).

An additional 673 RS3.1 models were replaced by RS1.3 models. The RS3.1 model had a ceramic combustion chamber and was introduced to the program in response to user feedback that they wanted more model options. CRT/N had experience distributing rocket cookstoves with ceramic combustion chambers in ICS programs in other parts of the country, so they developed the design with GACC-certified stove lab RTKC, then selected a manufacturer in Kathmandu to produce the ceramic chambers. The stoves were piloted in the field in May 2013 and were very well liked. However, as distribution of RS3.1 models scaled up, the project began receiving complaints from the users that the ceramic combustion chambers were breaking. Project staff and manufacturer conducted spot checks and confirmed that the ceramic chambers were not constructed and fired in an appropriate manner to withstand use conditions. Therefore, the project decided to replace all distributed RS3.1 models with the newest ICS model, RS1.3. A total of 195 RS3.1 models are still intact.While some households continue to use their RS3.1 model and are pleased with fuel savings and usage, the project conservatively chooses not to credit any RS3.1 ICS, thus these ICS are indicated as not being credited and are not included in total ICS numbers (see **ANNEX 10** - Detailed Customer Database).

For the majority of RS3.1 ICS that were replaced, when the replacement is made, the stove promoter only replaces the combustion chamber, not the top plate on which the serial number is engraved. As such, the serial number does not change, therefore there is only one entry in the database for the household and ICS. The replacement is indicated in the PoA Distribution and Monitoring Database through updating the 'Stove Type' to current model (RS1.3) and adding the previous model (RS3.1) and month that the replacement ICS was installed in the 'Remarks' field. Due to insufficient record keeping on the date of installation of the replacement, these ICS were not credited during the first crediting period. They are credited for the first time during this second crediting period.

The efficiency of ICS stoves distributed under the CPA # 01, CPA # 02, and CPA # 03 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 baseline survey conducted in the FWDR 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. [9]

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 is used.[10]

In the past, a number of ICS were distributed in the FWDR under other ICS implementation programs. SNV and CRT/N do not intend to disseminate to households which 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 05.0, the type of baseline stove in use is noted at the time of sale and if ICS stoves are in use in the baseline, those project ICS are notincluded for emission reduction crediting.

Eligibility criteria pertaining to the technology deployed in the CPAs is described in Table 8 below:

[9] 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.

[10] UNFCCC Methodology AMS II.G version 05.0

Table 8: Eligibility Criteria Relevant to Technology Employed

No.	Eligibility Criteria Relevant to Technology		Assessment for CPA # 01, CPA # 02, and CPA # 03	
	Description	**Conditions to be met**	**Means of proof**	**Conclusion** *(Yes/No)*
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 RS1.3 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 conducted for this monitoring period demonstratethe following efficiencies of installed stove types, all exceeding minimum requirement of 20%. **ICS** | **Efficiency** RS1.1 | 24.95% RS1.3 | 22.94%

(c) Relevant dates for the specific-case CPAs

The start date of each CPA is the date of the first installation included in the CPA, both of which are after the start date of the PoA, 22/05/2013. The start date of crediting is the date of the CPA inclusion. The start date of this second monitoring period for CPA # 01 and CPA # 02 and the first monitoring period for CPA # 03 is

02/04/2015, however no credits are claimed for CPA # 03 from 19/12/2014, the crediting period start date, until 09/04/2015, the installation date of the first ICS credited in the CPA[11].

Table 9: CPA Relevant Dates

Project Activity	CPA Start Date	Crediting Start Date	Monitoring Period #	Monitoring Period Dates
CPA # 01	23/05/2013	19/12/2013	2	02/04/2015 - 01/04/2017
CPA # 02	19/03/2014	19/12/2014	2	02/04/2015 - 01/04/2017
CPA # 03	24/05/2014	19/12/2014	1	02/04/2015 - 01/04/2017

Source: **ANNEX 10** - Detailed Customer Database

From the start date of CPA # 01 on 23/05/2013 through 02/04/2017, a total of 48,810 ICS have been installed and are credited in the CDM PoA; 19,786 in CPA # 01, 19,655 in CPA # 02, and 9,369 in CPA # 03, as demonstrated in
Table 10 below. This excludes the following ICS that will not be credited:

- 14 replacement ICS for which the replaced ICS remains in database. Crediting is based on the original, replaced ICS, to ensure that no double counting occurs, though technically the new ICS is credited.
- 13 installed ICS with ineligible baseline cooking devices, in all cases improved wood stoves.
- 152 ICS installed in Malatikot VDC, where an issue with the local promoters left the majority of stoves uninstalled. As a result, the program conservatively chooses to exclude all stoves from Malatikot from crediting.
- 195 RS3.1 ICS which are not credited, as explained in section D.1. (b) above.
- 2 ICS for which the installation date was blank in the database.

[11] See **ANNEX 11** - CPA 03 ICF054065 for Sales Agreement and Installation Completion Receipt of referenced ICS.

Table 10: ICS Installations by Month of Installation and CPA

Installation Month-Year	CPA 01	CPA 02	CPA 03	Total
May-13	1	-	-	1
Jun-13	2	-	-	2
Jul-13	21	-	-	21
Aug-13	423	-	-	423
Sep-13	1,448	1	-	1,449
Oct-13	589	-	-	589
Nov-13	1,191	2	-	1,193
Dec-13	3,048	3	-	3,051
Jan-14	3,520	1	-	3,521
Feb-14	1,915	-	-	1,915
Mar-14	182	-	-	182
Apr-14	1,000	42	-	1,042
May-14	2,364	102	-	2,466
Jun-14	952	1,289	-	2,241
Jul-14	1,048	1,515	-	2,563
Aug-14	820	1,271	-	2,091
Sep-14	685	1,788	-	2,473
Oct-14	362	1,134	-	1,496
Nov-14	197	1,071	-	1,268
Dec-14	5	1,348	-	1,353
Jan-15	2	1,167	-	1,169
Feb-15	6	3,175	-	3,181
Mar-15	3	2,226	-	2,229
Apr-15	2	1,965	19	1,986
May-15	-	1,555	934	2,489
Jun-15	-	-	2,337	2,337
Jul-15	-	-	1,760	1,760
Aug-15	-	-	1,926	1,926
Sep-15	-	-	2,008	2,008
Oct-15	-	-	284	284
Nov-15	-	-	101	101
Total	**19,786**	**19,655**	**9,369**	**48,810**

Reference: **ANNEX 10** - Detailed Customer Database

ICS have been installed across all seven districts of the FWDR, in a total of 257 Village Development Committees (VDCs).[12] CPA Implementer CRT/N began implementation in Doti, Dadeldhura, and Baitadi districts first, with installation of the first ICS included in CPA # 01 in June 2013, and expanded to all seven districts in October 2013. Installations of ICS by District and CPA are shown in Table 11 below.

[12] Village Development Committee is the local level government, to organize village people at the local level. There are multiple VDCs per district, each of which is further divided into an average of 9 wards. The VDC represents the large village level.

Table 11: Summary of ICS Installations by District and CPA

District	CPA 01	CPA 02	CPA 03	Total	% of Total
Achham	2,614	6,631	2,037	11,282	23.1%
Baitadi	6,336	3,441	1,078	10,855	22.2%
Bajhang	761	3,144	1,779	5,684	11.6%
Bajura	748	1,261	1,157	3,166	6.5%
Dadeldhura	5,170	2,105	1,159	8,434	17.3%
Darchula	1,500	851	253	2,604	5.3%
Doti	2,657	2,222	1,906	6,785	13.9%
Total	**19,786**	**19,655**	**9,369**	**48,810**	**100%**

Reference: **ANNEX 10** - Detailed Customer Database

(d) Total GHG emission reductions achieved in this monitoring period for the specific-case CPA(s), including information on how double counting is avoided

Table 12: Total GHG emissions reductions and $GWh_{thermal}$ Savings

Project Activity	tCO2e	Total GWh $_{thermal}$ Savings	Max Annual GWh $_{thermal}$ Savings
CPA # 01	34,425	335	168
CPA # 02	33,994	331	167
CPA # 03	13,725	133	79
Total	**82,144**	**799**	**168**

Source: **ANNEX 2** - ER Calculations

Per AMS-II.E, the aggregate energy savings of a single CPA may not exceed 180 GWh thermal per year. As demonstrated above, CPA #01, CPA # 02, and CPA # 03 are below the threshold. Calculations of GWh thermal are demonstrated in **ANNEX 2** - ER Calculations.

Information on how double counting is avoided is provided in Part I, Section B.1, *(d) Procedure to avoid double counting*.

D.2. Geographical references or other means of identification of the location of the specific-case CPA(s)

>>
CPA # 01, CPA # 02, and CPA # 03 are implemented in the same location:

(a) Host party: Federal Democratic Republic of Nepal

(b) Region/state/province, etc.: Far Western Development Region (FWDR)

(c) City/town/community, etc.: Districts of Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang, and Bajura

(d) Physical/geographical location:

Table 13: Geographical references for each district of FWDR

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 5: Geographical area covered by CPA # 01, CPA # 02, CPA # 03 – districts Doti, Dadeldhura, Baitadi, Achham, Darchula, Bajhang & Bajura (in color) in which ICS may be installed.

SECTION E. Post-registration changes to specific-case CPA(s)

E.1. Temporary deviations from registered monitoring plan, applied methodology or applied standardized baseline

>>
N/A

E.2. Corrections

>>
N/A

E.3. Changes to the start date of the crediting period of the specific-case CPA(s)

>>
N/A

E.4. Inclusion of a monitoring plan into the specific-case CPA(s) that was not included at registration

>>
N/A

E.5. Permanent changes to the monitoring plan as described in the registered specific-case CPA-DD(s), applied methodology or standardized baseline

>>
N/A

E.6. Changes to project design of the specific-case CPA(s)

>>
N/A

E.7. Types of changes specific to afforestation and reforestation specific-case CPA(s)

>>
N/A

SECTION F. Description of the monitoring system of specific-case CPA(s)

>>
Monitoring for CPA # 01, CPA # 02, and CPA # 03 involves three parts:

Part 1: PoA Distribution and Monitoring Database

Part 1 of the monitoring system involves use of the PoA Distribution and Monitoring Database to determine the following monitored parameters:

- N_{all} - Total number of ICS distributed under specific project activity
- $Stove_{year}$ - Calculated average stove operation years in the monitoring period (years)

The following process for entering each ICS into the database was developed to ensure a high standard of data quality and that double counting does not occur; further checks ensure database accuracy. The process, which was conducted through Februrary 2016 when project operations and installation of ICS temporarily stopped, is as follows, demonstrated in Figure 2: Data transferFigure 6 below, with numbers corresponding to the following steps 1-6. As noted in section B.2, prior to restart of sales and distribution, SNV will ensure that all project partners are trained to implement required roles and responsibilities listed below to ensure that implementation of the management system including data generation,transferring, and recording will not be impacted once the sales and distribution restarts. Moreover the personnel handling the records at RDSC office had been trained and served as assistant to Database Manager at the ICF headquarters office since 2014.

1. Household member visits LPO or attends awareness raising event to learn about stove. Selects stove model and fills out and signs a 'Sales Agreement'.

2. When ICS metallic components are available, user collects components from LPO; local Stove Promoter visits user household to install ICS and train user. Upon installation, Stove Promoter and user fill out and sign Installation Completion Receipt, collecting remaining household and stove information captured in database. The Stove Promoter delivers hard copies of the completed Installation Completion Receipts to the LPO.

3. LPO collects all hard copies in their local office and enters client information into excel template provided by CRT/N for all stoves installed in the month. CRT/N provided templates for data entry and training on correct data recording practices.

4. Once per month, LPO submits excel list of ICS installed and corresponding Sales Agreements and Installation Completion Receipts to CRT/N District Technical Coordinator (DTC), who checks hard copies against excel list and requests LPO to make any required corrections.

5. All District Technical Staff members brings Sales Agreements, Installation Completion Receipts, and list of sales to CRT/N Field Headquarters for monthly meeting.

6. Database Coordinator, CRT/N staff member, reviews soft copies provided by LPO with hard copy documentation and enters each ICF into PoA Distribution and Monitoring Database. Upon confirmation of information with Sales Agreement and Installation Completion Receipt, the field 'Checked' in the PoA Distribution and Monitoring Database is marked as 'Yes', certifying the accuracy of the record. All hard copy documentation is stored at CRT/N Field Headquarters in Dadelehdura. SNV as CME provides oversight of data entry into PoA Distribution and Monitoring Databse.

Note that as CRT/N is implementing CPA # 01, CPA # 02, and CPA # 03, there is no difference between the CPA ICS Sales Database and the PoA Distribution Monitoring Database to date. The distinction is to ensure that should SNV include a CPA with a different implementer, SNV as CME shall provide more oversight in the merging of the CPA ICS Sales Databases into the PoA Distribution and Monitoring Database.

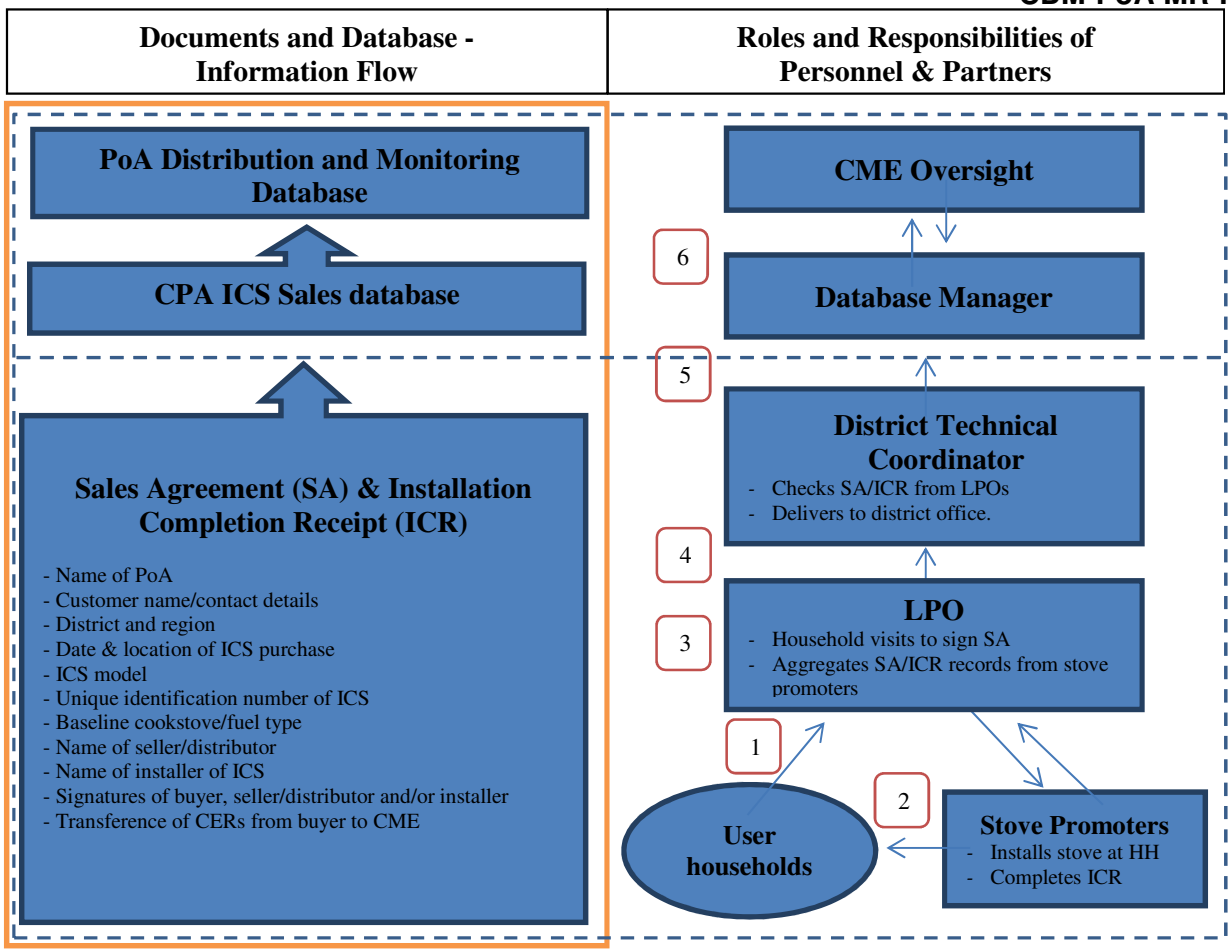

Figure 6: Database Information Flow

Further QA/QC measures ensure proper procedures are followed, each ICS included in database is installed and in use, and safety of data in case of emergency. The following measures were conducted through February 2016 and will be implemented again upon continuation of the sale and distribution of ICS.

1. LPO and District Technical Coordinator (DTC) conduct ongoing spotchecks on information provided by Stove Promoters to ensure stoves are installed correctly and follow-up service is provided. Any inconsistencies or issues found among users are reported to CRT/N. LPOs check 20% of the installations in their area on an ongoing basis, reporting on checks monthly basis to the DTC. The DTC, as district representative of CRT/N, checks 0.2-0.5% of all installations in their areas, reporting on spotchecks in monthly meetings with CRT/N.

2. CRT/N contracts RPO to conduct at least semi-annual monitoring on a sample of data provided by each LPO. Information from monitoring is used to update database and provide incentives or penalties to LPOs based on performance.

3. CRT/N cross-checks the number of stoves installed with the number of stoves provided by each stove manufacturer.

4. Programme Unit of SNV cross-checks the sales registry through periodic monitoring of random samples, to ensure no double counting and verify the accuracy of the database. Deviations are subject to penalty.

5. Double counting is avoided by territorial allocation of a particular VDC to one LPO only and recording the unique identification number of each ICS installed in the PoA Distribution and Monitoring database together with the contact details of the user

6. The database restricts entry of repeat serial numbers and/or user name, contact details. The serial number together with the name and contact details of the user constitute the unique identification of the system.

7. The data is backed up on an external hard drive and with cloud storage to ensure no loss of data. The office further uses a generator in case of power outages to decrease risk of data loss. CRT/N is also implementing procedures to scan Installation Completion Receipts to maintain a soft copy in case of damage to paper records.

Information in the database is used to ensure that the ICS is eligible for inclusion into the specified project activity, including:

- the location to ensure it is located in one of the seven districts in the FWDR;
- the baseline stove and fuel use type to ensure it aligns with requirements in the methodology and PDD; and
- the installation date to ensure it is installed after the start date of the PoA and respective project activity.

Eligible stoves are assigned to a CPA within the database, from which the parameter N_{all} is derived. Further, the ICS owner's name and location of household are used to locate end users for surveys or other customer follow-up. LPO and Promoter name are available for further assistance in finding the household.

ICS installation date is used to determine the parameter $Stove_{year}$ by comparing the installation date to the crediting period dates and determining the fraction of the crediting period during which each individual product was installed. The average of this value for each ICS in the project activity is applied as the value for $Stove_{year}$ (Reference: **ANNEX 2** - ER Calculations).

Part 2: Usage Survey

The Usage Survey, ex-post sampling, was conducted in March-May 2017 to determine values for the following parameters:

- SOF - Stove Operation Fraction, the fraction of stoves operating or replaced by equivalent in service appliance.
- f_{old} - Fraction of end users that are still using their replaced stoves during the monitoring period.

SNV contracted RDSC to conduct the Usage Survey. A detailed description of the Usage Survey including methods used is included in **ANNEX 3** - Usage Survey Report. Overall, surveyors visited a total of 448 households in March-May 2017 of the samples from CPA # 01, CPA # 02, and CPA # 03 which agreed to take the survey. A detailed description of the Usage Survey including methods used is included in **ANNEX 3** - Usage Survey Report. Details of the sampling approach and data analysis are provided in Part I, Section B.2.

Data collection procedures for the Usage Survey are described below and depicted along with collection procedures for WBT surveys in **Fehler! Verweisquelle konnte nicht gefunden werden.** below with numbers corresponding to following steps 1-5.

1. CME selects sample from PoA Distribution and Monitoring Database, across CPA # 01, CPA # 02, and CPA # 03 per cross-CPA sampling, using multi-stage sampling approach, as described in Part I, Section B.2 above.

2. CME provides samples to contracted partner RDSC to conduct Usage Survey. CME further provides training to RDSC Survey team leader and 5 surveyors from RDSC on conducting the Usage Survey (See **ANNEX 3** - Usage Survey Report).

3. RDSC Monitoring Agents visit sampled households and conduct Usage Survey, collecting the Stove Number, determining if the ICS is in use (SOF), and if the replaced stove is still in use (f_{old}).

4. Monitoring agents conduct the surveys on Android phones, using a webform developed on Open Data Kit (ODK), an open-source platform. The surveys are sent via wireless internet to the web-hosted server, from which CME can download survey results.

5. CME contracts consultant to analyze data, determine values for monitored parameters SOF and f_{old}, and calculate CERs according to monitored parameters. Analysis of each parameter is described in Part I, section B.2, sub-section (d).

Monitoring data is securely stored on ODK web-hosted server, exported survey results are saved on cloud-based storage. Data shall be kept in cloud-storage for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Part 3: WBT Surveys

The monitored parameter η_{new}, efficiency of project ICS, was determined through water boiling tests, conducted on a sample of ICS installed in CPA # 01, CPA # 02, and CPA # 03. The water boiling tests were conducted in March-April 2017. A detailed description of the WBT efforts is included in **ANNEX 6 -** WBT Report.Details of the sampling approach and data analysis are provided in Part I, Section B.2.

SNV hired the Rural Energy Testing Station (RETS) under the Nepal Academy for Science and Technology (NAST) to conduct the WBTs. RETS is the entity that conducts testing for Nepal's National ICF programme and has extensive experience in WBTs in field and laboratory settings. RETS conducted surveys on a total of 36 ICS.

Data collection procedures for WBT surveys are described below and depicted along with collection procedures for the Usage Survey in **Fehler! Verweisquelle konnte nicht gefunden werden.** below with numbers corresponding to following steps 1-5.

1. CME selects sample from PoA Distribution and Monitoring Database, across CPA # 01, CPA # 02, and CPA # 03 per cross-CPA sampling, using multi-stage stratified sampling approach, as described in Part I. Section B.2.

2. CME provides samples to contracted partner RETS to conduct WBT surveys. CME provides initiation and overview of program to RETS, including purpose and requirements of WBTs.

3. RETS team visit sampled households and tested stoves using the WBT (WBT version 4.2.3) ascribed by GACC, to determine the average thermal efficiency of each ICS.

4. The RETS team recorded testing results on paper test reports in the field, then transferred them to Excel tables. Both scanned copies of the paper test reports and excel files were submitted to the CME. RETS team prepared final report of test results (**ANNEX 6** - WBT Report).

5. CME cross-checked results between final report, excel files, and scanned test reports, and contracted consultant to analyze data, determine value for monitored parameter η_{new}, and calculate CERs according to monitored parameters. Analysis of the parameter is described in Part I, section B.2, sub-section (d).

Final report provided by RETS, excel versions of WBT results, and scanned test results are saved on cloud-based storage. Data shall be kept in cloud-storage for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

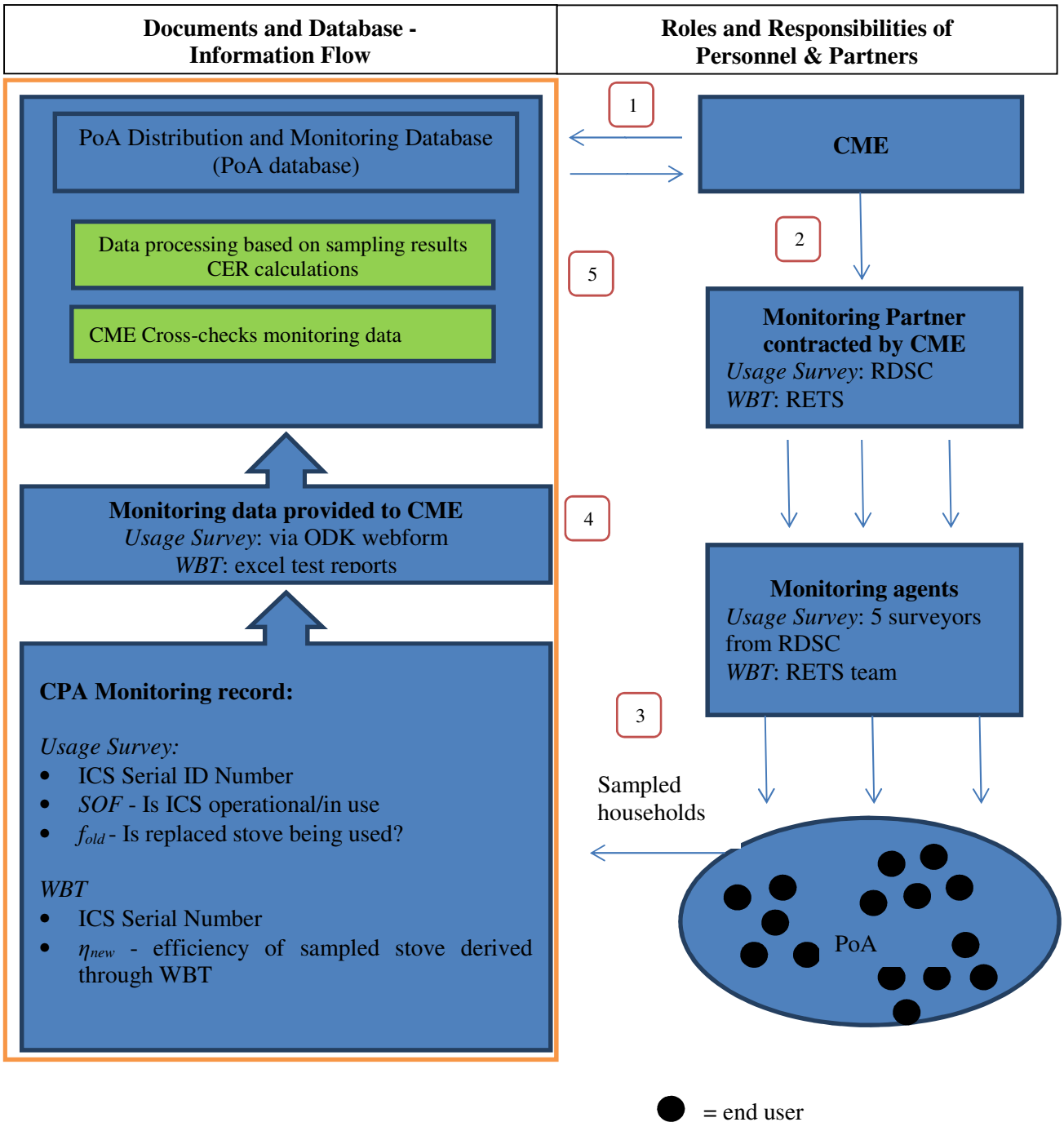

Figure 7: Ex-post Monitoring Activities - Usage Survey and WBT Surveys

SECTION G. Data and parameters

G.1. Data and parameters fixed ex ante, at registration, inclusion or renewal of crediting period

(Copy this table for each piece of 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 **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I24
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, that is without a grate or a chimney a default value of 0.10 for η_{old} may be optionally used. This option was applied; ICS stoves distributed in one CPA are 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 each project activity under the PoA, the type of baseline cookstove (traditional or ICS) replaced is recorded and emission reductions are 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 **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I14
Value(s) applied):	4.03
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[13] 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.

[13] 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.

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.

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 **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I13
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:	-

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 **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I15
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: $(ICS\ Average\ Consumption) * nnew = (\text{Dual cookstove Consumption} - \text{uold}) * \text{nnew} + \text{uold} * \text{nold}$ $180 * 0.2 = (198 - \mu_{old}) * 0.2 + \mu_{old} * 0.1$ $\mu_{old} = 0.43$
Purpose of data:	Calculation of emission reductions
Additional comment:	-

G.2. Data and parameters monitored

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

Data / Parameter:	$E_{Saving,appliance}$
Unit:	GWh/year
Description:	Average annual energy saving per ICS distributed for CPA # 01, CPA # 02, and CPA # 03 ($E_{Saving, appliance}$)
Measured/ Calculated / Default:	Calculated
Source of data:	Calculated from $B_{y,savings}$ and $NCV_{biomass}$ using equation #5 of PoA-DD, section B.6.1. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I29 Calculated at time of submission to DOE for assessment.
Value(s) of monitored parameter:	CPA # 01: 0.008 CPA # 02: 0.008 CPA # 03: 0.008
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least once per monitoring period.
Calculation method (if applicable):	Equation #5: $E_{Saving,appliance} = B_{y,savings} * NCV_{biomass} * T_{GWh/TJ}$ Where: $B_{y,savings}$ — Annual quantity of woody biomass that is saved in tonnes per device $NCV_{biomass}$ — Net calorific value of the non-renewable biomass that is substituted $T_{GWh/TJ}$ — Energy Unit Transformation factor Reference: **ANNEX 2** - ER Calculations
QA/QC procedures:	N/A
Purpose of data:	Calculation of baseline emissions
Additional comment:	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. Values applied for CPA # 01, CPA # 02, and CPA # 03 are the same because each parameter applied in the equation for $E_{Saving,appliance}$ is the same for CPA # 01, CPA # 02, and CPA # 03. $B_{y,savings}$ is derived from the same values for CPAs due to cross-CPA sampling. $NCV_{biomass}$ and $T_{GWh/TJ}$ are ex-ante parameters that are the same for CPAs.

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
Measured/ Calculated / Default:	Default
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 Confirmed via CDM website for 2015, 2016, 2017 upon first submission of monitoring report to DOE on 19/05/2017. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I57
Value(s) of monitored parameter:	2015 2016 2017 CPA # 01: 0.86 0.86 0.86 CPA # 02: 0.86 0.86 0.86 CPA # 03: 0.86 0.86 0.86
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Yearly
Calculation method (if applicable):	N/A
QA/QC procedures:	N/A
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 ofAMS-II.G methodology version 05. Values applied for CPA # 01, CPA # 02, and CPA # 03 are the same because it is applicable for Nepal as a whole, and thereby applicable to the project boundary for CPAs.

Data / Parameter:	N_{CPA}
Unit:	GWh
Description:	Maximum number of appliances in one CPA to reach small scale threshold of 180 $GWh_{(th)}$
Measured/ Calculated / Default:	Calculated
Source of data:	Calculated from the annual energy saving per appliance ($E_{Saving,appliance}$) per Equation #6 of PoA-DD, section B.6.1. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I36 Calculated at time of submission to DOE for assessment.
Value(s) of monitored parameter:	CPA # 01: 21,304 CPA # 02: 21,304 CPA # 03: 21,304

Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	Once per monitoring period
Calculation method (if applicable):	Equation #6: N_{CPA} = $SSC_{threshold}$ / $E_{Saving,appliance}$ Where: $SSC_{threshold}$: SSC threshold of 180 GWhth $E_{Saving,appliance}$: Average annual energy saving per one ICS distributed in a given CPA Reference: **ANNEX 2** - ER Calculations
QA/QC procedures:	N/A
Purpose of data:	Ensure cap is not exceeded for project
Additional comment:	Used to verify that the small scale threshold limit of 180 GWh_{th} for a given CPA is not exceeded. Values applied for CPA # 01, CPA # 02, and CPA # 03 are the same because both parameters applied in the calculation of N_{CPA} are the same for CPAs. $SSC_{threshold}$ is an ex-ante parameter, set due to the scale of the CPAs. $E_{Saving,appliance}$ is the same for both parameters, as described in parameter box above.

Data / Parameter:	$N_{y,i}$
Unit:	Number
Description:	Number of project devices of type i operating in year y
Measured/ Calculated / Default:	Calculated
Source of data:	Calculated as per equation # 4 of PoA-DD, section B.6.1. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', CPA # 01 - # 03: cells I-K66 Calculated at time of submission to DOE for assessment. The value was monitored once in the monitoring period, which is less than a two-year period, thus the requirement of monitoring no less than biennially is met.
Value(s) of monitored parameter:	CPA # 01: 16,128 CPA # 02: 15,926 CPA # 03: 6,430
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least once per monitoring period, but no less than biennially

Calculation method (if applicable):	Equation # 4 $N_{y,i}$ = N_{all} * SOF * $Stove_{year}$ Where: N_{all} — Total number of ICS installed in year y SOF — Stove Operation Fraction $Stove_{year}$ — Average stove operation years in monitoring period Reference: **ANNEX 2** - ER Calculations
QA/QC procedures:	Data 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 project emissions
Additional comment:	N/A

Data / Parameter:	N_{all}
Unit:	Number
Description:	Total number of ICS installed in a given monitoring period in CPA # 01, CPA # 02, and CPA # 03
Measured/ Calculated / Default:	Measured.
Source of data:	PoA Distribution and Monitoring Database. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', CPA # 01 - # 03: cells I-K68
Value(s) of monitored parameter:	CPA # 01: 19,786 CPA # 02: 19,655 CPA # 03: 9,369
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least once per monitoring period
Calculation method (if applicable):	N/A
QA/QC procedures:	Data on total number of ICS installed is 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 supervises the activities of CRT/N, and provides training, guidelines and distribution templates to facilitate accurate record keeping during the ICS distribution. The CME also maintains a record of thestove serial numbers supplied by each LPO, and can cross-check these against the ICS sales database(s) it receives back from the CRT/N.
Purpose of data:	Calculation of project emissions
Additional comment:	During ICS dissemination in each CPA, the type of baseline cookstove (traditional or ICS) replaced is recorded and emission reductions are accounted only for the cases when ICS replace traditional, unimproved cookstoves. N_{all} does not exceed N_{CPA} for either CPA.

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
Measured/ Calculated / Default:	Measured through survey
Source of data:	Usage Survey, conducted March-May 2017, see **ANNEX 3** - Usage Survey Report_v1. Analysis provided in **ANNEX 4** - Usage Survey Data Analysis, SOF value provided in worksheet '3. Summary Tables', cell C8. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', CPA # 01 - # 03:cells I-K69
Value(s) of monitored parameter:	CPA # 01: 0.407 CPA # 02: 0.407 CPA # 03: 0.407
Monitoring equipment:	Usage Survey
Measuring/ Reading/ Recording frequency:	At least biennially, likely to be done annually.
Calculation method (if applicable):	At VDC level: Number of ICS found in use / Total number of ICS users Value for parameter is determined applying the Hansen Hurwitz estimator to account for multi-stage sampling approach. In case that the value does not meet 95/10 confidence precision level required for cross-CPA sampling, the lower bound of the confidence interval shall be conservatively applied.
QA/QC procedures:	The CME provided training, guidelines and monitoring templates to ensure that RDSC, the third party and regional partner organization that was responsible for monitoring, follows appropriate procedures. Details and evidence of training provided in **ANNEX 3** - Usage Survey Report_v1. 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 comment:	As cross-CPA sampling was employed, the value is applied to both CPA # 01, CPA # 02, and CPA # 03. As 95/10 confidence precision estimate was not met, lower bound of confidence interval is conservatively applied. Usage survey was completed two months later than biennially due to funding constraints, previous survey completed in March 2015. As no new ICS were installed during the two month delay period (March 2017-May 2017), the population of ICS was collectively two months older during the applied survey period. While this minimal delay of 2 months due to funding constraints is expected to have a negligible impact on survey results, any impact it may have would be conservative, resulting in lower calculated emission reductions. Future surveys will be completed within the biennial requirement.

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 Stoveyear = 1.0. If less than 365 days, then Stoveyear is represented as a fraction of 365 (eg. 180 days= 0.5).
Measured/ Calculated / Default:	Calculated
Source of data:	PoA Distribution and Monitoring Database **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', CPA # 01 - # 03: cells I-K70
Value(s) of monitored parameter:	CPA # 01: 2.00 CPA # 02: 1.99 CPA # 03: 1.69
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least once per monitoring period
Calculation method (if applicable):	If ICS Installation date is before Crediting period start date: $Stove_{year}$ = (Crediting period end date - Crediting Period Start Date)/365 If ICS Installation date is after Crediting Period start date: $Stove_{year}$ = (Crediting period end date - ICS Installation Date)/365
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 project emissions
Additional comment:	-

Data / Parameter:	f_{old}
Unit:	Fraction
Description:	The fraction of end users that are still using baseline (replaced) stoves.
Measured/ Calculated / Default:	Usage Survey, conducted March-May, see **ANNEX 3** - Usage Survey Report_v1. Analysis provided in **ANNEX 4** - Usage Survey Data Analysis, SOF value provided in worksheet '3. Summary Tables', cell D9. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I16
Source of data:	Usage Survey
Value(s) of monitored parameter:	CPA # 01: 0.716 CPA # 02: 0.716 CPA # 03: 0.716
Monitoring equipment:	N/A
Measuring/ Reading/ Recording frequency:	At least biennially, likely to be annually.

Calculation method (if applicable):	At VDC level: Number of ICS users that continue to use baseline stove in use / Total number of ICS users Value for parameter is determined applying the Hansen Hurwitz estimator to account for multi-stage sampling approach. In case that the value does not meet 95/10 confidence precision level required for cross-CPA sampling, the upper level of the confidence interval shall be conservatively applied.
QA/QC procedures:	The CME provided training, guidelines and monitoring templates to ensure that RDSC, the third party and regional partner organization that was responsible for monitoring, follows appropriate procedures. Details and evidence of training provided in **ANNEX 3** - Usage Survey Report_v1. 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 comment:	As cross-CPA sampling was employed, the value is applied to CPA # 01, CPA # 02, and CPA # 03. As 95/10 confidence precision estimate was not met, upper bound of confidence interval is conservatively applied. Usage survey was completed two months later than biennially due to funding constraints, previous survey completed in March 2015. As no new ICS were installed during the two month delay period (March 2017-May 2017), the population of ICS was collectively two months older during the applied survey period. While this minimal delay of 2 months due to funding constraints is expected to have a negligible impact on survey results, any impact it may have would be conservative, resulting in lower calculated emission reductions. Future surveys will be completed within the biennial requirement.

Data / Parameter:	$\eta_{new,y}$
Unit:	Fraction
Description:	Efficiency of the device being deployed as part of the project activity in year y
Measured/ Calculated / Default:	Measured
Source of data:	Water Boiling Tests (WBT) conducted by RETS on 36 sampled ICS in March-April 2017; model surveyed proportional to total number of each ICS model in population. See **ANNEX 6** - WBT Report. Monitored parameter value reference **ANNEX 7** - WBT Data Analysis, worksheet 'Analysis'. **ANNEX 2** - ER Calculations, worksheet '2. ER Calcs', cell I25
Value(s) of monitored parameter:	CPA # 01: 0.234 CPA # 02: 0.234 CPA # 03: 0.234

Monitoring equipment:	Water Boiling Test protocol.
Measuring/ Reading/ Recording frequency:	Biennially per AMS II.G version05.0 §23 (b), footnote 12. There is a difference between the initial efficiency and the monitored efficiency for both stove types. The initial efficiency of the project cookstoves was 23.4% (for model RS1.1) and 25.1% (for model RS1.3) whereas the determined efficiency by the WBTs conducted during according to the methodology in this monitoring period were 24.95% (for model RS 1.1) and 22.94% (for model RS1.3). The initial efficiency was determined by conducting a WBT in the Regional CookstovesTesting and Knowledge Center in Kathmandu in a laboratory setting, under an emission hood (see **ANNEX 12** - Test Report RS1.1 Stove, **ANNEX 13** - Test Report RS1.3 Stove). Per the monitoring methodology, $\eta_{new,y}$ is derived from conducting WBTs on a sample of stoves in the field, as opposed to in a laboratory setting. In the first monitoring period, the efficiencies of both stove types, as determined by the WBT sampling effort, was higher in comparison to the initial efficiency. It is not unexpected that a WBT conducted in the field, at user households in a different region should produce slightly different results. In this second monitoring period, the efficiency of both stove types was lower as compared to the first monitoring period, two years prior. While for RS1.1, the determined efficiency is still higher than the initial efficiency; in the case of RS1.3 the determined efficiency in this monitoring period is lower than the initial efficiency. Nonetheless, this does not violate the requirement for biennial sampling,which states that the efficiency of the cook stove does not drop significantly as compared to the initial efficiency of the new device, over a time period of two years of typical usage. Over 77% of the ICS population (installed prior to May 2015) and 80% of the samples used for the WBTs are over two years of age; thus a decrease in efficiency from the previous monitoring period to the current is not unexpected due to more than two years of typical usage. The decision to conduct biennial sampling was based on the the WBT results in the first monitoring period which did not demonstrate a drop in efficiency over the first two years of use and the confirmation from the stove designer, the Regional Cookstove Testing and Knoweldge Center under CRT-N, that the efficiency was not expected to decrease over the period of use.
Calculation method (if applicable):	Calculated per stratified sampling calculations. See **ANNEX 7** - WBT Data Analysis for calculation approach and demonstrated conservativeness.
QA/QC procedures:	Sampling and survey were carried out with 95% confidence interval and a 10% margin of error for cross-CPA sampling. The WBTs were conducted by RETS, which is experienced in field and laboratory implementation of WBTs, and is experienced in cookstove projects in Nepal. 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 comment:	Upon dissemination, the ICS model received by each end user in the CPA is identified through the serial number of the ICS distributed. The ICS model sold to the end user is also recorded in the CPA Sales Record. In line with the methodology, a weighted average value of the efficiency is used based on the actual distribution numbers of the different stove types in a single sampling frame. This weighted average is derived through the use of multi-stage stratified sampling. Each WBT conducted during monitoring is 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 CPA # 01, CPA # 02, and CPA # 03. The difference between the value in the CPA-DD applied for ex-ante emission reductions and the parameter value is not a concern as the difference in test conditions, primarily fuel type and fuel moisture content, render a comparison between the two values unreliable. Parameter value is derived from 36 complete WBTs conducted on-site, using locally-used fuel wood; this is a more accurate and appropriate approach than value derived from one WBT per ICS model using a different fuel type under laboratory conditions. As cross-CPA sampling was employed, the value is applied to both CPA # 01, CPA # 02, and CPA # 03. WBT survey completed two months later than biennially due to funding constraints, with previous survey completed at the end of February 2017. As no new ICS were installed during the two month delay period (February 2017-April 2017), the population of ICS was collectively two months older during the applied survey period. While this minimal delay of 2 months due to funding constraints is expected to have a negligible impact on survey results, any impact it may have would be conservative, resulting in lower calculated emission reductions. Future surveys will be completed within the biennial requirement.

G.3. Implementation of specific-case CPA level sampling plan

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Cross-CPA sampling was employed for CPA # 01, CPA # 02, and CPA # 03, therefore the implementation of the sampling plan is provided in Section B.2 of Part I above.

SECTION H. Calculation of GHG emission reductions or net GHG removals by sinks

H.1. Calculation of baseline emissions or baseline net GHG removals by sinks

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The emission reductions achieved by CPA # 01, CPA # 02, and CPA # 03 are calculated per AMS-II G, Version 05 methodology as follows, according to Equations laid out in CPA-DD. See **ANNEX 2** - ER Calculations; column 'Ref. Cell' in tables below refers to the location of the value in worksheet '2. ER Calc Steps'. Equations reference those in registered PoA-DD, section B.6.1.

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

Equation # 3

Parameter	Description	Value	Unit	Source of Value	Ref. Cell
B_{old}	**=LAF * ($Q_{biomass}$ – (μ_{old} * f_{old}))**	**3.54**	**Tons**	**Equation #3**	**I11**
LAF	Net to gross adjustment factor to account for leakages	0.95	n/a	AMS-II.G v.5	I13
$Q_{biomass}$	Annual average biomass consumption per appliance	4.03	$t_{biomass}$/a	Fixed	I14
μ_{old}	Average volume of consumption accounted for by old (baseline) stoves.	0.43	$t_{biomass}$/a	Fixed	I15
f_{old}	Proportion of end users using old (baseline) stoves post ICS distribution.	0.716	Fraction	Monitored; **ANNEX 4** - Usage Survey Data Analysis, Worksheet '3. Summary Tables', cell D9	I16

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

Equation # 2

Parameter	Description	Value	Unit	Source of Value	Ref. Cell
$B_{y,savings}$	**=B_{old}·(1-η_{old}/ η_{new})**	**2.03**	**Tons**	**Equation #2**	**I22**
η_{old}	Efficiency of the system being replaced	0.10	Fraction	Fixed	I24
$\eta_{new,weighted\ average}$	Average of efficiency of systems being deployed as part of project activity, calculated through multi-stage stratified sampling approach.	0.234	Fraction	Monitored; **ANNEX 7** - WBT Data Analysis, Worksheet 'Analysis', cell E21	I25

Step 3: Determination of average annual energy saving per one ICS distributed in CPA # 01, CPA # 02, and CPA # 03 in GWh ($E_{Saving,appliance}$)

Equation #5:

Parameter	Description	Value	Unit	Source of Value	Ref. Cell
$E_{Saving\ appliance}$	**=$B_{y,savings}$ * $NCV_{biomass}$ * $T_{GWh/TJ}$**	**0.008**	**GWh/yr**	**Equation #5**	**I29**
$NCV_{biomass}$	Net calorific value of the non-renewable biomass that is substituted	0.015	TJ/tone	Fixed	I31
$T_{GWh/TJ}$	Energy Unit Transformation factor	0.278	GWh/TJ	Fixed	I32

Step 4: Determination of the maximum number of ICS in each CPA:

Equation #6:

Parameter	Description	Value	Unit	Source of Value	Ref. Cell
N_{CPA}	**$=SSC_{threshold} / E_{Saving\ appliance}$**	**21,304**		**Equation #6**	**I36**
$SSC_{threshold}$	SSC threshold of 180 GWh_{th}	180	GWh_{th}	Fixed	I38
$E_{Saving\ appliance}$	Average annual energy saving per one ICS distributed in a given CPA	0.008	GWh/yr	Calculated, Equation #5	I39

Steps 5, 6, and 7 are conducted separately for CPA # 01, CPA # 02, and CPA # 03, with values demonstrated in separate columns.

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

Equation # 4

Parameter	Description	CPA01 Value	CPA02 Value	CPA03 Value	Unit	Source of Value	Ref. Cell
$N_{y,i}$	**$=N_{all}$* SOF * $Stove_{year}$**	**16,128**	**15,926**	**6,430**		**Equation #4**	**I-K66**
N_{all}	Total number of ICS installed in year y	19,786	19,655	9,369	Units	Tracked; PoA Monitoring and Distribution Database	I-K68
SOF	Stove Operation Fraction	0.407	0.407	0.407	Fraction	Monitored; **ANNEX 4** - Usage Survey Data Analysis, Worksheet '3. Summary Tables', cell D8	I-K69
$Stove_{year}$	Average stove operation years in monitoring period	2.00	1.99	1.69	Fraction	Calculated; PoA Monitoring and Distribution Database	I-K70

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

The limit of NCPA is the number of ICS that can be installed and in use in a year, to ensure the cap of 180GWh is not exceeded. Thus the appropriate comparison between $N_{y,i}$ and N_{CPA} is when Stoveyear = 1.

If Stove Year = 1, then $N_{y,i}$ is less than N_{CPA} for CPA # 01:

Parameter	Description	CPA01 Value	CPA02 Value	CPA03 Value	Unit	Source of Value	Ref. Cell
N_{CPA}		21,304	21,304	21,304	ICS	Equation #6	I-K75
$N_{y,i\ [Stoveyear=1]}$	$N_{y,i}$ / Stoveyear	8,053	8,000	3,813	ICS	Calculated	I-K76

Step 7: Calculation of emission reductions during the year y in tCO2e for CPA # 01

Equation # 1

Parameter	Description	CPA01 Value	CPA02 Value	CPA03 Value	Unit	Source of Value	Ref. Cell
ER_y	$=B_{y,savings}$* $f_{NRB,y}$ *$NCV_{biomass}$ *	**34,425**	**33,994**	**13,725**	**tCO2e**	**Equation #1**	**I-K80**

	$EF_{projected\_fossilfuel} * N_{y,i}$						
$B_{y,savings}$		2.03	2.03	2.03	tonnes	Calculated, Equation #2	I-K82
$f_{NRB,y}$		0.86	0.86	0.86	Fraction	Fixed	I-K83
$NCV_{biomass}$		0.015	0.015	0.015	TJ/tonne	Fixed	I-K84
$EF_{projected\_fossilfuel}$		81.6	81.6	81.6	tCO2/TJ	Fixed	I-K85

The total ER_y for CPA # 01, CPA # 02, and CPA # 03 by year is demonstrated in Table 14 below. Calculations are demonstrated in **ANNEX 2** - ER Calculations.

Table 14: Total emission reductions by CPA and Year

Project Activity	ER_y (tCO2e)			
	2015	**2016**	**2017**	**Total**
CPA # 01	12,904	17,237	4,286	34,425
CPA # 02	12,615	17,122	4,257	33,994
CPA # 03	3,535	8,162	2,029	13,725
Total	**29,053**	**42,520**	**10,571**	**82,144**

H.2. Calculation of project emissions or actual net GHG removals by sinks

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Provided in section H.1.

H.3. Calculation of leakage

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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 #3, Step 1, LAF parameter).

H.4. Summary of calculation of GHG emission reductions or net GHG removals by sinks

Specific-case CPA reference number	Baseline emissions or baseline net GHG removals by sinks (tCO_2e)	Project emissions or actual net GHG removals by sinks (tCO_2e)	Leakage (tCO_2e)	GHG emission reductions or net GHG removals by sinks (tCO_2e) achieved in the monitoring period		
				Up to 31/12/2012	From 01/01/2013	Total amount
9811-0001	34,425	0	0	N/A	34,425	34,425
9811-0002	33,994	0	0	N/A	33,994	33,994
9811-0003	13,725	0	0	N/A	13,725	13,725
Total	**82,144**	**0**	**0**	**N/A**	**82,144**	**82,144**

H.5. Comparison of GHG emission reductions or net GHG removals by sinks with estimates in the included CPA-DD(s)

Specific-case CPA reference number	Value estimated in ex ante calculation in the included CPA-DD(s)	Actual values achieved by the specific-case CPA(s) during this monitoring period
9811-0001	83,288	34,425
9811-0002	82,793	33,994
9811-0003	70,129	13,725
Total	**236,210**	**82,144**

Values estimated in ex ante calculation in the included CPA-DDs included in the table above reflect the number of crediting days within this monitoring period for each CPA. CPA # 01, CPA # 02, and CPA # 03 have 730 crediting days in the monitoring period (02/04/2015 - 01/04/2017). Calculation is demonstrated in **ANNEX 2** - ER Calculations.

H.6. Remarks on difference from the estimated value in the included CPA-DD(s)

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Actual emission reductions achieved during the monitoring period are lower than the values estimated in ex ante calculation primarily because (a) monitored parameter SOF was substantially lower than expected in the CPA-DD, (b) monitored parameter f_{old} was higher than expected in the CPA-DDs, and (c) ICS in CPAs were installed progressively so that not every ICS in each CPA is credited for the entire monitoring period.

Appendix 1. Contact information of coordinating/managing entity and/or responsible persons/entities

Coordinating/managing entity and/or responsible person/entity	☒ Coordinating/managing entity ☐ Person/entity responsible for completing the CDM-MR-FORM
Organization name	SNV Netherlands Development Organisation
Street/P.O. Box	Post Box. 1966
Building	Jawalakhel
City	Kathmandu
State/Region	Lalitpur
Postcode	1966
Country	Nepal
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Contact person	Peter Newsum
Title	Country Director
Salutation	Mr.
Last name	Newsum
Middle name	
First name	Peter
Department	Country Director
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Direct fax	..
Direct tel.	+ 977 1 5523444
Personal e-mail	

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