



**CLEAN DEVELOPMENT MECHANISM
SMALL-SCALE PROGRAMME OF ACTIVITIES DESIGN DOCUMENT FORM
(CDM-SSC-PoA-DD) Version 01**

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NOTE:

- (i) This form is for the submission of a CDM PoA whose CPAs apply a small scale approved methodology.
- (ii) At the time of requesting registration this form must be accompanied by a CDM-SSC-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-SSC-CPA-DD (using a real case).



SECTION A. General description of small-scale programme of activities (PoA).

A.1 Title of the small-scale programme of activities (PoA):

The Breathing Space Improved Cooking Stoves Programme, India
25/09/2012
Version: 5.1

A.2. Description of the small-scale programme of activities (PoA):

The Breathing Space Improved Cooking Stoves Programme, India is a voluntary Programme of Activities (PoA) that aims at disseminating energy efficient improved cook-stoves (ICS) in domestic households of India.

General operating and implementing framework of PoA

The programme is a voluntary initiative taken by Envirofit, a non-profit organisation that develops well-engineered technology solutions to improve the living conditions on a global scale with primary emphasis on applications in the developing countries. Envirofit shall act as the coordinating/ managing entity (CME) for the programme. In India, Envirofit is based in Bengaluru in Karnataka. The Bengaluru office acts as the hub for the dissemination of Improved cook stoves (ICS) to various regions. At present the improved cook-stoves dissemination has been substantial only in the states of Karnataka and Tamil Nadu and expects expansion to other states in future.

ICS are designed to achieve reduction in fuel consumption (non-renewable biomass) and improvement in levels of indoor air pollution (IAP). The ICS result in better heat transfer and complete fuel combustion (avoiding smoke, black soot and Particulate matter (PM) as compared to that achieved in traditional cook stoves. This results in a significant reduction in non-renewable biomass consumption and levels of IAP in project households. Usage of non renewable biomass results in decrease in carbon stock of the forests. The non renewable biomass results in GHG emissions as the carbon emission released from unsustainable tree cutting cannot be sequestered later. Thus, the reduction in consumption of non-renewable biomass also lowers Greenhouse gas emissions (GHGs). Therefore, ICS reduce greenhouse gas emissions by virtue of their higher efficiency compared to traditional/ baseline stoves and contribute to emission reductions. In the absence of project activity, the traditional inefficient cook stoves, commonly referred to as chulhas, would have been used for cooking – producing substantial GHG emissions due to burning of non renewable biomass. A large portion of the rural population in India is dependent on traditional biomass chulhas. The most commonly used chulhas are made of mud/clay fixed in a kitchen corner with an opening near the floor for fuel and one or two openings on top to place pots. The following photograph shows a commonly used traditional chulha used in rural households in India.



Fig 1: Traditional cook-stove (fixed)



The use of solid biomass fuels (eg. fuel wood) in these inefficient traditional *chulhas* – while meeting domestic household needs - releases large amounts of particulate matter into the air, thus causing IAP¹. India's domestic sector is one of its largest primary energy consumers with 75% of energy requirements met by fuel-wood and agricultural waste. Cooking alone is responsible for 90% of household energy consumption, and demand is increasing annually at a rate of 8.1%². As per the World Health Organization Comparative Risk Study³, approximately 400,000 women and children die every year in India due to exposure to smoke from household use of solid fuels.

The Breathing Space Programme, by replacing traditional *chulhas*, contributes towards solving the IAP problem by deploying cleaner and greener ICS in addition to reducing GHG emissions.

Confirmation that the proposed PoA is a voluntary action by the coordinating/managing entity

The proposed programme is an entirely voluntary initiative undertaken by the coordinating entity. The coordinating entity is not bound by any governmental policy or mandatory law / regulation in India that mandates the dissemination or adoption of improved cook stoves by households.

Policy/measure or stated goal of the PoA

The goal of the PoA is large scale dissemination (more than a million) of energy efficient ICS replacing traditional cook stoves. The energy efficient cook stoves will provide multiple benefits of reducing global greenhouse gas emissions, reducing pressure on forests and woody biomass resources, and also reducing indoor air pollution associated with use of traditional stoves.

Contribution of the proposed programme to sustainable development

The proposed programme makes significant positive contributions towards sustainable development. This assessment was aided by the development of a sustainable development matrix in accordance with Gold Standard guidelines. The matrix was both self assessed and provided in one of the promotional campaigns to receive stakeholder comments. Stakeholder comments were recorded and analysed after which a consolidated matrix was developed to combine self assessment and stakeholders' feedback. The consolidated matrix resulted in positive scores for indicators like air quality, improved livelihood for persons in poverty and employment generation. None of the indicators resulted in a negative score.

The programme shall reduce the level of IAP in project households and also reduce the use of non renewable biomass for cooking by introducing ICS. The following gives an elaborate description of the same:

Environment

Air Quality

The ICS shall reduce household IAP levels through its design which produces complete biomass combustion aided by proper air flow in the stove's combustion chamber. Thus, the programme shall improve project household kitchen conditions with respect to air pollution. This shall reduce the exposure

¹ According to the World Health Report 2002, IAP is responsible for 2.7% of the global burden of disease. Around 2.5 million people in rural and urban areas of developing countries die every year due to exposure to indoor particulate matter. This accounts for 4-5% of the 50-60 million global deaths that occur annually.
http://whqlibdoc.who.int/hq/2002/WHO_SDE_OEH_02.05.pdf

² Pohekar, S.D. Kumar, D. Ramachandran, M. 2005. "Dissemination of cooking energy alternatives in India – a review", *Renewable and Sustainable Energy Reviews*, vol. 9, pp. 380

³ Dutta, K. Shields, K.N. Edwards, R. Smith, K.R. 2007. "Impact of improved biomass cookstoves on indoor air quality near Pune, India", *Energy for Sustainable Development*, vol. XI, no. 2, pp. 19



of women engaged in cooking in these households and small children who are accompanied by the mother most of the times. On the other hand in the baseline, cooking with traditional *chulhas* would have exposed project household occupants to CO, polycyclic aromatic hydrocarbons and PM - increasing occupant susceptibility to acute respiratory diseases⁴.

Socio-economic Development

Employment

The programme shall give rise to new employment opportunities for stove technicians, distributors/dealers, people engaged in awareness campaigns, and other support staff.

Livelihood of the poor

The programme would lead to improvements in living conditions especially for women in project households. The ICS are fuel efficient compared to traditional *chulhas*. Therefore, the programme reduces the drudgery of fuel wood collection for women and young children by reducing the time required for this activity. Furthermore, reduction in biomass consumption directly reduces cooking costs for the project population permitting higher savings for end users.

Access to affordable and clean energy services

The ICS are sold at nominal prices to end users thereby providing them affordable energy service. In addition, Envirofit has spent considerable effort in creating robust marketing and distribution channels for ICS sales which can be easily accessed by end users. Envirofit has trained distributors and retailers to ensure that ICS benefits are explained to end users at the time of purchase. Thus, the project contributes towards improving access to affordable and clean energy services.

Human and institutional capacity

The programme aims to develop human and institutional capacity of project households in India. The programme conducted awareness campaigns to sensitize people against the ill-effects of IAP. Further, by reducing the amount of cooking time (better heat transfer in ICS saves cooking time) the programme provides women in project households with more time to invest in productive and capacity development activities.

A.3. Coordinating/managing entity and participants of SSC-POA:

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| Name of Party Involved ((host) indicates a host Party) | Private and/or public entity(ies) project participants (as applicable) | Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|--|--|---|
| India | Envirofit International Limited | No |

Envirofit International Limited is the coordinating/ managing entity (CME) of the programme.

A.4. Technical description of the small-scale programme of activities:

A.4.1. Location of the programme of activities:

India

⁴ The IAP (smoke, PM, etc.) caused by incomplete combustion of fuel in traditional biomass stoves is directly linked with the health condition of those exposed to such constrained cooking environments. Staton, D. M. Harding, M. H., *Health and Environmental Effects of Cooking Stove Use in Developing Countries*, <<http://www.bioenergylists.org/stovesdoc/Environment/staton.pdf>>



A.4.1.1. Host Party(ies):

India

A.4.1.2. Physical/ Geographical boundary:

The boundary for the PoA in terms of a geographical area is defined as the political boundary of India. All small-scale voluntary programme activities (SSC-VPAs) associated with this PoA will be implemented within the geographical boundary of the PoA.

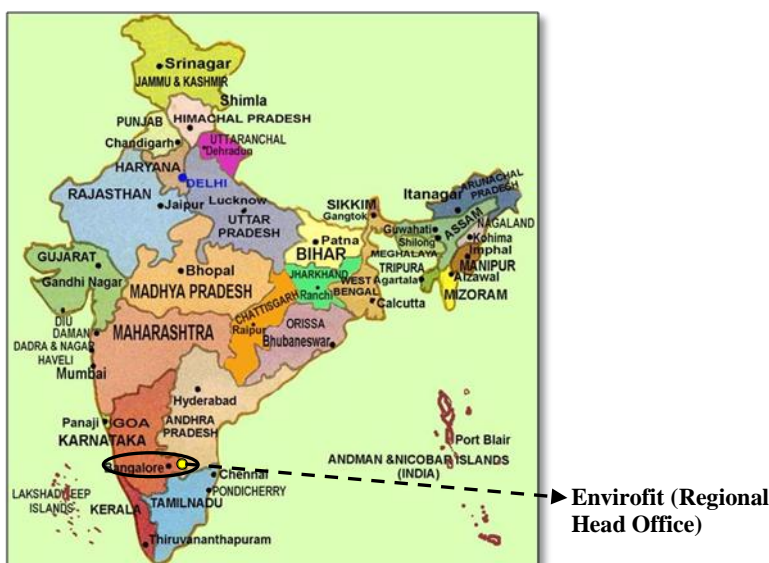


Fig 2: Geographical boundary of The Breathing Space Improved Cooking Stoves Programme PoA

The Government of India has not issued any mandatory law / regulation in India that mandates the dissemination of ICS in households.

Thus, the PoA being voluntary in nature, its boundary extends upto the geographical boundary of India

Only recently (December 2009), National Biomass Cookstove Initiative (NBCI) has been launched by MNRE with the primary aim to enhance the availability of clean and efficient energy for the energy deficient and poorer sections of the country. The MNRE as per recommendations from NBCI has proposed to take up a pilot scale cook stove programme during 2011-2012 to demonstrate, the use and impact of ICS on social and economic development of the users. The feedback from the programme shall be used in the Twelfth Five Year Plan (2012-17). This further substantiates that at present there is no comprehensive policy that caters to this sector.

A.4.2. Description of a typical small-scale CDM programme activity (CPA):

A typical small scale VPA will be implemented within the geographical boundary of the PoA. Each VPA aims at installation and dissemination of ICS replacing less efficient traditional *chulhas* in households.

Size of VPA

The size of each small scale VPA included within the PoA boundary shall be limited to the threshold level applicable to Type II small scale activities; 180 GWh_{th} annual thermal energy savings. The number



of stoves in a VPA shall be capped at the sales volume that has a capacity to generate a thermal energy savings of 180 GWh_{th}/year. Multiple VPAs shall be created to include total ICS sales under the programme.

The cook stoves are sold to regional dealers/ distributors/NGOs. A warranty card is made available with each cook stove. The warranty card records customer and stove details. The dealer asks the user to fill out the warranty card details and verifies the same. Two copies of the warranty card are maintained – one for the customer, and one for the dealer/ coordinating entity. A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained⁵.

A.4.2.1. Technology or measures to be employed by the SSC-CPA:

Technology employed:

The programme under consideration is a step forward in promoting clean technology in the rural households of India.

The ICS are built with single pot and multi pot options. These stoves are convenient to use, easy to clean and maintain. The different models can be:

- a. **Single Pot Stoves:** These are the simple and basic one pot models. They are portable and convenient to use and are durable. Some models have integrated systems that allow compatible accessory products to expand cooking options. These stoves have found maximum acceptability within the programme and are the most popular selling models.
- b. **Multiple Pot Stoves:** These are double/ multiple pot portable models. The varieties might include models with and without chimneys.

Details of cook stoves included in a VPA shall be provided in the SSC-VPA-DD.

A direct comparison between the kitchen conditions can be made from the photographs below:



Fig 3: Use of traditional *chulhas* Vs. ICS in a rural household

A.4.2.2. Eligibility criteria for inclusion of a SSC-CPA in the PoA:

Eligibility criteria

⁵ the end user details shall be collected as many as commensurate with representative sampling, i.e. the number of end user names and addresses (and phone numbers where possible) within sales record shall be large enough so that surveys and tests can be based on representative purely randomly selected samples. In all cases this should not be less than 10 times the survey and field test sample sizes (including usage surveys for each age of product), in order to ensure an adequate end user pool to which random sampling can be applied.



- Each SSC VPA shall involve installation of ICS within the geographical boundary of India.
- The size of each SSC VPA shall be limited to maximum energy saving of 180 GWh_{th}/year
- Each SSC VPA shall be implemented using the baseline and monitoring methodology AMS – II.G version 03.
- Each SSC VPA shall be voluntary in nature and not be mandated by any law/regulation in India
- The SSC-VPA does not result in diversion of ODA.
- Each SSC VPA must be approved by the coordinating and managing entity prior to its incorporation into the PoA.
- Criteria for transfer of credit ownership:
 - For regular cycle VPA, this shall be ensured through relevant provision for example warranty cards, customer agreements etc. or collecting stakeholder feedback on this issue during LSC
 - For retroactive VPA, stakeholder feedback should be collected during SFR or through warranty cards, customer agreements etc.
- Each SSC VPA includes sale of improved cook stoves where the users of the improved cook stoves are households or communities or Small and Medium Enterprises (SMEs)
- The size of each Improved cook stove in the VPA shall not exceed 5% of the small-scale CDM threshold that is 9 GWh thermal energy savings per year

Apart from the above mentioned inclusion criteria for demonstrating additionality, the following criteria also needs to be complied with for retroactive VPAs in case a new PO implements the VPA

- Each retroactive SSC VPA implemented by a new PO shall justify prior consideration of carbon revenues⁶

A.4.3. Description of how the anthropogenic emissions of GHG by sources are reduced by a SSC-CPA below those that would have occurred in the absence of the registered PoA (assessment and demonstration of additionality):

How anthropogenic emissions of GHG are reduced by SSC-CPA registered under the PoA

The prevailing cook-stove technology in India is the traditional “*chulha*” stove⁷. The substitution of traditional stoves with ICS saves up to 50%⁸ of fuel on an average. By reducing non-renewable biomass (e.g. fuel wood) consumption, the PoA is reducing anthropogenic GHG emissions. According to the approved methodology, in the absence of the project activity, the baseline scenario would be the use of fossil fuel to meet equivalent energy needs.

The Proposed PoA is a Voluntary Coordinated Action

The proposed programme is a voluntary co-ordinated action. No policies or laws currently prevailing in India mandate the dissemination and adoption of ICS by households in India.

The proposed voluntary coordinated action would not be implemented in the absence of the PoA

⁶ As VPA are based on time, multiple VPAs may be implemented by same PO. In this case prior consideration of CDM shall be considered at the time of start of stove distribution programme rather than on individual VPA level. Therefore, the aforesaid criteria shall be checked for retroactive VPAs of each new project organization (PO) in the PoA

⁷ Joon, V. Chandra, A. Bhattacharya, M 2009. “Household energy consumption pattern and socio-cultural dimensions associated with it: A case study of rural Haryana, India”, *Biomass and Bioenergy*, vol. 33

⁸ <http://www.envirofit.org/products/?pid=1>



The programme aims at dissemination and installation of over a million ICS in India. It faces barriers to investment and technological barriers as mentioned below. All these barriers are prohibitive in nature and the project cannot be viable at a reasonable scale without external finance. Therefore, carbon revenues are essential to make the project sustainable.

The key challenges of programme implementation were to reach into rural areas and create awareness amongst people to buy new improved ICS at affordable prices. This was followed by a challenge to establish a comprehensive sales and distribution network to sustain sales and ensuring after sales maintenance.

This project entails significant investment to cover the above mentioned costs. Margins garnered from the sale of the product are insufficient to cover these costs. The uncertainty about the acceptance of the stoves among the target population increases the financial risks for investors. A detailed assessment has been provided below under assessment and demonstration of additionality.

If the PoA is implementing a mandatory policy/regulation, this would/is not enforced;

Not applicable as the PoA is not implementing any mandatory policy/regulation.

If mandatory a policy/regulation is enforced, the PoA will lead to a greater level of enforcement of the existing mandatory policy/regulation.

Not applicable as the PoA is not implementing any mandatory policy/regulation.

Assessment and Demonstration of Additionality of the Proposed PoA

The additionality of the PoA is demonstrated using UNFCCC guidelines as outlined in “Tool for demonstration and assessment of additionality” version 5.2.1 as per Clause 2.3 of Gold Standard toolkit.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

The following alternatives are identified:

1. Usage of traditional cook stoves (Continuation of current practice)
2. Implementation of project activity without carbon revenues

Sub-step 1b: Consistency with mandatory laws and regulations:

There is no legislation/ regulation that prohibits/ mandates the use of Option 1 or Option2.

The Government of India has not issued any mandatory law / regulation in India that mandates the dissemination of ICS in households.

Only recently (December 2009), National Biomass Cookstove Initiative (NBCI) has been launched by MNRE with the primary aim to enhance the availability of clean and efficient energy for the energy deficient and poorer sections of the country. The MNRE as per recommendations from NBCI has proposed to take up a pilot scale cook stove programme during 2011-2012 to demonstrate, the use and impact of ICS on social and economic development of the users. The feedback from the programme shall be used in the Twelfth Five Year Plan (2012-17). This further substantiates that at present there is no comprehensive policy that caters to this sector.

Step 2: Investment analysis

Barrier Analysis is being used instead.



Step 3: Barrier analysis

Sub-step 3a: Identify barriers that would prevent the implementation of the proposed CDM project activity:

The barriers that prevent the implementation of the project without carbon revenues are as follows:

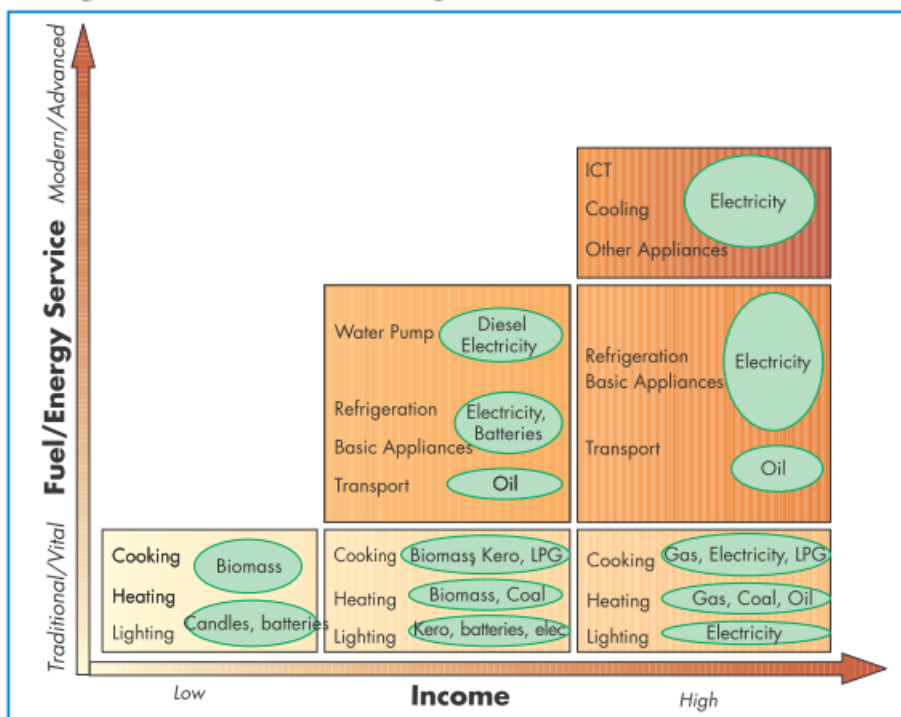
Barriers to Investment

Barriers to investment exist at both the User level and the Implementer level.

User Level: The cost of ICS is significantly higher than traditional cook stove. Although, there is fuel savings to the end user associated with use of ICS, however, that is realizable in small amounts over a long period of time. As a result, user acceptability especially in developing countries is slow, main reason being their high initial cost, particularly relative to the low cash incomes in many rural areas⁹.

As per World Energy Outlook (WEO) Report 2006, 69% of the Indian population relies on biomass for cooking in India with the same being 87% in rural areas¹⁰. As per WEO 2002 Report; heavy reliance on traditional biomass is a hallmark of poverty in developing countries. As poor families in developing countries gradually increase their incomes, they can afford more modern appliances, and they demand more and better energy services. Biomass as a fuel for cooking is at the lower section in the energy ladder and relates to low income groups usually.¹¹

Figure 13.1: Illustrative Example of Household Fuel Transition



⁹ Trends in Consumption and Production: Household Energy Consumption – Report by United Nations: Department of Economic and Social Affairs <<http://www.un.org/esa/sustdev/publications/esa99dp6.pdf>>

¹⁰ World Energy Outlook 2006, chapter 15, table 15.1 page 422

¹¹ World Energy Outlook 2002, chapter 13: Energy and Poverty, page 365 and 370.



Thus, there is the larger issue of placing the programme in the wider socio-economic context. There is a very strong argument for continuing a subsidized programme, and that is the abysmally low levels of rural incomes. The economics of 'payback' and environmental considerations are perhaps of no consequence to a person whose primary needs are work, food, and shelter. As long as the little food that she/he can manage to scrape together can be cooked, it does not matter whether the chulha is improved or otherwise¹².

This barrier is nonexistent in case of traditional cook stoves due to its relatively lower cost.

Implementer level: At the implementer level, it has been consistently observed that the lack of initial working capital required for scaling up ICS programmes has always been a challenge¹³. The same has also been confirmed by EcoSecurities Consulting Limited, USA in an independent study performed for Shell Foundation as “The sale of stoves is rarely to be called a booming business and in most cases projects will not succeed without donor funding; in this way the revenues from the sale of carbon credits provide the necessary incentive to upscale these projects.” Further, high distribution costs for remote and sparsely populated areas make the supply of ICS a difficult task in rural India¹⁴.

As per Shell Foundation, a partner to Global Alliance for Clean cook stoves led by United Nations Foundation with supporting parties as US EPA, WHO, UNEP, USAID etc. “Stove manufacturers face numerous barriers to successfully selling clean cook stoves at scale – and just like any infant industry they need support to address those barriers.”¹⁵

As explained above, initial funding to provide working capital and cover costs of creating market and distribution is imperative for an ICS programme. In this programme, working capital funding was provided by a Shell Foundation on account of the high possibility for the project to create sustainable benefits and Foundation’s focus on IAP reduction through distribution of ICS. The Shell Foundation actively promotes social and environmental awareness programmes throughout the world. The Shell Foundation is committed to reduce indoor air pollution from the use of inefficient cook stoves throughout the world. The funding provided was aimed at establishing manufacturing and distribution framework in initial years. Further, it was intended to cover funding gap for the time required for registration and verification of the programme. It was clearly recognised that carbon revenue was imperative in making the project sustainable and alleviation of barriers. Thus, the funding offered was conditional to the fact that carbon finance has a critical role in programme feasibility before it becomes an adequate revenue source¹⁶.

Therefore, carbon revenues will serve to hedge the aforesaid risks and cover the essential additional costs being incurred by the coordinating entity to make the project feasible and sustainable. The barrier to investment does not prevent the implementation/ usage of traditional cook stoves.

¹² http://www.hedon.info/BP30_CommercialMarketingForTheIndianNPIC?bl=y

¹³ Carbon Markets for Improved Cooking Stoves: A GIZ guide for project operators
<<http://www.gtz.de/de/dokumente/giz2011-en-carbon-markets-for-improved-stoves.pdf>>

¹⁴ Viswanathan, B. Kavi Kumar, KS, Cooking fuel use patterns in India:1983–2000, *Energy Policy*, vol. 33 (2005), pp. 1022

¹⁵ <http://cleancookstoves.org/blog/release-secretary-clinton-announces-global-alliance-for-clean-cookstoves/>

¹⁶ Letter from Shell Foundation to Envirofit dated 30 June 2007



Technological barrier

Lack on infrastructure for Implementation of the ICS

The dissemination/ distribution of ICS require creating awareness for its acceptance among the users. As per Shell Foundation, "India poses a complex set of challenges, and high amongst these is the issue of demand. Indian consumers in rural areas still struggle with the idea that purchasing a better cook stove is a good use of their limited resources. The impacts of IAP need to be spelt out at all levels, and consumers need help to understand the efficiencies and savings that improved stoves can offer"¹⁷.

Building awareness requires initiatives like door step campaigns (van campaigns), stalls and demonstrations at markets/ community places, distribution of information modules (flip charts/ pamphlets) etc. Without these initiatives it is difficult to change user's perception for traditional cook stoves (which are under use from generations) and create a market for ICS.

Besides, training has to be provided for proper usage, operation and handling of ICS throughout the distribution and supply chain including the end users. The awareness building activities also include sharing information on proper usage/ handling of ICS through live demonstrations as shown below.

No such measures are required to be taken in case of dissemination of traditional cook-stoves



Fig 4: A van campaign where awareness activity is being carried out besides demonstrations on proper usage and handling of ICS

¹⁷ Smoke in the Kitchen – “Addressing Africa’s Affordability Challenge: Is Carbon Trading The Answer?”



Process/ Technology failure risk

Continual improvisation of stove models is required for greater acceptance and sustained usage by stove users. One of the largest programmes of ICS dissemination in India promoted by Government of India (MNRE) was deemed a failure on account of stove design not catering to the needs of end user. As reported, “Many stoves did not accommodate the household cooking pot, or could not withstand the heat required for cooking. Many of the stoves plainly did not offer the assured savings in household firewood consumption.”¹⁸

To increase ICS acceptance by rural Indian populations, significant research and development is required to modify the design of the stoves to suit customer needs. ICS will need continued investment in design improvements to make it more user-friendly and accommodate cooking for all types of meals and utensils in different regions otherwise the ICS would face discontinuation resulting in a potential reverse shift to traditional cook-stove.

Any such technological risks are not anticipated in case of traditional cook stoves usage as they have been in use from generations in India.

Sub-step 3b: Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

As explained above, the continuation of current practice that is the use of traditional cook stove does not face any of the barriers as mentioned above.

Step 4: Common Practice Analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

The programme aims at distribution of more than a million cook-stoves in India. Though there have been many improved cook-stove initiatives in the past, however they are not close to the scale at which this programme is being implemented.

An assessment of some of the ongoing cook-stove initiatives in the past has been discussed below describing other cookstove initiatives. As explained above in the barrier section, ICS dissemination initiatives need external funding / subsidy element to run/ scale up in a sustainable manner.

1. National Programme on Improved Chulhas (NPIC) - The Indian government initiated the NPIC in 1983 in response to concerns about deforestation and rural fuel poverty. The NPIC was implemented by the Ministry of Non-conventional Energy Sources (MNES) in cooperation with regional, district, and state government offices. Under the original program, the NPIC provided a subsidy of at least 50% for households purchasing an improved cookstove. From 1983 to 2000, approximately 35 million ICS of various types were distributed through contractors/distributors etc (ARAVALI-U chulha, ASTRA OLE, ASTRA chulha, Doachhi Chulha Stove etc); however, the NPIC has not been effective or successful over the long term in promoting a fundamental change-over to improved stoves in India. In 2002 the NPIC was deemed a failure and funding was discontinued. Thus, despite the government of India providing a subsidy of 50% on ICS the programme failed due to the Investment and technical barriers discussed above.
2. Appropriate Rural Technology Institute (ARTI) cookstove initiative¹⁹ – Running in rural Maharashtra, the initiative has been funded by Shell Foundation UK. The aim of the initiative is to reach to 1.5 million households in the state with cleaner cooking fuels/ stoves. However at

¹⁸ Sinha, B. 2002. “The Indian stove programme: An insider’s view—The role of society, politics, economics and education.” Boiling Point 48: 23–26.<www.hedon.info/tiki-download_item_attachment.php?attId=164 >

¹⁹ http://www.arti-india.org/index.php?option=com_content&view=article&id=44&Itemid=92



present the initiative is still not fully operational and is securing remaining budgets through grants and donations.

Even relatively smaller initiatives have sourced funds from carbon

1. Improved cook stove CDM project of Samuha²⁰ – includes approx 21000 stove
2. Improved cook stove CDM project of JSMBT²¹ - includes approx 21000 stove

Apart from the aforesaid, even micro level projects are usually funded by Corporate/ Institutions An example is the ICS programme launched in North India in the Solan district of Himachal Pradesh²². The programme was sponsored by Indian Oil Corporation Ltd and the Gas Authority of India Ltd. but was limited to pilot scale only and including only 241 cook-stoves.

Thus, it can be concluded that the common practice is indeed use of traditional cookstoves. ICS initiatives are securing funds / grants through government subsidies / external grants etc. to achieve sustainable implementation.

Thus, taking into account all the barriers listed above, carbon revenue is imperative to make this programme sustainable and hedge the investment, technological and social risks

Carbon consideration Timeline

| Date | Events | Evidence |
|------------------|---|--|
| 15 November 2005 | <p>Cooking and Carbon Expert Workshop sponsored by Oxford University, Climate Care and EcoSecurities in Oxford with Shell Foundation as a participating entity.</p> <p>One of the action plans of the workshop was to assess carbon finance impact on cleaner cooking with primary focus on India supported by Shell Foundation. Shell Foundation stated to develop plans looking for ICS implementers and rolling out ICS programmes</p> | <p>Extract from Cooking and Carbon Expert Workshop sponsored by Oxford University, Climate Care and EcoSecurities in Oxford with Shell Foundation²³</p> |
| 30 June 2007 | <p>Envirofit partnered with Shell Foundation to launch “The Breathing Space Improved Cooking Stoves Programme, India”. It was recognized that project would require extensive funding for the coming years to become self</p> | <p>Letter from Shell Foundation to Envirofit stating that the funding provided by Shell Foundation is limited to stove dissemination in the initial years of the programme till the programme becomes self</p> |

²⁰ <http://cdm.unfccc.int/Projects/DB/PJR%20CDM1304601410.01/view>

²¹ <http://cdm.unfccc.int/Projects/DB/PJR%20CDM1297320586.35/view>

²² http://www.teriin.org/index.php?option=com_casestudy&task=details&sid=1

²³ <http://www.pciaonline.org/files/PCIA-15-Nov-meeting-actions-revised.pdf>



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CDM – Executive Board

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|---|--|--|
| | sustainable and the only realistic form was carbon finance – Serious carbon consideration | sustainable with the help of carbon revenues |
| 15 th March 2008 | Enterprise Works conducted a study on Commercial Pilot sale of stoves for Tamil Nadu and Karnataka, India | Final Report on Commercial Pilot for Tamil Nadu and Karnataka, India |
| 30 th April 2008 | EcoSecurities prepared a report assessing the carbon market and providing strategies towards securing carbon finance - Serious carbon consideration | Report titled “Assessing Implications of Participation in Carbon Markets for Cooking Stove Projects Supported by the Shell Foundation” |
| 10 th May 2008 | Start of Sale of B-1100 type of cook stoves – Start Date of PoA (and first VPA) | Stove sale data |
| 17 th – 21 st November, 2008 | Field visit by EcoSecurities to gather data for the feasibility assessment of the project | Copy of itinerary shared with DOE |
| 8 th December 2009 | ERPA between EcoSecurities International Limited and Envirofit International Limited - Serious carbon consideration | ERPA |
| 31 st January 2009 | EcoSecurities prepared a report to assess the baseline of the project and to study and analyze the different methodological approaches available for implementing the project | Report titled “Feasibility Assessment of the Breathing Space improved cooking stoves programme in Karnataka and Tamil Nadu, India |
| 5 th January 2010 | Meeting between Gold Standard representatives in India and EcoSecurities, India office to discuss about the project | Mail to Gold Standard |
| 27 th July 2010 | B-1 Schedule of Gold Standard signed between EcoSecurities International Limited and Envirofit International Limited that provides EcoSecurities the authority to access and manage Envirofit’s Gold Standard Registry Account | B-1 schedule |
| 2 nd August 2010 | Documents were uploaded onto Gold Standard registry for pre-feasibility assessment | Snapshot of Gold Standard registry account |
| 22 nd September 2010 – 17 th November | Assessing the fast tracking option under Gold Standard for implementation of PoA | Mail to Gold Standard |
| 17 September 2010 | Contacted DOE for validation quote | Mail to DOE |
| 23 November 2010 | MoU signed between Gold Standard and Envirofit International Limited | MoU between Gold Standard and Envirofit International |



| | | |
|--------------------------------|--|-------------------------|
| | stating that the project can follow the Gold Standard fast track approach for PoAs | Limited |
| 21 st December 2010 | Consultation with Gold Standard | Mail from Gold Standard |

As per the revised Guidelines on the Demonstration of Additionality of Small-Scale Project Activities, the project activity is deemed additional if project activities solely composed of isolated units where the users of the technology/measure are households or communities or Small and Medium Enterprises (SMEs) and where the size of each unit is no larger than 5% of the small-scale CDM thresholds. Therefore, in line with the above guideline, each VPA shall be deemed additional if it meets the key eligibility criteria for assessing additionality of a proposed VPA as mentioned in Section E.5.2

A.4.4. Operational, management and monitoring plan for the programme of activities (PoA):

A.4.4.1. Operational and management plan:

- (i) **A record keeping system for each CPA under the PoA,**
At the time of sale of cook-stove, the dealer/ distributor will provide the customer with a copy of the warranty card. The warranty card, besides other information, has the following details if available:
 1. The name and address of the customer
 2. Contact Number of customer
 3. The model type and batch/ID/tag number of ICS
 4. The date of ICS purchase

The dealer asks the customer to fill in the details on the warranty card and verifies the same. Two copies of the warranty card are maintained; one for the customer, and one for the operational entity. A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained²⁴.
- (ii) **A system/procedure to avoid double accounting e.g. to avoid the case of including a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA,**
To avoid inclusion of any stove which is a part of another registered Carbon project/ programme, all cook stoves under this programme shall bear the logo of VPA Implementer(s)/ CME. This shall ensure that only stoves that are part of this programme are included in the PoA. Any double counting due to inclusion of any stove external to this programme is not possible. Besides each ICS unit shall also have a unique ID number / Tag number either inscribed on the stove or retained by the buyer to uniquely identify the ICS later during inclusion/ verification.
- (iii) **The SSC-CPA included in the PoA is not a de-bundled component of another CDM programme activity (CPA) or CDM project activity.**

²⁴ the end user details shall be collected as many as commensurate with representative sampling, i.e. the number of end user names and addresses (and phone numbers where possible) within sales record shall be large enough so that surveys and tests can be based on representative purely randomly selected samples. In all cases this should not be less than 10 times the survey and field test sample sizes (including usage surveys for each age of product), in order to ensure an adequate end user pool to which random sampling can be applied.



As per Gold Standard PoA Rules and Guidance²⁵, De-bundling provisions do not apply to this programme.

- (iv) **The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA;**
Those operating VPA (different from CME) shall sign an agreement (or a memorandum of understanding) with CME to confirm that they are aware of their subscription to the said PoA.

A.4.4.2. Monitoring plan:

- (i) **Description of the proposed statistically sound sampling method/procedure to be used by DOEs for verification of the amount of reductions of anthropogenic emissions by sources or removals by sinks of greenhouse gases achieved by CPAs under the PoA.**

DOE shall adopt sampling method/procedure to be used for verification in accordance with the “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”.

- (ii) **In case the coordinating/managing entity opts for a verification method that does not use sampling but verifies each CPA (whether in groups or not, with different or identical verification periods) a transparent system is to be defined and described that ensures that no double accounting occurs and that the status of verification can be determined anytime for each CPA;**

The verification method opted by the coordinating/managing entity uses sampling procedures.

A.4.5. Public funding of the programme of activities (PoA):

No public funding is provided to the programme from Annex 1 party.

SECTION B. Duration of the programme of activities (PoA)

B.1. Starting date of the programme of activities (PoA):

The programme is retroactive in nature and the start date of the programme is 10th May 2008 which is the date of first sale of ICS under this programme²⁶.

B.2. Length of the programme of activities (PoA):

28 years

²⁵ http://www.cdmgoldstandard.org/wp-content/uploads/2011/10/Annex_F_23_Dec_10.pdf

²⁶ <http://iapnews.wordpress.com/2009/07/07/envirofit-expands-clean-burning-cookstoves-to-meet-global-demand/>



SECTION C. Environmental Analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

1. Environmental Analysis is done at PoA level
2. Environmental Analysis is done at SSC-CPA level

The proposed PoA aims to install and disseminate ICS. The programme is an initiative taken by the coordinating entity to combat the hazards of IAP prevailing in developing nations like India. The programme does not have any significant negative impact on the environment. Thus the environmental impacts are a characteristic of the programme and not the VPAs. Therefore, the environmental analysis is carried out at the PoA level.

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

The programme does not have any identified negative impact on the environment; instead the programme contributes to the environment by reducing the level of IAP prevalent in developing nation households. The ICS installed and disseminated as part of the programme release less indoor air pollutants as compared to traditional *chulhas* commonly used. Moreover, since the ICS are fuel efficient compared to traditional stoves, they also reduce the pressure on the forest resources for fuel wood collection. Therefore, the programme is a step forward in promoting environmental goals.

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA):

No policies/ laws prevailing in India mandate the requirement of Environmental Impact Assessment for the programme. Since the programme does not have any negative impact on the environment, therefore, no EIA has been performed at the PoA or SSC CPA level.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

1. Local stakeholder consultation is done at PoA level
2. Local stakeholder consultation is done at SSC-CPA level

At programme level:

The programme has been active in promoting awareness of the negative impact on human health of IAP resulting from traditional cook stove use. Since India is a diverse nation, it is difficult to sensitize the rural masses to the ill-effects of IAP. Therefore, the programme has tried to raise awareness by carrying out several IAP campaigns and training workshops for women.

The stakeholder consultation process has been carried out through multiple awareness sessions running since July 2009, and covering numerous sites targeted by the programme. At present, awareness campaigns have been held in approximately 111 villages in the state of Karnataka. The programme as part of its awareness campaign engages local villagers through community gatherings hosting a stream of street plays, flip chart stories, interactive games, mobile van campaigns and demonstration of ICS. Blind



Matrix exercises were also conducted to collect the feedback from stakeholders and identify SD indicator for monitoring. Records of the same have been submitted to DoE.



Fig4: Handing out leaflets to the stakeholders



Fig 5: Interactive sessions with the stakeholders



Fig 6: Interactive Games



Fig 7: Anganwadi Workers learn about ICS

The programme also joined hands with village level health workers, the Anganwadi workers, to spread awareness on the dangers of smoke in the kitchen and propagate the adoption of ICS. Over two days, nearly 100 anganwadi workers have been trained to take the IAP campaign to over different villages.

The programme has also received support from the Government of Karnataka to set up an inter-ministerial committee consisting of IAP experts, manufacturers, NGOs and others to develop a blueprint for the entire state. All the relevant officials of the State and District administration have shown active participation in the promotion of these campaigns. The programme is also promoted with the help of newspaper articles, blogs, videos and news coverage²⁷.

As the stakeholder consultation process reached out to a large number of areas covered by the programme, it provided stakeholders with a better platform to voice their comments when compared to one time centralised consultation activities. The multiple sessions provided stakeholders with ample opportunity to give responses and participate in the consultation process. Further, multiple awareness sessions have been organised by various participating NGOs in the programme. NGO representatives have created awareness among local women regarding IAP issues and the benefits of using the ICS. The awareness sessions are organised at regular intervals to provide and receive responses from stakeholders on ICS.

At VPA level:

LSC shall be conducted for VPA/group of VPAs in case of regular cycle projects. In case of retroactive VPAs this shall be accounted through pre feasibility assessment. SFR based on the outcome of pre feasibility assessment for the retro-active VPAs (groups of VPAs) shall be conducted if recommended by Gold Standard.

²⁷ http://www.youtube.com/watch?v=BMe_gYQilkw



D.2. Brief description how comments by local stakeholders have been invited and compiled:

Stakeholders or the potential users of the cook-stoves were invited to product launch awareness campaigns through public announcements. Each session introduced the stakeholders to the potential ill-effects of IAP caused by the use of old traditional cook-stoves and the features and benefits of using the ICS.

The advantages of ICS were demonstrated through enactments and plays in local language for effective communication. The play revolved around the lifestyle of a rural household in India. It tried to depict that though the rural population is aware about the modern age technologies like televisions and mobile phones, they are still unaware of the hazards caused by traditional ways of cooking. It portrayed the plight of Indian women that have been victims of IAP for ages. It explained the health risks associated with traditional cook-stoves and how they can be minimised with the use of improved cook-stoves. Pamphlets in local languages were also distributed among stakeholders. These provided brief descriptions of the improved stove types and their benefits over traditional cook-stoves. Many interactive games were also carried out and posters were put up at local grocery shops to raise awareness among the people. Comments were invited from attendees through open question and answer sessions.



Fig 8: Van campaign



Fig 9: Stakeholders gathered for awareness Campaign



Fig 10: Awareness campaign being held at the NGO level

D.3. Summary of the comments received:

The stakeholders present at these multiple sites and sessions were co-operative and showed interest in learning about the new energy-efficient cook-stoves. They were appreciative of the fact that the new products are more fuel-efficient, release less smoke compared to traditional stoves, and also save time in cooking. In general, no negative comments have been voiced against this programme. The stakeholders have been appreciative of the programme as a whole.

D.4. Report on how due account was taken of any comments received:

All the comments raised by the stakeholders were addressed to satisfy the query of the stakeholders.

SECTION E. Application of a baseline and monitoring methodology

E.1. Title and reference of the approved SSC baseline and monitoring methodology applied to a SSC-CPA included in the PoA:

AMS – II. G “Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass” – ver 03 (Sectoral Scope: 03)

E.2. Justification of the choice of the methodology and why it is applicable to a SSC-CPA:

The programme is being implemented using the baseline and monitoring methodology AMS – II. G as it meets the eligibility criteria of the same.

| Eligibility criteria | Justification |
|----------------------|---------------|
|----------------------|---------------|



| | |
|--|---|
| <p>This category comprises appliances involving the efficiency improvements in the thermal applications of non-renewable biomass. Examples of these technologies and measures include the introduction of high efficiency biomass fired cook stoves or ovens or dryers and/or improvement of energy efficiency of existing biomass fired cook stoves or ovens or dryers.</p> | <p>The programme aims at installation and dissemination of energy efficient cook-stoves. Since the ICS are fuel efficient, they would reduce the pressure on extraction and usage of non renewable biomass.</p> |
|--|---|



Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.

The forest cover of India has decimated from nearly 40% of India's geographical area a century ago to 22% in 1951 and to 20.55% in 2001²⁸. This indicates that large scale deforestation is prevalent since 1989. Further as per FAO, the forest cover including other wooded land in 1990 was 707490 sq km and in 2010, the same was equal to 732290 sq km giving a marginal increase of only 3.50%²⁹.

1.4 Data for Table T1

| FRA 2010 categories | Area (1000 hectares) | | | |
|-----------------------------|----------------------|----------------|----------------|----------------|
| | 1990 | 2000 | 2005 | 2010 |
| Forest | 63 939 | 65 390 | 67 709 | 68 434 |
| Other wooded land | 5 894 | 4 732 | 3 848 | 3 267 |
| Other land | 227 486 | 227 197 | 225 762 | 225 618 |
| ...of which with tree cover | 916 | 1 222 | 1 375 | 1 528 |
| Inland water bodies | 31 407 | 31 407 | 31 407 | 31 407 |
| Total | 328 726 | 328 726 | 328 726 | 328 726 |

On the other hand, the total wood removals have increased by 23.56% from 1990 to 2005 as shown below.

11.4 Data for Table T11

| FRA 2010 Category | Industrial roundwood removals | | | Wood fuel removals | | |
|--|-------------------------------|-----------|-----------|--------------------|-----------|-----------|
| | 1990 | 2000 | 2005 | 1990 | 2000 | 2005 |
| Total volume (1000 m ³ o.b.) | 35 055 | 41 173 | 45 957 | 213 169 | 245 837 | 260 752 |
| ... of which from forest | 4 534 | 2 953 | 2 957 | 42 634 | 49 167 | 52 150 |
| Unit value (local currency / m ³ .b.) | 2 780 | 4 643 | 6 000 | 556 | 929 | 1 200 |
| Total value (1000 local currency) | 97453000 | 191166000 | 275742000 | 118522000 | 228382000 | 312902000 |

Further, the per capita forest availability declined from 0.082 hectares in mid 1989-1990 to 0.074 hectares in 2001³⁰.

As per the working paper "Accounting for India's Forest Wealth" by Giles Atkinson and Haripriya Gundimeda, page 36, Table 3, the biomass extraction exceeds over the total biomass addition justifying scarcity of fuel wood³¹. Further, as discussed in "Climate Change Mitigation Projects in India; Methodology Workshop" organized at Centre for Ecological Sciences, Indian Institute of Science, Bangalore during July 10-12, 2003 by ICFRE & IISc, 131 million tonnes of fuelwood is extracted unsustainably in India with an increasing demand and supply gap³². Thus, it is clear that the wood resources in India are constrained with respect to extraction which has increased at a much higher rate as compared to increase in forests (including outside forests/wooded land) and non renewable biomass extraction is prevalent since 1989.

²⁸ State of Forest Report 2001, < <http://www.fsi.nic.in/sfr2001.pdf>>

²⁹ GLOBAL FOREST RESOURCES ASSESSMENT 2010, COUNTRY REPORT, INDIA

³⁰ <http://www.indiastat.com/table/forestandwildlife/13/forests/108/40476/data.aspx>

³¹ http://www.mse.ac.in/pub/HP_WP.pdf

³² http://ces.iisc.ernet.in/climatechange/presentations2/day_1/Neeta.ppt



The size of each small scale VPA included within the PoA boundary shall be limited to the threshold level applicable to Type II small scale activities; 180 GWh annual thermal energy savings.

E.3. Description of the sources and gases included in the SSC-CPA boundary

| Source | | Gas | Included? | Justification / Explanation |
|------------------|---|------------------|-----------|--|
| Baseline | Combustion of non-renewable biomass for cooking | CO ₂ | Yes | Major source of emissions |
| | | CH ₄ | No | Minor source of emissions |
| | | N ₂ O | No | Minor source of emissions |
| Project activity | Combustion of non-renewable biomass for cooking | CO ₂ | No | No project emissions as per methodology. |
| | | CH ₄ | No | |
| | | N ₂ O | No | |

E.4. Description of how the baseline scenario is identified and description of the identified baseline scenario:

According to paragraph 4 of the applied methodology AMS-II. G ver 03, in the absence of the programme, the baseline scenario would be the use of fossil fuel to meet equivalent energy needs.

NRB assessment

Fuelwood is used as the primary cooking fuel in India. The fuelwood consumption has increased over the years. The same can also be analysed from the data mentioned above in Section E.2. Since the use of fuelwood is prevalent across the nation, therefore, the demand and pressure on forest reserves is also a common feature across whole of India. Also, as per the methodology the following indicators exist as demonstrated below:

1) Increasing trends in fuel wood prices

As mentioned in Section E.2 –“Data for Table T11”, as per FAO 2010 report the fuelwood prices from 1990 to 2005 have constantly increased indicating scarcity of fuel wood.

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

United Nations Research Institute for Social Development Report, *Gender Environment and Poverty Interlinks in Rural India*, page 11³³ confirms that in recent years, there has been a notable increase in fuelwood collection time, to a small degree in some regions, dramatically in others.

Thus, two indicators are shown to exist as per AMS II G version 3 substantiating presence of NRB.

The NRB is calculated using the following formula:

(i)

$$f_{NRB} = NRB / (NRB + DRB)$$



Where:

f_{NRB} Fraction of non-renewable woody biomass
NRB Non-renewable woody biomass
DRB Demonstrably Renewable woody biomass

A recent study published by Forest Survey of India, “India State of Forest Report 2011”³⁴ has been employed for calculating NRB. This is the first time ever, FSI has published literature relating to production and consumption of fuel wood in India. The fuel wood production has been derived from Growing stock of various species and corresponding rotation period using Von Mentel’s Formula by FSI directly providing the value of fuel wood in tonnes. NRB is calculated using this published data. As can be observed from the table below, mean annual increment is calculated using the annual fuel-wood production from forests and trees outside forest.

| States | Annual fuel wood from forests (million tonnes) | Annual fuel wood from trees outside forests (million tonnes) | Annual Quantity of fuelwood used / Harvest (million tonnes) | MAI | NRB fraction |
|--------------------------|--|--|---|---------|--------------|
| Andhra Pradesh | 0.002 | 1.024 | 24.293 | 1.026 | 95.8% |
| Arunachal Pradesh | 0.007 | 0.353 | 0.402 | 0.36 | 10.4% |
| Assam | 0.0004 | 0.352 | 11.421 | 0.3524 | 96.9% |
| Bihar | 0.0000 | 0.945 | 11.475 | 0.945 | 91.8% |
| Chhattisgarh | 0.09 | 0.894 | 4.366 | 0.984 | 77.5% |
| Gujarat | 0.008 | 2.137 | 9.731 | 2.145 | 78.0% |
| Haryana | 0.002 | 0.825 | 1.494 | 0.827 | 44.6% |
| Himachal Pradesh | 0.00005 | 0.29 | 1.214 | 0.29005 | 76.1% |
| Jammu and Kashmir | 0.02 | 0.365 | 1.394 | 0.385 | 72.4% |
| Jharkhand | 0.004 | 0.656 | 4.844 | 0.66 | 86.4% |
| Karnataka | 0.03 | 0.907 | 20.967 | 0.937 | 95.5% |
| Kerala | 0.009 | 0.439 | 14.543 | 0.448 | 96.9% |
| Madhya Pradesh | 0.017 | 1.164 | 13.665 | 1.181 | 91.4% |
| Maharashtra | 0.07 | 1.533 | 9.508 | 1.603 | 83.1% |
| Orissa | 0 | 0.743 | 8.894 | 0.743 | 91.6% |
| Punjab | 0 | 0.92 | 3.348 | 0.92 | 72.5% |
| Rajasthan | 0.05 | 1.541 | 18.782 | 1.591 | 91.5% |
| Tamil Nadu | 0.005 | 0.378 | 12.387 | 0.383 | 96.9% |
| Uttaranchal | 0.008 | 0.297 | 2.566 | 0.305 | 88.1% |
| Uttar Pradesh | 0.05 | 2.253 | 19.063 | 2.303 | 87.9% |
| West Bengal | 0.003 | 0.529 | 14.158 | 0.532 | 96.2% |
| Other NE states | 0.02 | 0.689 | 5.274 | 0.709 | 86.6% |
| UTs | 0.0005 | 0.02 | 2.633 | 0.0205 | 99.2% |

³⁴ http://www.fsi.org.in/final_2011.pdf



| | | | | | |
|---------------------------------|-------|--------|---------|----------|-------|
| Total (including others) | 1.232 | 19.254 | 216.422 | 19.64995 | 90.0% |
|---------------------------------|-------|--------|---------|----------|-------|

$$\text{NRB} / (\text{NRB} + \text{DRB}) = (\text{Harvest} - \text{MAI}) / \text{Harvest} = \mathbf{0.90}$$

There is an existing policy in India on use of traditional biomass based cook-stoves. As explained in section A.4.1.2 above, only recently (December 2009), National Biomass Cookstove Initiative (NBCI) has been launched by MNRE with the primary aim to enhance the availability of clean and efficient energy for the energy deficient and poorer sections of the country. The MNRE as per recommendations from NBCI has proposed to take up a pilot scale cook stove programme during 2011-2012 to demonstrate, the use and impact of ICS on social and economic development of the users. The feedback from the programme shall be used in the Twelfth Five Year Plan (2012-17). This further substantiates that at present there is no comprehensive policy that caters to this sector.

E.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the SSC-CPA being included as registered PoA (assessment and demonstration of additionality of SSC-CPA): >>

E.5.1. Assessment and demonstration of additionality for a typical SSC-CPA:

As explained in section A.4.3. ICS dissemination initiatives in India face prohibitive barriers in general as compared to use of traditional cook-stoves. Therefore, additionality is characteristic of the entire programme and applies universally to all included cook-stove initiatives that are voluntary in nature and are not mandated by law/regulation.

In accordance with EB60 Annex 26, CPAs do not require a full additionality assessment. The confirmation of VPA additionality of each SSC-VPA would be done by means of meeting the eligibility criteria for inclusion in PoA as stated in section A.4.2.2.

E.5.2. Key criteria and data for assessing additionality of a SSC-CPA:

As explained above, additionality is characteristic of the programme itself. It is implicit that each SSC-CPA which is being included in the registered PoA is additional, provided it meets the eligibility criteria for inclusion in the PoA as stated in A.4.2.2.

Besides others, the inclusion criteria already includes the following to ensure that the SSC-VPA is additional

1. The VPA is voluntary in nature and is not prohibited or mandated by law /regulation in India.
2. The SSC-VPA does not result in diversion of ODA.
3. Each SSC VPA includes sale of improved cook stoves where the users of the improved cook stoves are households or communities or Small and Medium Enterprises (SMEs)
4. The size of each Improved cook stove in the VPA shall not exceed 5% of the small-scale CDM threshold that is 9 GWh thermal energy savings per year

Apart from the above mentioned inclusion criteria for demonstrating additionality, the following criteria also needs to be complied with for retroactive VPAs in case a new PO implements the VPA



5. Each retroactive SSC VPA implemented by a new PO shall justify prior consideration of carbon revenues³⁶

E.6. Estimation of Emission reductions of a CPA:

E.6.1. Explanation of methodological choices, provided in the approved baseline and monitoring methodology applied, selected for a typical SSC-CPA:

A typical SSC – VPA as part of the PoA aims at installation and dissemination of ICS and shall be implemented using the methodology AMS – II. G “Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass” – ver 03 as it meets the eligibility criteria of the methodology.

E.6.2. Equations, including fixed parametric values, to be used for calculation of emission reductions of a SSC-CPA:

The ex-ante emission reductions of a SSC – VPA are determined using the following set of equations:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * LAF$$

Where:

| | |
|------------------------------|--|
| ER_y | Emission reductions during the year y in tCO ₂ e |
| $B_{y,savings}$ | Quantity of biomass that is saved in tonnes |
| $f_{NRB,y}$ | Fraction of biomass saved by the project activity in year y that can be established as non renewable biomass using survey methods |
| $NCV_{biomass}$ | Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 0.015 TJ/tonne) |
| $EF_{projected_fossilfuel}$ | Emission factor for the substitution of non-renewable biomass by similar consumers. Use a value of 81.6tCO ₂ /TJ. |
| LAF | Default Leakage adjustment factor (In line with paragraph 13 and 23 c) of AMS II.G version 03, a gross leakage adjustment factor of 0.95 has been considered in ER calculations to account for leakage as described above) |

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

Where:

| | |
|--------------|--|
| B_{old} | Quantity of biomass used in the absence of the project activity in tonnes/ year |
| η_{old} | A default value of 0.1 as the replaced system is a conventional system (three stone cook stove) |
| η_{new} | Efficiency of the system being deployed as part of the project activity (fraction) as determined by using Water Boiling Test |

Following option (a) of paragraph 7 of the methodology, B_{old} is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year) as derived from historical data/ survey.

³⁶ As VPA are based on time, multiple VPAs may be implemented by same PO. In this case prior consideration of CDM shall be considered at the time of start of stove distribution programme rather than on individual VPA level. Therefore, the aforesaid criteria shall be checked for retroactive VPAs of each new project organization (PO) in the PoA



The value for the baseline efficiency of 10% is the default value taken from the methodology AMS-II.G version 03. The appliances displaced under this programme are of this type, for both domestic and non-domestic kitchens. As a complementary note, this value is recommended by the methodology for stoves of this type.

The efficiencies of the ICS have been assessed by the series of tests conducted by the Colorado State University. References are given in section E.6.3 below. The stoves have been tested in accordance with the “University of California Berkley Revised Water Boil Test Version 3.0” with emission measurements based on the biomass stove testing protocol developed by the Colorado State University.

In line with paragraph 13 and 23 c) of AMS II.G version 03, a gross leakage adjustment factor of 0.95 has been considered in ER calculations to account for leakage as described above.

Paragraph 14 of the methodology states, “If equipment currently being utilised is transferred from outside the boundary to the project activity, leakage is to be considered.” As the proposed project activity involves installation of new ICS, there is no equipment transferred from outside the boundary to the project activity. Therefore, para 14 is not applicable to the project and no leakage takes place due to equipment transfer.

E.6.3. Data and parameters that are to be reported in CDM-SSC-CPA-DD form:

| | |
|---|---|
| Data / Parameter: | Q_{biomass} |
| Data unit: | Tonnes/ year |
| Description: | Annual average biomass consumption per appliance |
| Source of data used: | Envirofit brochures |
| Value applied: | 1.915 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Baseline surveys of biomass usage (Controlled cooking test) were performed to determine the average biomass consumption per appliance in the baseline. Further, a conservative assumption of cooking only twice a day has been used for the same. |
| Any comment: | Used for calculation of B_{old} as per paragraph 7 (a) of methodology |

| | |
|---|---|
| Data / Parameter: | $f_{\text{NRB},y}$ |
| Data unit: | Fraction |
| Description: | Fraction of biomass in year y that can be established as non renewable |
| Source of data used: | Global Forest Resources Assessment 2010, Country Report for India (FAO) |
| Value applied: | 0.90 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The value has been derived using the references mentioned above using the formula: $f_{\text{NRB},y} = \text{NRB}/(\text{NRB} + \text{DRB})$ |
| Any comment: | |

| | |
|--------------------------|-------------------------------|
| Data / Parameter: | $\text{NCV}_{\text{biomass}}$ |
| Data unit: | TJ/tonne |



| | |
|---|---|
| Description: | Net Calorific Value of the non –renewable woody biomass that is substituted |
| Source of data used: | AMS – II. G ver 03, page 2 |
| Value applied: | 0.015 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Default value as mentioned in the methodology applied |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | EF _{projected_fossil fuel} |
| Data unit: | tCO ₂ /TJ |
| Description: | Emission factor for the substitution of non-renewable biomass by similar consumers. |
| Source of data used: | AMS-II. G version 03, page 2 |
| Value applied: | 81.6 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | Default value as prescribed by methodology applied |
| Any comment: | |

| | |
|---|---|
| Data / Parameter: | η_{old} |
| Data unit: | Fraction |
| Description: | Efficiency of the system being replaced |
| Source of data used: | AMS-II. G version 03 |
| Value applied: | 0.1 |
| Justification of the choice of data or description of measurement methods and procedures actually applied : | The default value taken from the methodology AMS-II.G version 03. |
| Any comment: | |

| | |
|---|--|
| Data / Parameter: | LAF |
| Data unit: | Fraction |
| Description: | Leakage Adjustment Factor |
| Source of data used: | AMS-II. G version 03 |
| Value applied: | 0.95 |
| Justification of the choice of data or description of measurement methods | Default value as prescribed by methodology applied |



| | |
|-----------------------------------|--|
| and procedures actually applied : | |
| Any comment: | |

E.7. Application of the monitoring methodology and description of the monitoring plan:

1. Monitoring Plan

The cook stoves are packed into cartons with warranty cards and are then sold to the regional dealers/distributors/NGOs. The warranty card is made available with each cook stove. The dealer asks the user to fill the details in the warranty card and verifies the same. Two copies of the warranty card are maintained – one for the customer, and one for the coordinating entity. The warranty card entails records of customer and stove details. A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained.³⁷

The coordinating and managing entity will submit to a verifier a distinct installation record together with transparent calculation of emission reductions accumulated up to the end of the monitoring period. For details of sampling procedures refer to Annex 4

2. Responsibility

The onus of maintaining and updating the database lies with the coordinating entity.

3. Governing equation for emission reduction

The equation for calculation of emission reductions is:

$$ER_y = B_{y,savings} * f_{NRB,y} * NCV_{biomass} * EF_{projected_fossilfuel} * LAF$$

Where:

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

Following option (a) of the methodology, B_{old} is calculated as the product of the number of appliances multiplied by the estimate of average annual consumption of biomass per appliance (tonnes/year) derived from historical data/ survey of local usage.

$$B_{old} = Q_{biomass} * \sum_{i=1}^{Nall} (Stove\ year_i) * SOF$$

Where,

B_{old} Quantity of woody biomass used in the absence of project activity (tonnes)
 $Q_{biomass}$ Average annual biomass consumption per appliance (tonnes/ year)

³⁷ the end user details shall be collected as many as commensurate with representative sampling, i.e. the number of end user names and addresses (and phone numbers where possible) within sales record shall be large enough so that surveys and tests can be based on representative purely randomly selected samples. In all cases this should not be less than 10 times the survey and field test sample sizes (including usage surveys for each age of product), in order to ensure an adequate end user pool to which random sampling can be applied.



SOF Stove Operation Fraction (% of stoves operating) – measured ex post using survey
 Stove year_{*i*} Calculated stove operation year for stove *i* (years)

| |
|--|
| E.7.1. Data and parameters to be monitored by each SSC-CPA: |
|--|

| | |
|--|--|
| Data / Parameter: | η_{new} |
| Data unit: | Fraction |
| Description: | Efficiency of the system being deployed as part of the project activity |
| Source of data to be used: | Water Boiling Test records |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | NA ³⁸ |
| Description of measurement methods and procedures to be applied: | On site Water Boiling Test will be performed for a sample of installed ICS. Refer Annex 4 for sampling procedure |
| QA/QC procedures to be applied: | The CME/PO conducts Water Boiling Tests with the help of trained personnel. In case where survey results indicate that desired precision is not achieved, the lower bound of confidence interval of the parameter value would be used. All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | Same protocol to be followed in a given monitoring period for all the samples In the likelihood of replacement of an expired ICS by a new ICS, the new stove and the expired stove shall be uniquely identifiable. The efficiency of the new ICS should be similar to the expired ICS. A conservative efficiency (minimum of the two) shall be used for ER calculations. The replacement shall be limited and VPA shall not result in thermal energy savings of more than 180 GWh _{th} / year (applicable in case the efficiency of new ICS is higher than expired ICS). |

| | |
|--------------------------|-----------|
| Data / Parameter: | N_{all} |
| Data unit: | Number |

³⁸ PoA-DD does not include any emission reduction calculation. The applicable values are mentioned in the specific VPA-DD



| | |
|--|---|
| Description: | Total Number of stoves sold |
| Source of data to be used: | Envirofit sales records |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Monitored |
| Description of measurement methods and procedures to be applied: | A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained. ³⁹ |
| QA/QC procedures to be applied: | All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

| | |
|--|--|
| Data / Parameter: | SOF |
| Data unit: | Fraction |
| Description: | Stove Operation Fraction - To determine only stoves that are still operating, measured ex-post through survey |
| Source of data to be used: | Survey |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 1 |
| Description of measurement methods and procedures to be applied: | This is measured ex-post by investigation of the number of ICS installations within the sampled ICS which are operational. If for example 90% of the sample is only found to be operational, then SOF is 0.9. Refer Annex 4 for sampling procedure |
| QA/QC procedures to be applied: | A sample survey shall be conducted for the same with the help of trained personnel. In case where survey results indicate that desired precision is not achieved, the lower bound of confidence interval of the parameter value would be used. All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

| | |
|--------------------------|--|
| Data / Parameter: | Disposal/Discontinuation of traditional cookstove |
|--------------------------|--|

³⁹ the end user details shall be collected as many as commensurate with representative sampling, i.e. the number of end user names and addresses (and phone numbers where possible) within sales record shall be large enough so that surveys and tests can be based on representative purely randomly selected samples. In all cases this should not be less than 10 times the survey and field test sample sizes (including usage surveys for each age of product), in order to ensure an adequate end user pool to which random sampling can be applied.



| | |
|--|--|
| Data unit: | Fraction |
| Description: | Disposal of traditional cookstove |
| Source of data to be used: | Survey |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | 1 |
| Description of measurement methods and procedures to be applied: | The sampled ICS households shall be cross checked for disposal / discontinuation of traditional cook-stove. In case it is observed that the traditional cook-stove are not disposed/ discontinued and are still in use, the fuel-wood consumption of those traditional stoves shall be excluded from Q_{biomass} accordingly as per its weightage in the sample. |
| QA/QC procedures to be applied: | A survey shall be conducted for the same. In case where survey results indicate that desired precision is not achieved, the lower bound of confidence interval of the parameter value would be used. All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

Sustainability Parameters

| | |
|--|---|
| Data / Parameter: | Air Quality |
| Data unit: | Qualitative |
| Description: | Reduction in smoke or Particulate Matter (PM) |
| Source of data to be used: | Either Questionnaires/ Surveys of a sample of stove users |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Monitored annually / Monitored biennially |
| Description of measurement methods and procedures to be applied: | Through questionnaires and Surveys of a sample of stove users for qualitative assessment of improvement in air quality achieved by the project activity (reduction in smoke or PM). Refer Annex 4 for sampling procedure |
| QA/QC procedures to be applied: | A survey shall be conducted for the same. All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

| | |
|-------------------|--|
| Data / Parameter: | Access to affordable and clean energy services |
| Data unit: | Number |



| | |
|--|---|
| Description: | Number of sold improved cook-stoves |
| Source of data to be used: | Cook-Stove Sales Record |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Monitored |
| Description of measurement methods and procedures to be applied: | Cook-Stove Sales Record to assess the number of people achieving access to cleaner cooking technology. |
| QA/QC procedures to be applied: | All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

| | |
|--|---|
| Data / Parameter: | Quantitative employment and income generation |
| Data unit: | Number |
| Description: | No of Jobs created due to the project activity |
| Source of data to be used: | HR records/ Sales and marketing records |
| Value of data applied for the purpose of calculating expected emission reductions in section B.5 | Monitored |
| Description of measurement methods and procedures to be applied: | The direct employment generated by the project at the coordinating entity shall be determined through internal HR records. Indirect employment generated at market level (retailers/distributors) may be estimated using the sales and marketing records. |
| QA/QC procedures to be applied: | All data required for verification and issuance will be backed-up and kept for at least two years after the end of the crediting period or the last issuance of CERs of this project, whichever occurs later. |
| Any comment: | |

E.7.2. Description of the monitoring plan for a SSC-CPA:

The onus of maintaining and updating the database lies with the coordinating entity. A database will be maintained for each SSC-VPA. A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained.⁴⁰

- The coordinating entity will check that the information included in each database is complete and updated.

⁴⁰ the end user details shall be collected as many as commensurate with representative sampling, i.e. the number of end user names and addresses (and phone numbers where possible) within sales record shall be large enough so that surveys and tests can be based on representative purely randomly selected samples. In all cases this should not be less than 10 times the survey and field test sample sizes (including usage surveys for each age of product), in order to ensure an adequate end user pool to which random sampling can be applied.



- The monitoring shall be done on a sampling basis from ICS installations.

E.8 Date of completion of the application of the baseline study and monitoring methodology and the name of the responsible person(s)/entity(ies)

Date of completion of the baseline study and monitoring methodology – 15/05/2010

Radhika Tomar

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Annex 1

**CONTACT INFORMATION ON COORDINATING/MANAGING ENTITY and
PARTICIPANTS IN THE PROGRAMME of ACTIVITIES**

| | |
|------------------|--|
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Annex 2

INFORMATION REGARDING PUBLIC FUNDING

No public funding has been provided to the programme



Annex 3

BASELINE INFORMATION

Refer to Section E.4



Annex 4

MONITORING INFORMATION

For detailed monitoring plan, please refer to Section E.7 above.

The sampling procedure/method used for monitoring is as follows in line with EB65, Annex 2, “Standard for Sampling and Surveys for CDM Project Activities and Programme of Activities”:

a) Sampling Design:

(i) *Objective and Reliability Requirements:* The objective of sampling is to monitor the following parameters:

1. η_{new} - Efficiency of the ICS deployed
2. SOF - Stoves that are operating
3. Disposal / discontinuation of traditional cook-stove
4. Reduction in smoke or Particulate Matter (PM)

The above parameters shall be monitored using a 90/10 (confidence/precision) in case of annual surveys and 95/5 (confidence/precision) in case of biennial surveys. The same is in line with paragraph 22 of the applied methodology AMS-II. G version 03.

(ii) *Target Population:* The target population is the stove users under the programme

(iii) *Sampling Frame:* A database containing details of all the cook-stoves sold to bulk purchasers like dealers, distributors, retailers and NGOs within a particular SSC VPA is maintained. The same shall be used as sampling frame and shall be used for drawing random samples

(iv) *Sampling Method:* The sampling method chosen is simple/ stratified random sampling

The following options with respect to sampling are available:

1. A single-stage process which samples households across all the VPAs i.e. a sample would be picked from all stove installations combined (total population) in all the VPAs included in the PoA.
2. A two-stage process whereby a sample of VPAs is randomly and within these, a random selection is made of ICS using households. If the two-stage process is followed, than the first step is to randomly select a group of VPAs. This approach ensures that every VPA has an equal probability of selection, so the sample is representative of the entire population of VPAs.

(v) *Sample Size:* The sample size shall depend upon the survey frequency

1. Sample size calculated for 90/10 (confidence/precision) in case of annual surveys
2. Sample size calculated for 95/5 (confidence/precision) in case of biennial surveys

The Sample size shall be determined using the following formula:

$$n \geq \frac{z^2 \times N \times V}{(N - 1) \times precision^2 + z^2 \times V}$$



Where,

n = Number of ICS to be sampled

N = Total number of ICS in the population

p = Proportion

z = Constant referring to level of confidence (e.g. 1.645 for 90 % and 1.96 for 95 % confidence)

precision = Required precision (e.g. 10% = 0.1)

$$V = \frac{p \times (1 - p)}{p^2} \quad \text{for proportion based parameters and;}$$

$$= \left(\frac{SD}{mean} \right)^2 \quad \text{for mean based parameters}$$

In case VPAs involve replacement of expired cook stoves with new cook stoves, it shall be ensured that sample also involve a representative fraction of new stoves.

- (vi) *Field Measurements*: Field measurements for different parameters are conducted using the following monitoring procedures:

| Parameter | Description of measurement methods and procedures to be applied: |
|--|---|
| Efficiency of the ICS deployed (η_{new}) | On site Water Boiling Test |
| Stoves that are operating (SOF) | Survey |
| Disposal / discontinuation of traditional cook-stove | Survey |
| Reduction in smoke or Particulate Matter (PM) | Survey |

The frequency of monitoring is annual or biennial depending on whether (90/10) or (95/5) confidence/ precision is being followed.

- i. *Quality Assurance/ Quality Control*: In case where survey results indicate that desired precision is not achieved, the lower bound of corresponding confidence interval of the parameter value would be used as an alternative to repeating survey. the same is also in accordance with the representative sampling methods provided by the methodology AMS-II.G version 03, paragraph 22



- ii. *Analysis:* The data derived using monitoring shall be used to estimate the actual amount of ERs accrued by the project.

b) Implementation Plan:

Training shall be provided to ensure that the above mentioned requirements are complied with at the time of sampling.
