**.PROGRAMME DESIGN DOCUMENT FORM FOR SMALL-SCALE CDM PROGRAMMES OF ACTIVITIES (F-CDM-SSC-PoA-DD) Version 02.0**

# PROGRAMME OF ACTIVITIES DESIGN DOCUMENT (PoA-DD)

## PART I. Programme of activities (PoA)

### SECTION A. General description of PoA

### A.1. Title of the PoA

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Water Purifiers Programme in India
Version 04
19/12/2012

### A.2. Purpose and general description of the PoA

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**Purpose of PoA**

The proposed PoA aims at improving the quality of drinking water through dissemination of low greenhouse gas emitting water purification systems to provide safe drinking water for rural populations in residents and institutions of India . The program activity will avoid the use of thermal energy and/or low energy and associated emissions. The programme aims to provide safe drinking water to both individual & community levels in accordance with national standards[1] by utilising the financial mechanism such as carbon revenue. The CPA Implementer may decide to provide the purification system either free or charge full or partial cost.

The programme will minimize the use of non renewable biomass or fossil fuel utilized or which otherwise would have been utilized for boiling as a means of purification to achieve safe drinking water quality. The reduction in usage of non renewable biomass or fossil fuel would result in the reduction of emission into the atmosphere.

*Why safe drinking water is required to provide?*

As described in the The United Nation formulated Millennium Development Goals, include a target: "to halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation." Despite constitutional mandates and official proclamations, India has lagged behind, among others, in the two most important concerns for the well being of people in any society: (income) poverty and access to clean drinking water and sanitation. Millions of Indians, especially women and children, are living (rather forced to live) in conditions of severe poverty devoid of any meaningful living conditions. About 226 million people lack access to safe water. The water related diseases are claiming the lives of about 1.5 million children (500,000 children due to diarrhoea alone) under 5 years and person-days lost in India are estimated to be about 180-200 million a year[2].

[1] Drinking water Specifications – IS 10500:2012 (2nd revision) or latest revision/standard if any
[2] http://www.cess.ac.in/cesshome/wp%5CWater.pdf

The process for obtaining microbiologically safe drinking water typically involves energy intensive processes. In developing nations, boiling of water is considered to be the surest method for obtaining safe drinking water. The boiling of water is an energy intensive process. The energy for boiling can be obtained either from electricity or biomass or fossil fuel. Due to the scarcity in availability of electricity in many parts of the country the dependence is more either on biomass or fossil fuels to meet the daily water requirement of households[3]. Due to the increasing awareness on climate change & green house gas emissions and increased use of biomass/fossil fuel and thus degradation of forests , there is necessity to facilitate the introduction of low green house gas emitting water purification systems at households and/or community level.

An improved drinking-water source is defined as one that, by nature of its construction or through active intervention, is protected from outside contamination, in particular from contamination with faecal matter[4].
Water is of drinking quality or potable when parameters such as pH, Turbidity, chlorides, total solids, hardness, Arsenic, Flouride, E-coli, Nitrate, Sulphate, Alkalinity, Calcium, Magnesium. under the prescribed limit as mentioned in the national standard IS 10500: 2012 (2nd revision) or latest revision/standard/ amendment if any.

**Policy/measure or stated goal of PoA**

The stated goal of the proposed SSC-PoA is to provide safe drinking water as per national standards through promotion and by facilitating dissemination of low greenhouse gas emitting (low/zero electricity) water purification systems to rural households and/or communities in India which otherwise do not have access to a public distribution network of safe drinking water. The water purification system will reduce the carbon emission by allowing the families to purify the water without the usage of fossil fuels or non renewable biomass for boiling the water.

*Pre project Scenario:*

Prior to the implementation of programme activity as identified in the baseline for the purpose of water purification it is boiled by means of fossil fuel or non renewable biomass.[5]

***Programme Activity:***

The CME will promote the programme to support the distribution of low/zero greenhouse gas emitting water purification systems which provides safe drinking water to the individual households or communities and involve other CPAs into the programme.

The CME of the programme would bring in investors such as corporate / not-for-profit organisations or companies / individual sponsors / government bodies/trusts /producer organizations or companies/ Micro Finance Institutions (MFIs) /technology suppliers individually or jointly to invest in the proposed project partly or fully to cover the capital cost of the water purification system and recovery of such investment through carbon revenue. The CPA implementer may decide whether to distribute the water purification system free or charge partial or full cost against the distribution of such systems.

The CPA implementer may avail any subsidies or incentives available to implement the programme and the additionality will be demonstrated at each CPA level. Monitoring of the database (UNFCCC and other GHG ER standards) would be carried out to check project activity does not generate offsets more than once simultaneously.

[3] http://www.cea.nic.in/reports/yearly/lgbr_report.pdf
[4] http://www.wssinfo.org/definitions-methods/introduction/
[5] This is same as described by methodology AMS III.AV in the baseline

**General operating and framework for the implementation of proposed PoA**

General Carbon Advisory Services Pvt Ltd is the coordinating/managing entity (CME) who will provide guidance framework for successful implementation of proposed SSC PoA to the CPA implementers. This may include but not limited to support,distribution and awareness creation, capacity building, monitoring, operation & maintenance of community based and household systems, replacements and disposal of equipments after its lifetime and documentation related to programme of activities. Each Component Project Activity (CPA) under this PoA will comprise of any or combination of the water purification system as explained in section A.6 and result in aggregate emission reduction of less than or equal to 60 kt$CO_2$e annually, the threshold for type III ("other project activities"). The distribution and installation of purification systems either at household and/or community level will be performed by CPA implementer. The awareness programme will be conducted to demonstrate the importance of clean & safe drinking water of quality as prescribed by national standard prior and during implementation. Monitoring will include tracking of usage of the equipment, replacements if required as well as the quality of purified water based on parameters specified in IS 10500:2012 or latest revisions/standards/ amendment if any performed by NABL approved laboratory. The documentation of the CPAs will be undertaken as required by the "Simplified modalities and procedures for small scale CDM project activities" prescribed by UNFCCC/CDM EB for generation of emission reductions (ERs).. The data collected during the entire life time of PoA will be recorded in database and maintained by CME.

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

There are no mandatory regulations in India that mandates the implementation of low/zero greenhouse gas emitting water purification systems. General Carbon Advisory Services Pvt. Ltd.[6], CME of the programme is a consulting firm delivering various energy & environmental commodities such as GHG ER project development, GHG ER transaction services, climate strategy for multi – sectoral, multi-national business entities, Renewable Energy Certificates and Renewable Purchase Obligations, power trading, green energy/power sourcing , PAT mechanism and ECerts, corporate social responsibility and sustainability. The CME is not mandated to comply with any community development norms by the host country.
This confirms that the CME is not mandated to implement any such programme and the initiative is taken up voluntarily.

**Contribution to sustainable development**

Reduction in non renewable biomassor fossil fuel consumption for purification of water by deploying low greenhouse gas systems to rural households and/or community thereby reducing green house gas emissions and thus contributing to sustainable development.

The National CDM Authority(NCDMA), Ministry of Environment and Forests(MoEF), Govt. of India has stipulated the social, economic, environmental, and technological well being as the four indicators for sustainable development in the interim approval guidelines host country approval eligibility criteria for Clean Development Mechanism (CDM) projects[7].

**Social well being**

- Access to safe drinking water
- Improved health conditions and reduced number of water borne illnesses
- The proposed PoA will reduce the drudgery and fuel expense.

[6] http://www.general-carbon.com/
[7] http://envfor.nic.in/cdm/host_approval_criteria.htm

- Operation and maintenance of purification systems would result in employment of locals thus increasing household income.

**Economic well being**

- This programme will create/ increase business opportunities for water purification system suppliers etc.
- Reduced medical expenses for treatment of water-borne diseases results in money savings and hence can be used for their economic welfare.
- Attract Public/private investments into the programme.

**Environmental well being**

- The water purifier is low/zero energy consuming.. Avoids deforestation or reduces consumption of non- renewable biomass.
- Improves indoor air quality.

**Technological well being**

- The PoA will facilitate introduction of new energy efficient technologies compared to baseline leading to reduction of usage of non renewable biomass or fossil fuel.

**A.3. CMEs and participants of PoA**

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General Carbon Advisory Services Pvt. Ltd. is the Co-ordinating/managing entity (CME) and project participants of the proposed PoA.

For first real case CPA, the CPA implementer or project participant is General Carbon Advisory Services Pvt. Ltd.

**A.4. Party(ies)**

| Name of Party involved (host) indicates a host Party | Private and/or public entity(ies) project participants (as applicable) | Indicate if the Party involved wishes to be considered as project participant (Yes/No) |
|---|---|---|
| India (Host) | General Carbon Advisory Services Pvt. Ltd. - Private entity | No |

**A.5. Physical/ Geographical boundary of the PoA**

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Geographical area

The political boundary of India is chosen as the country/ geographical boundary of the SSC-PoA. The SSC-CPAs that will be included under the SSC-PoA will be within the defined geographical location of the SSC-CPA area and follow applicable national and / or sectoral policies and regulations.

Geographical boundary of India

The latitude and longitude of India is $20^0$N and $77^0$ E[8]. Delhi is the national capital of India and latitude, longitude of Delhi is 28.38 N and 77.12 E[9].

**A.6. Technologies/measures**

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**Baseline Technology:**

The current practice of utilization of biomass in traditional three stone fire or a conventional system is lacking improved combustion air supply mechanism and flue gas ventilation system. This has efficiency of 10 %[10] leading to inefficient combustion resulting in emissions such CO2 particulate matter etc) into the atmosphere.

**Technologies of water purification**

As per methodology AMS III.AV., Water purification technologies that involve point-of use (POU) or point-of-entry (POE)[11] treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, pasteurization appliances, etc.

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[8] http://www.mapsofindia.com/lat_long/

[9] http://www.mapsofindia.com/lat_long/delhi/

[10] Default value as per the methodology AMS III. AV

[11] Point of Use (POU) devices treat only the water intended for direct consumption, typically at a single tap or limited number of taps, while Point of Entry (POE) treatment devices are typically installed to treat all water entering a single home, business, school, or facility (USEPA, 2006).

The proposed PoA involves deployment of low green house gas emitting water purification technologies as mentioned in AMS III. AV. which complies with "protective"[12] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO 2011)[13] or will achieve water quality as described in Drinking water - specification IS 10500: 2012 (2nd revision) or latest revision/standard/ amendment if any. The technologies which can be included but are not limited to:

**Chemical Disinfection:**

Chemical disinfection of drinking-water includes any chlorine- or iodine-based technologies,including chlorine dioxide, as well as bromine, ozone, other oxidants, strong acids and bases, ferrates and some antimicrobial metals (e.g. silver and copper). Chemical disinfection is most widely done with technologies using free chlorine (hypochlorous acid) and, to lesser extents, dicyanurates and tricyanurates of free chlorine, chloramines, chlorine dioxide or other forms of chlorine oxidants. The chlorine, bromine and iodine technologies as well asozone and other oxidants all share similar mechanistic features. Disinfection with metals has been done with soluble, colloidal and larger solid (metallic) forms added to water. Disinfection of household drinking-water in developing countries is done primarily with free chlorine, however. This is because it is quite effective, widely available, easy to dose properly in principle and inexpensive.

**Membrane or structured porous media filters (ceramic, porous carbon black, etc.):**

Point-of-use water filtration technologies include cloth or fibre filters, membrane filters, porous ceramic filters, carbon block filters, composite filters or similar technologies. These filters reduce microbes by a combination of physical and chemical (and, in some cases, biological) processes, including physical straining, sedimentation and adsorption. Filtration technologies are finding increasing application in developing countries where chemical disinfection or boiling may not always be practical or effective (Colwell et al., 2003). Traditional membrane technology is generally expensive and therefore less known for effectiveness when applied to small-scale drinking-water treatment in developing countries. However, reverse osmosis, nanofilters and other membrane technologies are common in developed countries (Hörman et al., 2004), may be used by travelers to developing countries (Backer, 2002) and are now being evaluated and field implemented in developing countries (Boisson et al., 2010). These advanced filters may include composite filters that employ several methods for reduction of microbes in water. Some low-cost applications of these types of filters have been developed and may have an increasing role to play in the future of HWT in developing countries.

Cloth filters, such as those of sari cloth, have been recommended for reducing *Vibrio cholerae* in water when these pathogens are associated with copepods or other eukaryotes in water (Huo et al., 1996; Colwell et al., 2003). These cloths will not significantly retain dispersed bacteria not associated with copepods, other crustaceans, suspended sediment or large eukaryotes because the pores of the cloth fabric (> 20 $\mu$m) are not sufficiently small to exclude bacteria. However, where appropriate, these filters can have significant health impacts.

Filtration through porous ceramic material is also used to reduce microbes in water. Ceramic technologies exist in many forms, the most prevalent being the ceramic "candle" filters (Clasen et al., 2004; Clasen, Brown & Collin, 2006) or the ceramic "pot" filters of the type promoted by the nongovernmental organization *Potters for Peace* (e.g. Brown, Sobsey & Proum, 2007). Filters are generally gravity driven and are often used in a nested bucket system to safely store treated water. Field trials of commercially

[12] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

[13] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf

produced ceramic "candle" filtration devices have suggested that they do provide an effective barrier against microbial pathogen indicators in water and that interventions are associated with significant health gains in users compared with non-users of the technologies. Studies of locally produced, low-cost ceramic pot filters in Cambodia have suggested that these interventions are also effective. Diarrhoeal reductions associated with filter use were approximately 50% in two field trials in rural Cambodia, with filters providing a mean 99% reduction of *E. coli* in household drinking water and a mean 90–99% reduction in viruses in laboratory testing.

Filters having a structured porous barrier to retain microbes and other contaminants should be tested according to the implementer's or manufacturer's recommendations for use in the target setting. A flow rate, average volume treated per day (minimum 20 litres) and other operational parameters that closely mimic actual household use conditions should be used. As with chemical disinfection, volumes of test waters of defined quality should be spiked with known concentrations of target microbes and treated by the filtration process, and both the initial (spiked) feed water and the treated filtrate water should be assayed to determine the microbial concentrations and extent of microbial reduction.

**Granular media filters:**

Granular media filters include filters containing sand, diatomaceous earth or other particulate media in packed beds, layers or surfaces over or through which water is passed. These filters retain microbes by a combination of physical and chemical processes, including physical straining, sedimentation and adsorption. Some may also employ chemically active antimicrobial or bacteriostatic surfaces or other chemical modifications. Other granular media filters are biologically active because they develop layers of microbes and their associated exopolymers on the surface of or within the granular medium matrix. This biologically active layer, called the *schmutzdecke* in conventional slow sand filters, retains microbes and often leads to their inactivation and biodegradation. A household-scale filter with a biologically active surface layer that can be dosed intermittently with water has been developed called the BioSand filter, which is an intermittently operated slow sand filter (Stauber et al., 2006). The BioSand system has been the subject of several studies (Kaiser et al., 2002; Duke et al., 2006; Stauber et al., 2009) suggesting that the filters can be effective in reducing waterborne microbes and improving health among users.

Filters using porous granular media to retain microbes and other contaminants should be tested according to the implementer's or manufacturer's recommendations for use in the target setting. A flow rate, average volume treated per day (minimum 20 litres) and other operational parameters that closely represent actual household use conditions should be used.

**Solar disinfection:**

There are a number of technologies using solar irradiation to disinfect water, and mechanisms for reduction of microbes and technologies have been well studied (e.g. Acra et al., 1980; Acra, Raffoul & Karahagopian, 1984; Joyce et al., 1996; Kehoe et al., 2004; Lonnen et al., 2005; Méndez-Hermida et al., 2005; Berney et al., 2006a,b). Some use solar radiation to inactivate microbes in either dark or opaque containers by relying on heat from sunlight energy. Others, such as the SODIS system developed at the Swiss Federal Agency for Environmental Science and Technology (EAWAG), use clear plastic containers penetrated by UV radiation from sunlight and rely on the combined action of the UV radiation, oxidative activity associated with dissolved oxygen and heat. Other physical forms of solar radiation exposure systems also employ combinations of these solar radiation effects in other types of containers, such as UV-penetrable bags and panels, to improve the microbial quality of water. A number of field trials have been conducted to evaluate the health impacts and field effectiveness of the technology (Conroy et al., 1996, 1999, 2001; Rainey & Harding, 2005).

Solar disinfection technologies should be tested in accordance with the implementer's or manufacturer's recommendations for use in the target setting. Incident solar radiation that controls UV intensity and

thermal flux depends on the latitude, altitude, weather, season, exposure orientation and specific design features of the water vessel, and water quality.

**UV light technologies using lamps, including UV light emitting diodes:**

UV radiation has been used in drinking-water treatment for over 100 years (Ward, 1893; Baker, 1948), and its mechanisms for inactivating microbes have now been well characterized (Sobsey, 1989; Blatchley & Peel, 2001). The technology's increasing use is due in part to its proven effectiveness against chlorine-resistant protozoan pathogens, such as *Cryptosporidium* and *Giardia*. A number of drinking-water treatment technologies employ UV light radiation from UV lamps to inactivate microbes. For household or small-scale water treatment, most employ low-pressure mercury arc lamps producing monochromatic UV radiation at a germicidal wavelength of 254 nm. Typically, these technologies allow water in a vessel or in flow-through reactors to be exposed to the UV radiation from the UV lamps at sufficient dose (fluence) to inactivate waterborne pathogens.

Technologies using UV lamps must be tested in accordance with the manufacturer's or implementer's recommendations for use, including specific properties of the lamps, power input, water treatment vessel, treatment reactor or orientation of lamp relative to the water to be treated, incident UV intensity (in mW/cm2 or other standard units), estimated UV dose delivered (fluence, based on intensity and exposure time), reported in standard units (e.g. mJ/cm2), and flow rate.

**Thermal (heat based) technologies:**

Thermal technologies are those whose primary mechanism for the destruction of microbes in water is heat produced by burning fuel. This includes boiling and heating to pasteurization temperatures (typically > 63 °C for 30 minutes). For example, pasteurization (Iijima et al., 2001) was found to improve household drinking-water quality in a trial in Kenya. Another field trial from Bangladesh demonstrated inactivation of thermotolerant coliforms using a pasteurization process (Islam & Johnston, 2006). Relatively low heat (55 °C) for several hours may inactivate key protozoan pathogens in water, such as *Cryptosporidium parvum*, *Giardia intestinalis* and *Entamoeba histolytica* (Feachem et al., 1983; Sobsey & Leland, 2001; Sobsey, 2002; Spinks et al., 2006). Boiling remains the most common form of household-scale water treatment worldwide, having been used to treat drinking-water since antiquity.

Because boiling of drinking-water is the most widespread practice for treating drinking-water in the world and, in theory, the most effective for reducing pathogens, it should, like other existing methods of water treatment, not be discouraged when alternative technologies are not as effective or are less likely to be used correctly, consistently and continuously. In practice, however, boiling may not be as effective as other strategies, for various reasons. Disadvantages to boiling include the following: boiling does not reduce sediment or turbidity; boiling may negatively affect taste; boiling heats up water so that it cannot be drunk immediately; the temperature achieved may not be easily measured; and the method may use large amounts of fuel. Boiling may not be a cost-effective or practical option in many places. Boiled water still must be safely stored to avoid contamination in the household, as well.

Technologies that use thermal energy for heat inactivation as the main mechanism for microbial reductions in water should be tested according to the manufacturer's or implementer's recommendations for use. The specifics of the temperature required and the length of time at this temperature that must be maintained for proper treatment should be included in the testing conditions.

**Coagulation-flocculation and/or sedimentation:**

Coagulation or precipitation is any device or method employing a natural or manufactured coagulant or precipitant to coagulate and/or precipitate suspended particles, including microbes, to enhance their sedimentation. Sedimentation is any method for water treatment using the settling of suspended particles,

including microbes, to remove them from the water. These methods may be used along with cloth or fibre media for a straining step to remove the flocculated particles ("floc") that have formed. This category includes simple sedimentation, or that achieved without the use of a chemical coagulant. Coagulant–flocculant products have been tested in the laboratory and field (e.g. Rangel et al., 2003; Reller et al., 2003; Souter et al., 2003; Crump et al., 2004a; Chiller et al., 2006). Promising results have been achieved with low-cost, locally available coagulants for use in simple coagulation/filtration systems (Babu & Chaudhuri, 2005).

Some combination systems are commercial products in the form of granules, powders or tablets containing a chemical coagulant such as an iron or aluminium salt and a disinfectant such as chlorine. When added to water, these chemicals coagulate and flocculate impurities to promote their rapid and efficient sedimentation and also deliver the chemical disinfectant (e.g. chlorine) to inactivate microbes. To use these combined coagulant–flocculant–disinfectant products, they are added to specified volumes of water, allowed to react for floc formation, usually with brief mixing to promote coagulation–flocculation, then allowed to remain unmixed for the floc to settle; the clarified supernatant water is then decanted off, usually through a cloth or other fine mesh medium to strain out remaining particles. The recovered supernatant is then stored for a period of time to allow for additional chemical reactions and disinfection to occur before the water is consumed.

Technology evaluation or verification challenge tests of coagulation–flocculation and sedimentation for the removal of microbes should be performed according to the manufacturer's or implementer's recommendations for normal household use in the target context. Specific representative conditions of the volume of water to be treated (minimum of 20 litres), coagulant dose (if applicable), mixing conditions (e.g. stirring method) and the specified or recommended method for removing floc from the treated water (physical straining, settling, decanting, etc.) should be included.

Since the quality of water varies based on the source and region, in each CPA the water quality will be tested before the implementation of technology which will adhere to the parameters as per IS 10500:2012 (2$^{nd}$ revision) or latest revision/standard/amendment if any.

There is no moving parts in the water purification system which otherwise could have resulted in wear and tear. The cartridges of the purification system will be replaced after its life time and the same will be monitored. The manufacturer will provide the test certificate with regards to water quality and during monitoring to further enhance the credibility of the equipment and the output it delivers the CPA Implementer will test the quality of water in NABL accredited laboratory as per IS 10500:2012 or latest revision/standard/amendment.

Hence the PoA will allow the above technologies which are environmentally safe and sound.

A water purifier included in this PoA can use one or more of these technologies and provide output water at point of use that meets the WHO drinking water standards. Based on the implementation of the above technologies emission reduction will be determined in each CPA

**A.7. Public funding of PoA**

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The PoA will not receive any public funding from Parties included in Annex I.

**SECTION B. Demonstration of additionality and development of eligibility criteria**

**B.1. Demonstration of additionality for PoA**

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The start date of CPA (30/12/2012) is after 2$^{nd}$ August 2008 and after the start date of PoA (13/06/2012). Hence the prior consideration is not required for this PoA.

A SSC-CPA can demonstrate the additionality using "Guidelines for demonstrating additionality of microscale project activities", version 04, EB 68, Annex 26.

As per para 4, Other project activities i.e. Type III project activities[14] that aim to achieve emission reductions at a scale of no more than 20 ktCO2e per year, are additional if any one of the following conditions is satisfied:

(a) The geographic location of the project activity is an LDC/SIDS or special underdeveloped zone of the host country as identified by the government in accordance with the paragraph 2 (a) (i) above before 28 May 2010;

(b) The project activity is an emission reduction activity with both conditions (i) and (ii) below satisfied:

(i) Each of the independent subsystems/measures in the project activity achieves an estimated annual emission reduction equal to or less than 600 tCO2e per year; and

(ii) End users of the subsystems or measures are households/communities/SMEs.

As per paragraph 04, Annex 26 of the EB 60 meeting report "full additionality assessment is not required in the context of component project activities (CPA), rather the confirmation of additionality for CPAs should be conducted by means of the eligibility criteria. However PP chooses to demonstrate additionality at CPA level.

Hence it would be demonstrated in each CPA that the proposed activity would not be implemented in the absence of the PoA.

**B.2. Eligibility criteria for inclusion of a CPA in the PoA**

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As per the "Standard for the demonstration of additionality, development of eligibility criteria and application of multiple methodologies for programme of activities" Annex 3 of EB 65 and EB 55, Annex 38 following criteria must be met by each CPA to be included under PoA:

| S.No | Requirement | Eligibility criteria |
|---|---|---|
| a. | The geographical boundary of the CPA including any time-induced boundary consistent with the geographical boundary set in the PoA | Each CPA will be located within the geographical boundary of India. |
| b. | Conditions that avoid double counting of emission reductions like unique identifications of product and end-user locations (e.g. programme logo) | For each CPA ,CME will check for double counting by:<br>1. Identification of each purification system will be done based on the unique identification code maintained in the CME database containing:<br>a) Acronym of programme<br>b) Acronym of CME & CPA implementer<br>c) Location of CPA<br>d) Serial number of water purifiers/ water |

[14] All technologies/measures included in approved Type III small-scale CDM methodologies are currently eligible to be considered, except for AMS-III.V "Decrease of coke consumption in blast furnace by installing dust/sludge recycling system in steel works", AMS-III.P "Recovery and utilization of waste gas in refinery facilities", AMS-III.Q "Waste Energy Recovery (gas/heat/pressure) Projects" and AMS-III.W "Methane capture and destruction in non hydrocarbon mining activities". In the latter cases further analysis is required.

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| | | purification systems.<br>2. Monitoring the database (UNFCCC and other GHG ER standards) to check project activity does not generate offsets more than once simultaneously. |
| c. | The specifications of technology/measure including the level and type of service, performance specifications including compliance with testing/certifications. | a. In accordance with AMS III.AV., version 02 each CPA will deploy technology/measures mentioned in the PoA which complies with the performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO 2011)[15]". Or<br>b. Each technology will achieve water quality as described in IS 10500: 2012 (2nd revision) or latest revision/standard/amendment if any. |
| d. | Conditions to check the start date of the CPA through documentary evidence. | For each CPA<br>a. Start date is after the commencement of validation of PoA i.e starting date of the PoA.<br>b. The start date will be earliest of the date of<br>purchase order for the purification systems/water purifiers |
| e. | Conditions that ensure compliance with applicability and other requirements of single or multiple methodology/ies applied by CPAs | Each CPA will satisfy the following applicability criteria described in approved methodology AMS III.AV. *Low greenhouse gas emitting water purification system :*<br>a. This methodology comprises introduction of low greenhouse gas emitting water purification systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality.[16]<br>b. Water purification system involves point-of-use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at school or community centre are included. The examples include, but are not limited to water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, |

[15] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf

[16] In case a national standard/guideline for drinking water quality is not available, the most recent standards/guidelines by the World Health Organization (WHO) or United States Environmental Protection Agency (US-EPA) may be applied.

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| | | pasteurization appliances, etc.<br>c. The methodology is applicable under the following conditions:<br><br>i. Prior to the implementation of the project activity, a public distribution network of safe drinking water does not exist within the total project area and safe drinking water (SDW) if any is produced by the consumers by only using point-of-use or point of entry water purifiers. If during the crediting period SDW is made available in (parts of) a project area through a public distribution network, this methodology cannot be applied anymore to this project area (or part of the project area) from that point in time and the emission reductions pertaining to this project area cannot be claimed from that point onwards. This condition should be checked annually during the crediting period;<br><br>ii. It shall be demonstrated that the application of the project technology/equipment achieves compliance with "protective" [17] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011) or a comparable national standard or guideline;<br><br>iii. In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there must be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality.<br><br>d. Applicability of this methodology is foreseen in the following types of situations that shall be reassessed at the beginning of each crediting period:<br><br>a. Case 1: Project activities implemented in rural or urban areas[18] |

[17] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

[18] As per the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.

| | | |
|---|---|---|
| | | of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % confirmed by one of the three options below:<br><br>i. Proportion of populations using an improved drinking-water source for the most recent year for which data is available from WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation shall be used (<http://www.wssinfo.org /data-estimates/table/>) for this purpose. Definition of improved and unimproved drinking water source shall be as per the information provided by JMP;<br><br>ii. Using official data such as publicly available statistical data from a government agency or an independently commissioned study by an international organization or an university;<br><br>iii. Using survey methods (use 90/10 confidence/precision for sampling);<br>b. Case 2: Project activities implemented in areas not included in Case 1. |
| f. | The conditions that ensure that CPAs meet the requirements pertaining to the demonstration of additionality. | Each CPA will demonstrate the additionality as per the requirements of methodology AMS III.AV. in accordance with "Guidelines for demonstrating additionality of micro scale project activities", version 04, Annex 26, EB 68. The same guidelines will be applicable for all combination of technology/measure and methodology. |
| g | The PoA-specific requirements stipulated by the CMEs including any conditions related to undertaking local stakeholder consultations and environmental impact analysis. | Each CPA will undertake local stakeholder consultations as follows :<br><br>a. Identification of local stakeholders (identified by CME and CPA implementer)<br>b. Invitation to local stakeholder consultation or |

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| | | meets<br>c. Description of the CPA project activity<br>d. Inviting comments from local stakeholders<br>e. Compilation of the comments and responding with corrective actions as required.<br>The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India, 2006[19]. Hence, it is not required to be conducted for this programme. |
| h. | Conditions to provide an affirmation that funding from Annex I parties if any, does not result in a diversion of official development assistance. | Each CPA will demonstrate that no Official Development Assistance (ODA) is being used. This may be evidenced through any of the following:<br><br>a. Undertaking by CPA implementer to the CME<br>b. If applicable certificate by CPA implementer's Chartered Accountant provided after the procurement of equipment. |
| i. | Where applicable, target group (e.g. domestic/commercial/industrial, rural/urban, grid-connected/off-grid) and distribution mechanisms (e.g. direct installation) | The target group of each CPA will be rural households currently using fossil fuel or non renewable biomass in 3 stone fire system to boil water as means of water purification and don't have access to safe drinking water.<br><br>The households or individual households of the communities (cooperatives/society/association) would be identified by government identified list of families who are below poverty line (BPL) card holders and/or ration card and/or electoral card and/or any other government approved identification card.. |
| j. | Where applicable, the conditions related to sampling requirements for a PoA in accordance with the approved guidelines/standard from the Board pertaining to sampling and surveys. | .The technology to be implemented in the CPA will be done based on the interactions between target beneficiaries, technology suppliers and CPA Implementer (financier) of the project.<br>Each CPA will conduct sampling and surveys as appropriate or applicable based on monitoring requirements of :<br>a. Sampling & survey methods described in the approved methodology AMS III.AV. *Low greenhouse gas emitting water purification systems* which refers to para 17 of AMS I.E.<br>b. Standard for sampling and surveys for CDM project activities and programme of activities", version 03.0, EB 69, Annex 4, and Guidelines for sampling and surveys for CDM project activities and programme of activities, |

[19] http://www.envfor.nic.in/legis/eia/so1533.pdf

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|---|---|---|
| | | version 02, EB 69 , Annex 5..<br><br>The CME and CPA implementer will conduct survey for baseline identification and monitoring. |
| k. | Where applicable, the conditions that ensure that CPA in aggregate meets the small-scale or micro-scale threshold criteria and remain within those thresholds throughout the crediting period of the CPA. | Each CPA will meet the following small-scale threshold criteria as per EB 61, Annex 21, "General Guidelines to SSC CDM methodologies", version 17<br><br>• Each CPA will show that the emission reductions every year will not go beyond the limits of 60 $ktCO_2e/y$ and will remain within the limits over the entire crediting period. |
| l. | Where applicable, the requirements for the debundling check, in case CPAs belong to small-scale (SSC) or microscale project categories | Each CPA will not undergo debundling check as per EB 47, Annex 32 and EB 54 Annex 13, "Guidelines on assessment of debundling for SSC project activities"<br><br>• If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.<br>Each independent subsystems/measures included in the CPA will have annual emission reduction not greater than 0.6 ktCO2e (i.e. 1% of 60 ktCO2e). |

**B.3. Application of methodologies**

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SECTORAL SCOPE – 3; Energy Demand

TYPE III – Other project activities

CATEGORY: III. AV – Low greenhouse gas emitting water purification system, version 02

EB: 62

This methodology is applicable for all the CPAs joining this PoA.

| S.No | Methodology | Justification |
|---|---|---|
| 1. | This methodology comprises introduction of low greenhouse gas emitting water purification systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality. | In accordance with AMS III.AV ,version 02,the proposed PoA involves the installation of low/zero greenhouse gas emitting water purification system complying with the "protective" [20] performance target as per "Evaluating household water treatment |

[20] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

| | | |
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| | | options: Health based targets and microbiological performance specifications" (WHO 2011) [21] " or comparable national standard or guideline. Accordingly the water quality will be achieved as described in IS 10500: 2012 (2nd revision) or latest revision/standard/amendment if any.<br><br>Thus, the applicability condition is met |
| 2. | Water purification technologies that involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, pasteurization appliances, etc. | The proposed PoA will include a technology that involves point –of-use treatment systems for residential and/or institutional applications.<br>In first real case CPA, the CPA Implementer is considering the use of Four stage purification system for households. The water quality that it achieves will be in accordance with IS 10500:2012 (2nd revision) or latest revision/standard/amendment if anyand testing of water quality would be carried out by an NABL approved laboratory. The technology to be deployed will be decided at CPA level. |
| 3. | The methodology is applicable under the following conditions:<br>a. Prior to implementation of the project activity , a public distribution network of safe drinking water does not exist within the total project area and safe drinking water (SDW) if any is produced by the consumers by only using point –of-use or point of entry water purifiers. If during the crediting period SDW is made available in (parts of) a project area through a public distribution network, this methodology cannot be applied anymore to this project area (or part of the project area) from that point in time and the emission reductions pertaining to this project area cannot be claimed from that point onwards. This condition should be checked annually during the crediting period.<br>b. It shall be demonstrated that the application of the project technology/equipment achieves compliance with .protective performance target as per .Evaluating household water treatment options: | a. The CPAs will be undertaken in such regions that are not covered by public distribution network of safe drinking water (SDW). To substantiate that there is no SDW network the CPA implementer/CME will carry out water quality test to check if the drinking water is safe in pre project (baseline) and testing will be done by National Accreditation Board for Testing and Calibration Laboratories (NABL) [22] approved laboratories in each CPA. This is also included in the eligibility criteria for inclusion of CPA and annual monitoring for each CPA.<br><br>b. The proposed PoA will deploy only those technology (ies) in the CPA which provides drinking water in accordance with the national standard i.e IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any. |

[21] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf
[22] http://www.nabl-india.org/

| | | |
|---|---|---|
| | Health based targets and microbiological performance specifications. (WHO, 2011) or a comparable national standard or guideline.<br>c. In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there must be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality. | While choosing the water purification treatment technologies and units, their compliance with applicable standard will be certified by the manufacturer or NABL approved laboratory.<br><br>c. The CME/CPA Implementer will maintain a document which will contain measures that monitors replacement of part or whole purification systems of comparable quality where the life span of treatment technologies is shorter than the crediting period of the project activity.<br>The technology being deployed by first real case CPA is four stage purification system household purifier. Here the cartridges which purifies water, requires replacement after certain time period/quantity of water purified. This is easily available and if this is unavailable equivalent water purification system of comparable quality may be procured from the market.<br><br>Thus, the applicability condition is met |
| 4. | Applicability of this methodology is foreseen in the following types of situations that shall be reassessed at the beginning of each crediting period:<br>(a) Case 1: Project activities implemented in rural or urban areas [23] of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % confirmed by one of the three options below:<br>i. Proportion of populations using an improved drinking-water source for the most recent year for which data is available from WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation shall be used (<http://www.wssinfo.org/data estimates/table/>) for this purpose. Definition of improved and unimproved drinking water source shall be as per the information provided by JMP;<br>ii. Using official data such as publicly available statistical data from a | Based on WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (http://www.wssinfo.org/data estimates/table/>), the total proportion of improved water source in India is 92% [24] which is greater than 60 % and hence the CPA under this PoA falls under case 2. |

[23] As per the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.

[24] http://www.wssinfo.org/data-estimates/table/

| | | |
|---|---|---|
| | government agency or an independently commissioned study by an international organization or an university;<br>iii. Using survey methods (use 90/10 confidence/precision for sampling);<br>(b) Case 2: Project activities implemented in areas not included in Case 1. | The programme will adopt case 2 as described above. |

The PoA will allow for the combination of technologies in accordance with methodology AMS III.AV. which will comply with performance target as per "Evaluating household water treatment options:Health based targets and microbiological performance specifications" (WHO 2011)[25] or will achieve water quality in accordance with IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any. The following are list of technologies which may be included in the proposed PoA are

- Chemical disinfection
- Membrane or structured porous media (ceramic, porous carbon black,etc.) filters:
- Granular media filters
- Solar disinfection
- UV light technologies using lamps,including UV light emitting diodes
- Thermal(heat based) technologies
- Coagulation-flocculation and/or sedimentation

As per para 29 of EB 65, Annex 3 , the PoA will allow for applications of combination or single technologies which will be in accordance with the methodology AMS III.AV. The PoA and all CPAs joining this PoA will follow the applicability conditions as required by the methodology AMS III.AV. The CPAs included in the PoA will satisfy the inclusion criteria as mentioned in section B.2 of PoA DD and implementation will be in accordance with the framework provided by PoA.

**Cross Effects**:

As per annex 3, EB 65, para 28 for the application of multiple small scale technologies "Combinations of technologies/measures and/or methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technologies/measures applied . Where such cross effects do exist, the CME shall propose methods to account for such cross effects using the "Procedures for requests to the executive board for deviation from an approved methodology" so as to ensure that the calculation of emission reductions is accurate. The cross effects between technology/methodologies s will be checked at CPA level.

As per annex 3, EB 65, para 30 The CME may optionally use the Procedure for the submission and consideration of request for clarification on the application of approved small scale methodologies (see EB 34 report, annex 6)[26] to seek clarifications on cross effects in the proposed combinations. Since the only applicable methodology is AMS III.AV, the above guideline is not applicable for this PoA.

Sampling will be undertaken for baseline justification and monitoring parameters for each CPA as per the requirements of of AMS - I.E which states that as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities", Annex 4, EB 69 and "Guidelines for sampling and surveys for CDM project activities and programme of activities", Annex 5, EB 69 . When biennial inspection is chosen a 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error

[25] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf
[26] <http://cdm.unfccc.int/Reference/Procedures/methSSC_proc01_v01.pdf>

requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision. The detail sampling plan is described in section B.7.2 of Part II of PoA DD.

**SECTION C. Management system**
>>
**Procedure to check for De-bundling**

The CDM EB 54 meeting report Annex 13"Guidelines on assessment of debundling for SSC project activities". Para10 stipulate the following:

'*If each of the independent subsystems/measures (e.g. biogas digester, solar home system) included in the CPA of a PoA is no greater than 1% of the small scale thresholds defined*[27] *by the methodology applied, than that CPA of PoA is exempted from performing de-bundling check i.e. considered as being not a de-bundled component of a large scale activity*'

The threshold to prove the activity is not a debundled action is derived from the small scale threshold for each SSC-CPA, which corresponds to 0.6ktCO2e/year.

Therefore, a debundling check will occur for all individual CPA that includes a technology type with a annual emission reduction of more than 0.6kt$CO_2$e.

**The provisions to ensure that those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA:**

The CME is a managing entity of the PoA and is therefore responsible for operating the PoA.The operating CPAs are fully aware and have voluntarily agreed to participate in the PoA owned by CME, thus their activity is subscribed to the PoA. The CME will enter a contract with the CPA implementer that confirms the CPA implementers involvement in the PoA.

*As per para 17 (a) of EB 65, Annex 3, A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies*

*Roles and responsibilities:*

Execution personnel:

- Academic qualification: Bachelors/ Masters degree in Science or Engineering
- Knowledge of CDM PoA/CPA DD requirement (acquired amongst other things through internal induction training or past experience)
- Sound communication skills

Stakeholder management personnel:

- Academic qualifications: Bachelors/ Masters in Arts / Science / Commence/ Engineering/ Management / Social Work
- Project management / Coordination ability

[27] This is based on the clarification from "Guidelines on assessment of debundling for SSC project activities, v03 (EB 54, Annex 13, par. 10) for determining the occurrence of debundling under a Programme of Activities (PoA)", if each of the independent subsystem/measures included in the CPA of a PoA is no larger than 1% of the small scale threshold defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check, i.e. considered as being not a de-bundled component of a large scale activity.

- Negotiation and sound communication skills
- Should have writing and speaking ability in at least the national/regional language

Transaction team personnel:

- Academic qualifications: Bachelors/ Masters in Arts / Science / Commence/ Engineering/ Management
- Experience of managing carbon / environmental commodities transactions ( managed at least 3 commodities transactions)

Documentation management personnel:

- Managerial cadre person, with experience of handling administration responsibilities
- Proficient in using computer based systems.
- Understanding of document management principles
- Familiar with CDM processes

*Review of competencies:*
The CME will be responsible for carrying out the review of the competencies of personnel assigned to different roles and responsibilities as described in Para 17 (a), EB 65, Annex 3. The review will be carried out when roles are assigned.

*As per para 17 (b) of EB 65, Annex 3, Records of arrangement for training and capacity development for personnel:*

Trainings:
The CME will conduct an in-house training programme at the commencement of the PoA, the training will involve familiarising the personnel with the procedures, policies and practices necessary for discharging the roles. The personnel will be encouraged to update themselves with the latest guidelines issued at the EB meets relevant to the PoA, points that need deliberation and discussion will be addressed/facilitated through in-house meets / other prevalent official communication practices.

Capacity Development:
The CME will make sure that the CPA implementers will be provided with the requisite knowledge that would enable them to discharge their responsibilities with regards generation , storage and transmission of documentation relevant to the project. The CME will provide the necessary guidance to the CPA Implementer in order to ensure sufficient capacity is developed to understand the the monitoring plan and attendant responsibilities in order to enable recording of all data needed, providing data for verification and generation of emission reductions.

*As per para 17 (c) of EB 65, Annex 3, Procedures for technical review of inclusion of CPA into PoA:*

The CME is responsible for the technical review of inclusion of CPAs and will follow the steps below:

- The CME will carry out a preliminary check of the compliance of the proposed CPA with the eligibility criteria established in the PoA-DD. A detailed technical review and additionality assessment of the proposed CPA to approve its eligibility for inclusion in the PoA. All necessary evidences to prove the eligibility of the CPA has to be provided by the Implementer. The CME will issue a written approval after reviewing to each CPA implementer. Without the CME written approval, the CPA cannot and will not be included in the PoA..

*As per para 17 (d) of EB 65, Annex 3, Procedure to avoid double Counting:*
At the time of implementer(s) empanelment, SSC-CPA implementer credentials are verified and SSC-CPA owner will undertake that this project activity is not included in any CDM project activity or any other programme of activities. The CME will also monitor available data bases (UNFCCC, and other

GHG ER standards) to check that the project activity is not generate offsets more than once simultaneously.

*As per para 17 (e) of EB 65, Annex 3,Records and documentation control process for each CPA under this PoA:*

A record keeping system for each CPA under this PoA, the monitoring plan for this project is closely derived from the methodology AMS III.AV.. A record base for the entire PoA will be maintained by the CME.
The CME has created a "records and documentation control process". This document contains the Record Management policy and documentation control procedures adopted by CME for storing and managing records of PoA.

Each PoA directory will comprise /consist of a number of sub-directories namely

1. Legal Documents
2. Host Government Approval Documents
3. Validation Documents
4. Verification Documents
5. Transaction Documents
6. CPAs
7. UNFCCC Communication
8. DDs

Each of the above sub-directories could be further divided for a clarity and ease of finding purposes.

**Record Types**
A typical POA directory will comprise of the following sub-directories:

**1 Legal Documents**
The directory will contain scanned copies of all agreements the GC (As the C/ME) and any other entity in the PoA process including project sponsors, CPAs, implementation partners, technology providers, validating agencies and so on.

**2 Host Government Approval (HGA)**
All documents which are submitted/ to be submitted to DNA(s) for obtaining HGA will be stored here.

**3 Validation**
All documents pertaining to validation of the project (barring the contract with validator) will be mentioned under this directory.

**4 Verification**
All documents pertaining to verification of the project (barring the contract which will be mentioned under Legal Documents) will be stored in this directory. The Monitoring reports submitted to verifier and the Verification Reports will be stored here. The DVRs will also be stored in this directory.

**5 Transaction**
All documents pertaining to transacting of the carbon credits (barring the contract with credit purchasing agency which will be stored under Legal Documents) will be mentioned under this directory. Documents with details of transaction proceeds received and distributed will also be stored here.

**6 CPAs**
A folder will be created for each CPA and information will be stored under this sub-directory. Each of the CPAs will have two sub-directories pertaining to implementation documents and emission reduction logs.

**7 UNFCCC**

This directory will include all important communications to UNFCCC including CDM prior intimation, other MOCs, clarifications sought, response received which concern a particular PoA.

**8 DDs**

This directory will contain all landmark versions of DDs, including Generic CPA- DD, Specific CPA-DD used for the PoA process.

*Document Control Process*:

All PoA records will be under the control of the Document Controller.

The document controller will be assisted by office administration personnel and the CME team discharging such responsibilities.

The Document Controller will report to the Chief Executive Officer (CEO).

The Document Controller will be the custodian of the PoA records in CME. All controlled versions of records will reside in the document management system as articulated below.

The Document Controller will authorize entry of records in the record management system, maintain record of all entries and exits from the record management system.

The Document Controller will be responsible for integrity, security and back up of the record management system.
The Document Controller will conduct audit of PoA records (from records management standpoint) in collaboration with the CME. The Document Controller will propose corrective actions and seek the authorization of CEO for implementation of the corrective actions.

**CME:** The CME will be responsible for identifying records of PoAs which will need to be maintained in the record management system. The CME will be responsible for ensuring that a complete set of records pertaining to the PoA are provided to the Document Controller for entry into the record management system. The CME will collaborate with the Document Controller during audits.

**Storage of Records**

**Location**: As the anticipated life of the PoA is 28 years, CME will record and maintain all the necessary documents till the life of the project. This will also be beneficial when project management staffs, co-ordinators cease to work for the company or if the CPA and PoA owners transfer their rights. The records of PoAs will be kept in CME's office..

**Primary Location:** The primary location has restricted access. It is only accessible to staff of CME whose involvement on the project is essential. For staff and visitors other than the project manager and record keeping in- charge/document controller, who would be interested in accessing records, will need to take prior permission by stating a reason.

The record keeping in-charge/document controller will maintain a log book with entries indicating record issue date, record return date, name of person to whom issued with signatures of respective people.
**Secondary Location:** Back up information that will be saved on computers, laptops, pen drives and other electronics will have anti-virus software installed and will have no access to internet. Back up documents will be transported physically to CME's registered office on a six monthly basis and a record of the same will be maintained at the respective office.

*As per para 17 (f) of EB 65, Annex 3, Measures for continuous improvement of PoA management system:*

The PoA management system is subject to continuous improvement in order to optimize the effectiveness and quality of the system and assure its continuous compliance with the relevant UNFCCC requirements.

The CME will accumulate its experience with regards to the adequacy of PoA management system which is in place and periodically update the system to remove any shortcomings.

The CME will keep track of the guidelines issued by EB from time to time with regards to PoA and undertake the necessary updations required in the PoA Management system

Any stakeholder involved in the PoA is encouraged to inform the CME on any weakness of the system or on any proposal for improvement. The CME will take into consideration each comment received, appraise it and, if applicable, deduce any improvement measure there out, organize its implementation and assure its adherence, however always assuring to be in line with the relevant UNFCCC requirements and other relevant regulations.

**SECTION D. Duration of PoA**
**D.1. Start date of PoA**
>>
13/06/2012
As per EB 55 Annex 38, the starting date of any CPA under the PoA cannot be prior to the commencement of validation, i.e. the date on which the PoA-DD is first published for global stakeholder consultation. The proposed PoA was uploaded on 13/06/2012 at UNFCCC website.

**D.2. Length of the PoA**
>>
28 years 00 months

**SECTION E. Environmental impacts**
**E.1. Level at which environmental analysis is undertaken**
>>
1. Environmental Analysis is not done at PoA level
2. Environmental Analysis is not done at CPA level

The project activity under this PoA does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India, 2006. Hence, it is not required either at PoA or CPA level by the host party.

**E.2. Analysis of the environmental impacts**
>>
The project activity under this PoA does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India, 2006[28]. Hence, Environmental Impact Analysis is not done.

**SECTION F. Local stakeholder comments**
**F.1. Solicitation of comments from local stakeholders**
>>
Local stakeholder consultation is done at PoA level √
Local stakeholder consultation is done at SSC-CPA level √

[28] http://www.envfor.nic.in/legis/eia/so1533.pdf

Since the local stakeholder concerns will vary for every CPA included in PoA and specific to the socio-economic and environmental conditions of the location, CME proposes to undertake local stakeholder consultation at CPA level. However, an initial national level stakeholder consultation is also conducted for the PoA. The stakeholders contacted at both PoA and CPA levels are likely to overlap. However, key institutional stakeholders viz. different technology providers, regulatory bodies and ministry representatives were contacted at PoA level while members of local village organizations, informal groups will be more specific to a region and will be consulted at individual CPA levels.

The stakeholder consultation for the PoA was undertaken by CME as the PoA co-ordinating/managing entity as follows:

The stakeholder consultation was conducted at national level to get the comments of various stakeholders about the project. This was conducted to acquire details, feedback, and create preparedness for possible hindrances likely to affect the project.
The PoA DD was made publicly available through GC's website on 25th January 2012. The stakeholders identified throughout the nation were invited to comment via mails, phone calls, personal invitation.

Wide ranges of stakeholders pan India were identified and their feedbacks were invited. They were grouped under the following broad categories:

a. Corporate and Multinational representatives and industry associations such as CII, FICCI,
b. Central and State Government Representatives
c. Forest Officials
d. Think tanks and academics affiliated to community development
e. Water purifiers Manufacturers and Suppliers
f. Investors/ Buyers of future credits
g. Non Government Organizations working in the fields of environment, rural and community development.

The identified categories of stake holders were all well represented and the feedback was received over the 30 days duration when the project details were carried on website. The design of the consultation ensured that participants were given maximum time for inputting into the design, airing their concerns and also highlighting what they felt was good about the overall project.

**F.2. Summary of comments received**

>>

Although Local Stakeholder consultation is conducted in SSC-CPA level, we have conducted the Stakeholder consultation at PoA level. The comments received are as follows

| Sr. No. | Name of Stakeholder | Comment |
|---|---|---|
| 1 | Mr. Chandrakant Kumbhani<br>Deputy General Manager-Community Development-Ambuja Cement Foundation | • The PoA is well designed and will bring out positive change in lives of project end beneficiaries.<br>• The economic, environmental and social benefits are well defined |
| 2 | J.P.Maithani<br>AAGAAS Federation<br>www.aagaas.org<br>Uttarakhand | • The provision of safe drinking water to all in rural and urban areas is a big challenge and as mentioned in the report and document provided in the PDF file reflects the knowledge and information.<br>• This will be great initiatives if we can provide low cost safe drinking water device to all in rural and urban areas of our |

| | | |
|---|---|---|
| | | country. Now days the good water filter is not available which can be of affordable price and can be run without power.<br>• We wish you all success, and will extend our support for all Himalayan states if you need any help. |
| 3 | J.Elamathi Raja<br>Assistant manager, Climate & Energy, General Carbon | • Considering the present quality of life lead by the people living in the chosen project area, this project has potential of contributing positive social, environmental and economical impact to the local population by means of improving water quality, decrease in illness falling rate and contribution to environmental friendly practise of water treatment in spite of sterilizing it by firing of fuels which leads to indoor air emission. |
| 4 | Manali Suresh Mane<br>Assistant manager, General Carbon | • This is a very good initiative by the project proponent. This will help the poor people to get the good water purifier in a low cost. One more thing i would like to suggest to the project proponent that they should have the strong monitoring plan so that they can do the monitoring of water purifier and they can identify the correct candidates which are really in need of this water purifier. |
| 5 | Kshitija s. Rangnekar<br>CDM Analyst, General Carbon | • This initiative is positive in a way that it helps enhancing the custodianship by safeguarding the environmental values. Moving to a cleaner technology has become the need of an hour. This also provides practical solutions that can help build awareness in the locals about the detrimental health effects. Some initiatives like these also foster environmental sustainability thereby enhancing the life of local community. |
| 6 | Alok Vijayvergiya<br>Carbon credits; Corporate Strategy & Development Team, JSW Steel Ltd. | • Safe & clean drinking water is right to every individual. This kind of project should be encouraged as it helps in upbringing the livelihood of rural India. Better technology & its efficient use will help to overcome various water borne diseases. Not limited to GHG emission reductions only, but definitely this PoA will help in sustainable development for all stakeholders. |
| 7 | Krishna Kuya<br>Assistant Manager, General Carbon | • The PDD mention that the boiling is the most prevalent method of water purification. But the purifier is intended for areas which have least awareness about water purification and health. What is the basis for assuming such baseline<br>• If biomass is used for boiling in baseline, which is most likely in villages, then there is no reduction in Emission due to project?<br>• How will the quality of water purifier be taken care of? Will it be equivalent to boiled water? |

**F.3. Report on consideration of comments received**

>>

The comments received from the various stakeholders through mail were listed out and GC responded t the queries of the stakeholder via mail. The comments and response are given below

| Stakeholder | Comments | Responses |
|---|---|---|
| Krishna Kuya,<br>Assistant Manager, General Carbon | The PDD mention that the boiling is the most prevalent method of water purification. But the purifier is intended for areas which have least awareness about water purification and health. What is the basis for assuming such baseline | Based on the survey conducted in the project region it was established that the people are currently boiling water by means of traditional stoves using non renewable biomass .The programme will be |

| | | |
|---|---|---|
| | | implemented in areas where there is no access to safe drinking water and the people purify water by boiling it. This would give the people access to new and improved technology which would improve their health creating awareness about the necessity of purification of water. |
| | If biomass is used for boiling in baseline, which is most likely in villages, then there is no reduction in Emission due to project? | In the baseline scenario, the people uses non renewable biomass in traditional inefficient stoves leading to incomplete combustion resulting in GHG emissions. The water purifier would reduce the usage of non renewable biomass for purification of water which ultimately leads to reduction in emission. |
| | How will the quality of water purifier be taken care of? Will it be equivalent to boiled water? | The water quality will adhere to the national standard IS 10500: 2012 (2nd revision) or any latest revision/standard/amendment. |

**SECTION G. Approval and authorization**

>>

The CME has received host country approval on 22nd November 2012.

## PART II. Generic component project activity (CPA)

**SECTION A. General description of a generic CPA**

**A.1. Purpose and general description of generic CPAs**

>>

The proposed CDM Programme Activity "CPA XXX – Water Purifiers Programme in India" involves the distribution of low green house gas emitting water purifiers to XX households in XX district of XXX. General Carbon Advisory Services Pvt Ltd is the coordinating/managing entity (CME) of the PoA. The water purifiers will be given either free or may charge partial or full cost and the installation of purifiers in the rural households will be financed from the CERs generated.

Prior to the implementation of project activity the baseline would be use of fossil fuel or non renewable biomass to boil water as means of purification.

**The CPA will follow the policy/measure or stated goal of the PoA**

The stated goal of the proposed SSC-PoA is to provide safe drinking water as per national standards through promotion and facilitate dissemination of low greenhouse gas emitting (low/zero electricity) water purification systems to rural households and/or communities in India which otherwise do not have access to a safe drinking water network.. The water purification system will reduce the carbon emission by allowing the families to purify the water reducing the usage of fossil fuels or non renewable biomass for boiling the water.

**Contribution to sustainable development**

Reduction in non renewable biomass or fossil fuel consumption for purification of water by deploying low greenhouse gas systems to rural households and/or community thereby reducing green house gas emissions and thus contributing to sustainable development.

The National CDM Authority(NCDMA), Ministry of Environment and Forests(MoEF), Govt. of India has stipulated the social, economic, environmental, and technological well being as the four indicators for sustainable development in the interim approval guidelines host country approval eligibility criteria for Clean Development Mechanism (CDM) projects[29].

**Social well being**

- Access to safe drinking water
- Improved health conditions and reduced number of water borne illnesses
- The proposed PoA will reduce the drudgery and fuel expense.
- Operation and maintenance of purification systems would result in employment of locals thus increasing household income.

**Economic well being**

- This programme will create/ increase business opportunities for water purification system suppliers etc.
- Reduced medical expenses for treatment of water-borne diseases results in money savings and hence can be used for their economic welfare.
- Attract Public/private investments into the programme.

**Environmental well being**

- The water purifier is low/zeros energy consuming.
- Avoids deforestation or reduces consumption of non- renewable biomass.
- Improves indoor air quality.

**Technological well being**

- The PoA will facilitate introduction of new energy efficient technologies compared to baseline leading to reduction of usage of non renewable biomass or fossil fuel.

**SECTION B. Application of a baseline and monitoring methodology**

**B.1. Reference of the approved baseline and monitoring methodology(ies) selected**

>>

AMS III.AV: Low Greenhouse Gas Emitting Water Purification Systems, version 02 EB 62

AMS I.E Switch from non renewable biomass for thermal applications by the user, version 05, EB 68
Tools:

Tool to calculate project or leakage CO2 emissions from fossil fuel combustion (version 02)
Tool to calculate baseline, project and/or leakage emissions from electricity consumption (version 01).

Guidelines for demonstrating additionality of microscale project activities, (version 04).

[29] http://envfor.nic.in/cdm/host_approval_criteria.htm

**B.2. Application of methodology(ies)**

>>

This project activity is applicable as per definition in the Annex B of simplified methodologies for small scale CDM project activity categories, AMS III.AV.: Low Greenhouse Gas Emitting Water Purification Systems, Version 02

As per para 81, project activity eligibility criteria for small scale project activities mentioned in Clean Development Mechanism Project Standard

The CPA under this PoA will have emission reduction not exceeding 60 $ktCO_2e$ per year in any year of the crediting period. The same will be demonstrated for each CPA under this PoA. Hence the proposed SSC-CPA under this PoA qualifies as Type III.

| S.No | Methodology | Justification |
|---|---|---|
| 1. | This methodology comprises of introduction of low greenhouse gas emitting water purification systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality. | In accordance with AMS III.AV ,version 02,the proposed PoA involves the installation of low/zero greenhouse gas emitting water purification system complying with the "protective" [30] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO 2011)[31]" or comparable national standard or guideline Accordingly the water quality will be achieved as described in IS 10500: 2012 (2nd revision) or latest revision/standard/amendment if any.<br><br>Thus, the applicability condition is met |
| 2. | Water purification technologies that involve point-of use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at a school or a community centre are included. The examples include, but are not limited to water filters (e.g. membrane, activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, pasteurization appliances, etc. | The proposed CPA will include a technology that involves point –of-use treatment systems for residential and/or institutional applications. Thus, the applicability condition is met |
| 3. | The methodology is applicable under the following conditions:<br>a. Prior to implementation of the project activity , a public distribution network of safe drinking water (SDW) if any is produced by the consumers by only using point –of-use or point of entry water purifiers. If during the crediting period SDW is made available in | a. The CPAs will be undertaken in such regions that are not covered by public distribution network of safe drinking water (SDW). To substantiate that there is no SDW network the CPA implementer/CME will carry out water quality test to check if the drinking water is safe in pre project (baseline) and testing will be done by National Accreditation Board for Testing and Calibration Laboratories (NABL) [32] approved laboratories in each CPA. This is |

[30] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

[31] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf

[32] http://www.nabl-india.org/

| | | |
|---|---|---|
| | (parts of) a project area through a public distribution network, this methodology cannot be applied anymore to this project area (or part of the project area) from that point in time and the emission reductions pertaining to this project area cannot be claimed from that point onwards. This condition should be checked annually during the crediting period.<br>b. It shall be demonstrated that the application of the project technology/equipment achieves compliance with .protective performance target as per .Evaluating household water treatment options: Health based targets and microbiological performance specifications. (WHO, 2011) or a comparable national standard or guideline.<br>c. In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there must be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality. | also included in the eligibility criteria for inclusion of CPA and annual monitoring for each CPA.<br>b. The proposed CPA will deploy only those technology (ies) which provides drinking water in accordance with the national standard i.e IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any. While choosing the water purification treatment technologies and units, their compliance with applicable standard will be certified by the manufacturer or NABL approved laboratory.<br>c. The CPA Implementer will maintain document which will contain measure that monitors replacement of part or whole purification systems of comparable quality where the life span of treatment technologies is shorter than the crediting period of the project activity. The technology being deployed by CPA is XXX.<br>Thus, the applicability condition is met. |
| 4. | Applicability of this methodology is foreseen in the following types of situations that shall be reassessed at the beginning of each crediting period:<br>(a) Case 1: Project activities implemented in rural or urban areas [33] of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % confirmed by one of the three options below:<br>(i) Proportion of populations using an improved drinking-water source for the | Based on WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (http://www.wssinfo.org/data estimates/table/>), the total proportion of improved water source in India is 92%[34] which is greater than 60 % and hence the CPA under this PoA falls under case 2. |

[33] As per the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.

[34] http://www.wssinfo.org/data-estimates/table/

| | | |
|---|---|---|
| | most recent year for which data is available from WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation shall be used (<http://www.wssinfo.org/data estimates/table/>) for this purpose. Definition of improved and unimproved drinking water source shall be as per the information provided by JMP;<br>(ii) Using official data such as publicly available statistical data from a government agency or an independently commissioned study by an international organization or an university;<br>(iii) Using survey methods (use 90/10 confidence/precision for sampling);<br>(b) Case 2: Project activities implemented in areas not included in Case 1. | The CPA will adopt case 2 as described above. |

As per para 29 the combination of methodologies/technologies mentioned in the PoA is in the accordance with the methodology AMS III.AV. The PoA and all CPAs joining this PoA will follow the applicability conditions as required by the methodology AMS III.AV. Each CPA under this PoA will deploy the combination of technologies as mentioned in section A.6 of PoA DD. The CPAs included in the PoA will satisfy the inclusion criteria as mentioned in section B.2 of PoA DD and implementation will be in accordance with the framework provided by PoA.

**Cross Effects**:

As per EB 65, annex 3, para 28 for the application of multiple small scale technologies "Combinations of technologies/measures and/or methodologies for a PoA are eligible where it is demonstrated that there are no cross effects between the technologies/measures applied. Where such cross effects do exist, the CME shall propose methods to account for such cross effects using the "Procedures for requests to the executive board for deviation from an approved methodology" so as to ensure that the calculation of emission reductions is accurate. The cross effects between technology/methodologies s will be checked at CPA level.

*General description of Sampling plan:*

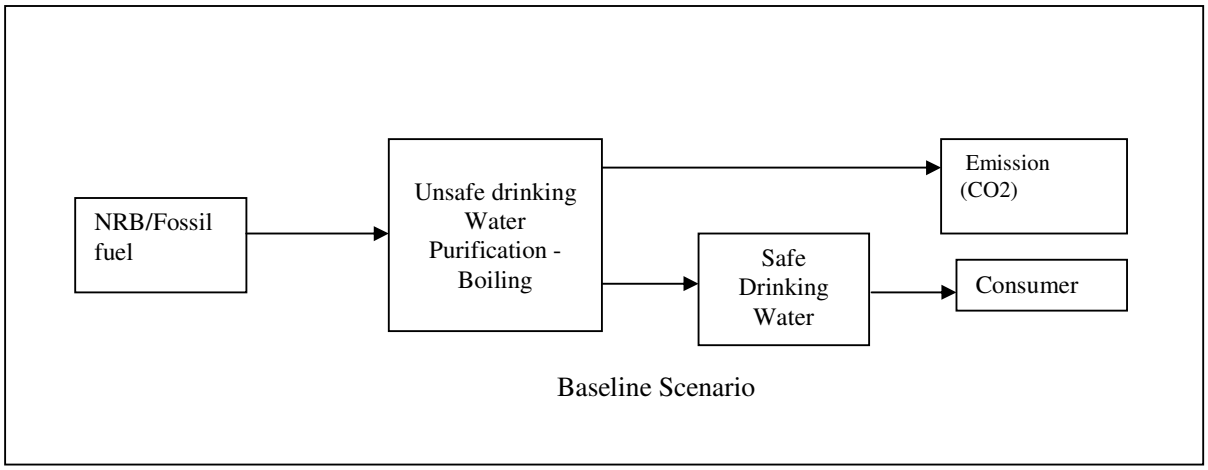
Sampling will be undertaken for baseline justification and monitoring parameters for each CPA as per the requirements of para 17 of AMS - I.E which states that as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities", Annex 4, EB 69 and "Guidelines for sampling and surveys for CDM project activities and programme of activities", Annex 5, EB 69 . When biennial inspection is chosen a 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision. The detail sampling plan is described in section B.7.2 of Part II of PoA DD.

**B.3. Sources and GHGs**

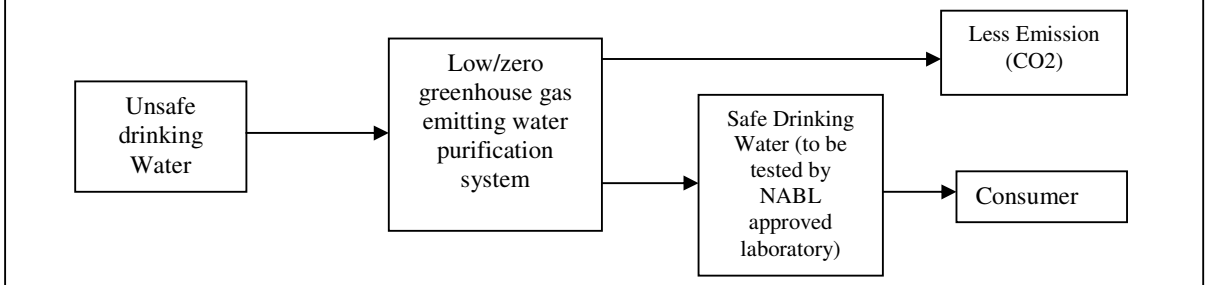
>>

| | Source | Gas | Included? | Justification/Explanation |
|---|---|---|---|---|
| **Baseline** | $CO_2$ emissions from fossil fuels/ Non Renewable biomass /electricity utilized for obtaining safe drinking water by boiling | $CO_2$ | **Yes** | Major source of emissions |
| | | $CH_4$ | **No** | Minor source of emissions and limited data available. Exclusion is conservative assumption. |
| | | $N_2O$ | **No** | Minor source of emissions and limited data available. Exclusion is conservative assumption. |
| **Project activity** | Low greenhouse gas emitting water purification system ensures safe drinking water supply. | $CO_2$ | **Yes** | Major source of emissions |
| | | $CH_4$ | **No** | Minor source of emissions and limited data available. Excluded for simplicity. |
| | | $N_2O$ | **No** | Minor source of emissions and limited data available. Excluded for simplicity. |

Flow diagram physically delineating the CPA




Baseline Scenario




Project Scenario

**B.4. Description of baseline scenario**

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In accordance with the methodology AMS III.A.V, Low greenhouse gas emitting water purification system, version 02. EB 62, for a simplified and standardized approach it is assumed that fossil fuel or non-renewable biomass (NRB) is used to boil water as means of water purification in the absence of the project activity.

For each CPA baseline survey will be conducted to determine

1. Total project population
2. Average number of person in households
3. Types of fuel used for boiling
4. Types of stoves in place
5. Method of purification of water practised
6. Access to safe drinking water
7. Average volume of drinking water per person per day

As per para 44 of EB 65, annex 5, the following national and/or sectoral policies or regulations are considered to establish the baseline scenario

The National Rural Drinking Water programme by Government of India aims at providing safe drinking water to the rural communities. The programme ensures permanent drinking water security in rural India through measures to improve /augment existing drinking water source and conjunctive use of ground water, surface water and rain water harvesting, solving the issue of potability[35].

However the baseline will be determined based on the survey conducted for each CPA.

As per para 4 of "*Guidelines on the consideration of suppressed demand in CDM methodologies"*,EB 68, Annex 2, the Host country i.e. India, where programme of activity would take place does not fall under "the least developed countries, small island developing States, African countries and countries underrepresented in the clean development mechanism. Hence the same is not considered for the baseline identification.

**B.5. Demonstration of eligibility for a generic CPA**

>>

| S.No | Eligibility Criteria | Justification |
|---|---|---|
| a. | Each CPA will be located within the geographical boundary of India. | The proposed CPA is located in XX district of XsXX state within political boundary of India. |
| b. | For each CPA ,CME will check for double counting by:<br>Identification of purification system will be done based on the unique identification code maintained in CME database containing:<br>a) Acronym of programme<br>b) Acronym of CME & CPA implementer<br>c) Location of CPA<br>d) Serial number of water purifiers/ water purification systems.<br>Monitoring the database (UNFCCC and other GHG ER standards) to check project activity does not generate offsets more than once simultaneously. | The purifier in the proposed CPA will be provided with unique identification number(Appliance ID) bearing<br>a) CPA XX<br>b) XX, XX<br>c) XX, XXX<br>d) Serial number will be given at time of implementation |
| c. | a. In accordance with AMS III.AV., version | a. In accordance with AMS III.AV., |

| | | |
|---|---|---|
| | 02 each CPA will deploy technology/measures mentioned in the PoA which complies with the "protective" [36] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO 2011)[37]" or comparable national standard or guideline.<br><br>Each technology will achieve water quality as described in IS 10500: 2012 (2nd revision) or latest revision/standard/amendment if any. | version 02.the technology/measure to be deployed will comply with the "protective" [38] performance target as per "Evaluating household water treatment options:Health based targets and microbiological performance specifications" (WHO 2011) [39] " or comparable national standard or guideline. Or<br>b. The technology deployed will achieve water quality as described in IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any. |
| d. | For each CPA<br><br>a. Start date is after the commencement of validation of PoA i.e starting date of the PoA.<br><br>b. The start date will be earliest of the date of<br><br>Purchase order for the purification systems/water purifiers | The documentary evidences for start date of the CPA will be submitted during the inclusion of CPA satisfying the following conditions<br>a. Start date is after the date of commencement of validation of PoA i.e. XX/XX/XXXX.<br>b. The start date will be<br>• Purchase order date for the Water purifiers is XX/XX/XXXX (expected) |
| e. | Each CPA will satisfy the following applicability criteria described in approved methodology AMS III.AV. *Low greenhouse gas emitting water purification system :*<br><br>a. This methodology comprises introduction of low greenhouse gas emitting water purification systems to achieve water quality defined in a relevant national standard or guideline for drinking water quality.[40]<br><br>b. Water purification system involves point-of-use (POU) or point-of-entry (POE) treatment systems for residential or institutional applications such as systems installed at school or community centre are included. The examples include, but are not limited to water filters (e.g. membrane, | a. The CPA will involve low greenhouse gas emitting water purification system which results in water quality as described in IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any.<br>b. The water purification system to be deployed in the CPA involves point-of-use (POU)/point-of-entry (POE) treatment systems.<br>c. i. For each CPA survey is conducted in the region to show the network of safe drinking water does not exist in the CPA.<br>ii. The technology to be applied in the CPA is in compliance with relevant WHO results in water quality as described in IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any. .<br>iii. The CPA Implementer will document measure that monitors replacement of part or |

[36] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

[37] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf

[38] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

[39] http://www.who.int/water_sanitation_health/publications/2011/evaluating_water_treatment.pdf

[40] In case a national standard/guideline for drinking water quality is not available, the most recent standards/guidelines by the World Health Organization (WHO) or United States Environmental Protection Agency (US-EPA) may be applied.

| | | |
|---|---|---|
| | activated carbon, ceramic filters), solar energy powered UV (ultraviolet) disinfection devices, photocatalytic disinfection equipment, pasteurization appliances, etc.<br>c. The methodology is applicable under the following conditions:<br><br>i. Prior to the implementation of the project activity, a public distribution network of safe drinking water does not exist within the total project area and safe drinking water (SDW) if any is produced by the consumers by only using point-of-use or point of entry water purifiers. If during the crediting period SDW is made available in (parts of) a project area through a public distribution network, this methodology cannot be applied anymore to this project area (or part of the project area) from that point in time and the emission reductions pertaining to this project area cannot be claimed from that point onwards. This condition should be checked annually during the crediting period;<br><br>ii. It shall be demonstrated that the application of the project technology/equipment achieves compliance with "protective" [41] performance target as per "Evaluating household water treatment options: Health based targets and microbiological performance specifications" (WHO, 2011) or a comparable national standard or guideline;<br><br>iii. In cases where the life span of the water treatment technologies is shorter than the crediting period of the project activity, there must be documented measures in place to ensure that end users have access to replacement purification systems of comparable quality.<br><br>d. Applicability of this methodology is foreseen in the following types of situations that shall be reassessed at the beginning of | whole purification systems of comparable quality where the life span of treatment technologies is shorter than the crediting period of the project activity. The technology being deployed by CPA is XXX.<br><br>4. Based on WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation (http://www.wssinfo.org/data estimates/table/>), the total proportion of improved water source in India is 92%[43] which is greater than 60 % and hence the CPA under this PoA falls under case 2. |

[41] Protective default performance target is defined by a 2 $\log_{10}$ reduction of bacteria, a 3 $\log_{10}$ reduction of viruses and a 2 $\log_{10}$ reduction of protozoa ("protective"). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

| | | |
|---|---|---|
| | each crediting period:<br><br>a. Case 1: Project activities implemented in rural or urban areas[42] of countries with proportion of rural or urban population using an improved drinking-water source equal to or less than 60 % confirmed by one of the three options below:<br><br>i. Proportion of populations using an improved drinking-water source for the most recent year for which data is available from WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation shall be used (<http://www.wssinfo.org/data-estimates/table/>) for this purpose. Definition of improved and unimproved drinking water source shall be as per the information provided by JMP;<br><br>ii. Using official data such as publicly available statistical data from a government agency or an independently commissioned study by an international organization or an university;<br><br>iii. Using survey methods (use 90/10 confidence/precision for sampling);<br>b. Case 2: Project activities implemented in areas not included in Case 1. | |
| f. | Each CPA will demonstrate the additionality as per the requirements of methodology AMS III.AV. in accordance with "Guidelines for demonstrating additionality of micro scale project activities", version 04, Annex 26, EB 68. The same guidelines will be applicable for all combination of technology/measure and methodology. | The XXX barrier is used to demonstrate the additionality in this CPA which is in line with "Guidelines for demonstrating additionality of micro scale project activities, Annex 26, EB 8". |
| g. | Each CPA will undertake local stakeholder consultations as follows :<br><br>a. Identification of local stakeholders (identified by CME and CPA implementer)<br>b. Invitation to local stakeholder consultation or meets | The local stakeholder consultation was conducted in XX district of XXX on XX, XX.<br>a. The stakeholders identified were not-for-profit bodies, forest officials, Gram panchayats, NGOs such as XX, XX, self-help groups, and technology providers/suppliers/operators. |

[43] http://www.wssinfo.org/data-estimates/table/

[42] As per the WHO/UNICEF Joint Monitoring Programme for water supply and sanitation.

| | | |
|---|---|---|
| | c. Description of the CPA project activity<br>d. Inviting comments from local stakeholders<br>e. Compilation of the comments and responding with corrective actions as required.<br>The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India, 2006[44]. Hence, it is not required to be conducted for this programme. | b. The identified stakeholders were invited through personal invitation, emails, and advertisement in local newspaper XX.<br>c. Description of project activity were conducted<br>d. The comments from stakeholders were invited during the consultation.<br>e. Compilation of comments were prepared and response were made..<br><br>The project activity does not fall under the purview of the Environmental Impact Assessment (EIA) notification of the Ministry of Environment and Forest, Government of India, 2006[45]. Hence, it is not required to be conducted for this project. |
| h. | Each CPA will demonstrate that no Official Development Assistance (ODA) is being used. This may be evidenced through any of the following:<br><br>a. Undertaking by CPA implementer to the CME<br>b. If applicable certificate by CPA implementer's Chartered Accountant provided after the procurement of equipment. | The proposed CPA does not use any Official Development Assistance (ODA) from other countries. The document submitted are<br>a. Undertaking from CPA Implementer to the coordinating/managing entity.<br>b. Certificate from Chartered Accountant of CPA implementer will be provided at the time of verification. |
| i. | The target group of each CPA will be rural households currently using fossil fuel or non renewable biomass in 3 stone fire system to boil water as means of water purification and don't have access to safe drinking water.<br><br>The households or individual households of the communities (cooperatives/society/association) would be identified by government identified list of families who are below poverty line (BPL) card holders and/or ration card and/or electoral card and/or any other government approved identification card. | The target group in this CPA will be rural households currently using fossil fuel or non renewable biomass in 3 stone fire system to boil water as means of water purification and don't have access to safe drinking water.<br><br>The identification of households or individual households of the communities (cooperatives/society/association) would be based on government identified list of families who are below poverty line (BPL) card holders and/or ration card and/or electoral card and/or any other government approved identification card. |
| j. | The technology to be implemented in the CPA will be done based on the interactions between target beneficiaries, technology suppliers and CPA Implementer (financier) of the project.<br>Each CPA will conduct sampling and surveys as appropriate or applicable based on monitoring requirements of :<br>a. Sampling & survey methods described in the approved methodology AMS III.AV. | Each CPA will follow<br><br>a) Sampling & survey methods described in the approved methodology AMS III.AV. *Low greenhouse gas emitting water purification systems* which refers to para 17 of AMS I.E.<br><br>b) Standard for sampling and surveys for |

[44] http://www.envfor.nic.in/legis/eia/so1533.pdf

[45] http://www.envfor.nic.in/legis/eia/so1533.pdf

| | | |
|---|---|---|
| | *Low greenhouse gas emitting water purification systems* which refers to para 17 of AMS I.E.<br>b. Standard for sampling and surveys for CDM project activities and programme of activities", version 03.0, EB 69, Annex 4, and Guidelines for sampling and surveys for CDM project activities and programme of activities, version 02, EB 69 , Annex 5.<br><br>The CPA implementer will conduct survey for baseline identification and monitoring. | CDM project activities and programme of activities", version 03.0, Annex 4, EB 69 and Guidelines for sampling and surveys for CDM project activities and programme of activities, version 02, Annex 5, EB 69 |
| k. | Each CPA will meet the following small-scale threshold criteria as per EB 61, Annex 21, "General Guidelines to SSC CDM methodologies", version 17<br><br>Each CPA will show that the emission reductions every year will not go beyond the limits of 60 $ktCO_2e/y$ and will remain within the limit over the entire crediting period. | The purifier to be deployed in the proposed CPA has the emission reductions below 60 ktCO2e/y. |
| l. | Each CPA will not undergo debundling check as per EB 47, Annex 32 and EB 54 ,Annex 13, "Guidelines on assessment of debundling for SSC project activities"<br><br>• If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.<br><br>Each independent subsystems/measures included in the CPA will have annual emission reduction not greater than 0.6ktCO2e (i.e. 1% of 60 ktCO2e). | The emission reduction of each system/measures included in the CPA is less than 1 % of small scale thresholds defined by the methodology. |

**B.6. Estimation of emission reductions of a generic CPA**

**B.6.1. Explanation of methodological choices**

>>

SECTORAL SCOPE – 3; Energy Demand

TYPE III – Other project activities

CATEGORY: III. AV – Low greenhouse gas emitting water purification system, version 02, EB 62

The CPAs under this PoA will apply the small scale methodology AMS-III.AV, version 02 Low greenhouse gas emitting water purification systems.

**Baseline Emissions:**

As per para 7, equation 1 of AMS III.AV, version 02, the baseline emissions shall be calculated as follows:

$$\mathrm{BE_y} = QPW_y * \mathrm{SEC} * f_{NRB,y} * EF_{projected_fossilfuel} * 10^{-9}$$

Where

| | |
|---|---|
| $\mathrm{BE_y}$ | Baseline emissions during the year *y* in ($tCO_2e$) |
| $QPW_y$ | Quantity of purified water in year *y* (litres)<br>For Case 1 the quantity of purified water is the total amount of water treated by the project activity as established per paragraph 6 in year *y*.<br>For Case 2 the quantity of purified water is monitored, and the total amount is subject to a cap derived from the number of total project population for which it can be demonstrated through documentation that the common practice of water purification is or would have been water boiling multiplied by the maximum volume of drinking water per person per day, set at 5.5 litres[46] per person per day |
| SEC | Specific energy consumption required to boil one litre of water (kJ/L) |
| $f_{NRB,y}$ | Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non renewable as per the relevant provisions of AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User".<br>If the displaced fuel is fossil fuel use a default value of 1.0 |
| $EF_{projected_fossilfuel}$ | Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted ($tCO_2/TJ$) |

As per para 8, equation 2 of AMS III.AV, version 02, specific energy consumption required to boil one litre of water is to be calculated as follows:

$$SEC = \left[ WH * (T_f - T_i) + 0.01 * WHE \right] / n_{wb}$$

| | |
|---|---|
| $WH$ | Specific heat of water (kJ/L $^{o}$C)<br>Use a default value of 4.186 kJ/L $^{0}$C |
| $T_f$ | Final temperature ($^{o}$C)<br>Use a default value of 100 °C[47] |

[46] Based on WHO recommendations (Domestic Water Quantity, Service Level and Health, Table 2: Volumes of water required for hydration, WHO 2003).

[47] Boiling point of water at standard conditions.

| | |
|---|---|
| $T_i$ | Initial temperature of water (°C)<br>Use annual Average ambient temperature;[48] or<br>Use a default value of 20 °C |
| $WHE$ | Latent heat of water evaporation (kJ/L)<br>Use a default value of 2260 kJ/LThe latent heat required to boil one litre of water for five minutes is assumed to be equivalent to latent heat for the evaporation of 1% of the water volume (WHO recommends a minimum duration of five minutes of water boiling)[49] |
| $\eta_{wb}$ | Efficiency of the water boiling systems being replaced<br>Use one of the options below:<br>(1) The efficiency of the water boiling system shall be established using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of systems are encountered;<br>(2) 0.10 default value may be optionally used if the replaced system or the system that would have been used is a three stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system i.e. without a grate as well as a chimney; for the rest of the systems using woody biomass 0.2 default value may be optionally used;<br>(3) 0.5 default value may be used if the replaced system or the system that would have been used is a fossil fuel combusting system |

**Project emissions**

As per para 9 of AMS III.AV, version 02, if the operation of the project water purification system involves consumption of fossil fuels and/or electricity, project emissions[50] include:

- $CO_2$ emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the tool "Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion";
- $CO_2$ emissions from electricity consumption by the project activity using the latest version of the tool "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

**Leakage emissions**

As per para 10 of AMS III.AV, version 02, where relevant leakage relating to the non-renewable woody biomass shall be assessed as per the relevant procedures of AMS-I.E which states that.

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[48] Ambient temperature data must be from globally accepted data sources, e.g. data published by the National Aeronautics and Space Administration (NASA) or the National Renewable Energy Laboratory (NREL). Data can be used only if they are for a location that can be demonstrated to be representative of the project location.

[49] WHO guidelines for Emergency Treatment of drinking water at point of the use <http://www.searo.who.int/LinkFiles/List_of_Guidelines_for_Health_Emergency_Emergency_treatment_of_drinking_water.pdf>.

[50] Calculations of the project emissions may also be limited to the quantity of purified water used for the baseline calculations as per paragraph 6.

Leakage related to the non-renewable woody biomass saved by the project activity shall be assessed based on *ex post* surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage shall be considered:

(a) The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources. If this leakage assessment quantifies an increase in the use of nonrenewable woody biomass used by the non-project households/users, that is attributable to the project activity, then $B_y$ is adjusted to account for the quantified leakage. Alternatively, $B_y$ is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.

The CPA implementer will multiply $B_y$ by net to gross adjustment factor of 0.95, in which case surveys are not required.

**B.6.2. Data and parameters that are to be reported ex-ante**

| **Data / Parameter** | **N** |
|---|---|
| **Unit** | Number |
| **Description** | Number of households |
| **Source of data** | The data maintained by the CPA Implementer |
| **Value(s) applied** | XX |
| **Choice of data or Measurement methods and procedures** | The data provided by CPA Implementer. |
| **Purpose of data** | The data is used to estimate the baseline emission. |
| **Additional comment** | -- |

The other parameter used for calculation of emission reduction such as WH, $T_f$, $T_i$, WHE, $EF_{projected_fossil\ fuel}$, $\eta_{wb}$ are given default in the methodology AMS III.AV and parameters QPWy, $f_{NRB,y}$ which are to be monitored for each CPA are not required to be mentioned here as per Guidelines for completing the programme design document form for small-scale CDM programme of activities, EB 67, annex 30.

**B.6.3. Ex-ante calculations of emission reductions**

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As per Project Completion guidelines ex ante calculation will involve calculation of project emissions, baseline emissions(or, where applicable, direct calculation of emission reductions) and leakage emissions expected during the crediting period, applying all relevant equations provided in the selected methodology. For data or parameters available before validation, use values contained in the table in section B.6.2 above. For data/parameters not available before validation and monitored during the crediting period, use estimates for parameters contained in the table in section B.7.1 below.

**Baseline Emissions, BEy:**

As per para 7 , equation 1 of AMS III.AV baseline emission is calculated as

$$BE_y = QPW_y * SEC * f_{NRB,y} * EF_{projected_fossilfuel} * 10^{-9} \quad \textbf{(1)}$$

Where:

| | |
|---|---|
| $BE_y$ | Baseline emissions during the year *y* in ($tCO_2e$) |
| $QPW_y$ | Quantity of purified water in year *y* (litres)<br>For Case 1 the quantity of purified water is the total amount of water treated by the project activity as established per paragraph 6 in year *y*.<br>For Case 2 the quantity of purified water is monitored, and the total amount is subject to a cap derived from the number of total project population for which it can be demonstrated through documentation that the common practice of water purification is or would have been water boiling multiplied by the maximum volume of drinking water per person per day, set at 5.5 litres[5] per person per day |
| SEC | Specific energy consumption required to boil one litre of water (kJ/L) |
| $f_{NRB,y}$ | Fraction of woody biomass used in the absence of the project activity in year *y* that can be established as non renewable as per the relevant provisions of AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User".<br>If the displaced fuel is fossil fuel use a default value of 1.0 |
| $EF_{projected_fossilfuel}$ | Emission factor as per AMS-I.E procedures when NRB is displaced or the emission factor of the fossil fuel substituted ($tCO_2/TJ$) |

The sample calculation is provided below:

BEy = 3650000* 3575* 0.89 * 81.6
= 947 tCO2/year

As per para 8, equation 2 of AMS III. AV, version 02, specific energy consumption required to boil one litre of water is to be calculated as follows:

$$SEC = \left[ WH * (T_f - T_i) + 0.01 * WHE \right] / n_{wb} \quad \textbf{(2)}$$

Where:

| | |
|---|---|
| $WH$ | Specific heat of water (kJ/L °C)<br>Use a default value of 4.186 kJ/L °C |
| $T_f$ | Final temperature (°C)<br>Use a default value of 100 °C[6] |

| | |
|---|---|
| $T_i$ | Initial temperature of water (°C)<br>Use annual Average ambient temperature;[7] or<br>Use a default value of 20 °C |
| $WHE$ | Latent heat of water evaporation (kJ/L)<br>Use a default value of 2260 kJ/L<br>The latent heat required to boil one litre of water for five minutes is assumed to be equivalent to latent heat for the evaporation of 1% of the water volume (WHO recommends a minimum duration of five minutes of water boiling)[8] |
| $\eta_{wb}$ | Efficiency of the water boiling systems being replaced<br>Use one of the options below:<br>1. The efficiency of the water boiling system shall be established using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of systems are encountered;<br>2. 0.10 default value may be optionally used if the replaced system or the system that would have been used is a three stone fire or a conventional system for woody biomass lacking improved combustion air supply mechanism and flue gas ventilation system i.e. without a grate as well as a chimney; for the rest of the systems using woody biomass 0.2 default value may be optionally used |

SEC = [4.186*(100-20) + (0.01*2260)]/0.1
= 3575 KJ/L

The fraction of woody biomass saved by the project activity in year y that can be established as non-renewable is:

$$f_{NRB,y} = \frac{NRB}{NRB + DRB}$$

fNRB - Fraction of woody biomass used in the absence of the project activity in year y that can be established as non renewable biomass using survey methods
NRB - Non- renewable woody biomass in tonnes
DRB - Demonstrably renewable woody biomass in tonnes
Where
NRB = By - DRB

**Procedure adopted by CPA Implementer for calculation of fNRB (as described in Annex 4 of PoA DD)**

The CPA will be conducted in a group of villages within a taluk. Forest Cover details and data may not available at taluk level. Hence, the district or the state in which the CPA project area is located will be the region for calculating the bio energy availability and demand.

**Bio-energy availability:**

Bio–energy availability = ∑ (Forest area type * Productivity of Forest type) * Energy Equivalent of Fuel wood

*Sources of Data:*

Forest Cover by Forest Type is available at Country/State/District level from Forest Survey of India and it is normally updated bi annually and the data delay is of two years. Hence most recent available data may be used. (However as per the methodology requirement, this is to be done annually, hence at the time verification latest available authentic data will be used.)

Alternatively, satellite imagery data, analysed by a third party shall be used.

**Bio-energy Demand:**

Bio-energy demand = Rural population * per capita fuel wood consumption * Energy equivalent of firewood

*Sources of Data:*

Rural population data from Census of India report published which provides the population at Country/state/district level. Latest available authentic census data will be used.

**Non-renewable woody biomass (*NRB*)**

Non-renewable woody biomass (*NRB*) is the quantity of woody biomass used in the absence of the project activity ($B_y$) minus the *DRB* component.

**NRB = Bio-energy demand – Bio-energy availability**

The ratio of non-renewable woody biomass (NRB) to demand (DRB+NRB) was computed for India, State and district.

The detail computation of $f_{NRB}$ is provided in Annex 5 of the CPA DD. The value of fNRB works out as follows:

For

India = 0.92
Maharashtra = 0.92
Thane = 0.89

Out of the three mentioned above, 0.89 is adopted which is most conservative.

**Project Emissions, PEy:**

If the operation of the project water purification system involves consumption of fossil fuels and/or electricity, project emissions[51] include:

- CO2 emissions from on-site consumption of fossil fuels due to the project activity shall be calculated using the latest version of the tool .Tool to calculate project or leakage CO2 emissions from fossil fuel combustion.;

[51] Calculations of the project emissions may also be limited to the quantity of purified water used for the baseline calculations as per paragraph 6.

- CO2 emissions from electricity consumption by the project activity using the latest version of the tool .Tool to calculate baseline, project and/or leakage emissions from electricity consumption.

**Leakage emissions, LEy:**

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

$LE_y = BE_y*(1- L_{adj})$

Where

$L_{adj}$ – Gross adjustment factor = 0.95

LEy = 947*(1-0.95)
= 47.33

Emission Reductions, ERy:

ERy = BEy-PEy-LEy
= 947-0-47.33
= 899 tCO2e/y

**B.7. Application of the monitoring methodology and description of the monitoring plan**
**B.7.1. Data and parameters to be monitored by each generic CPA**

*(Copy this table for each data and parameter)*

| **Data / Parameter** | **$N_{P,y}$** |
|---|---|
| **Unit** | Number |
| **Description** | Number of functional project appliances in year y |
| **Source of data** | Annual survey report |
| **Value(s) applied** | XX |
| **Measurement methods and procedures** | As per methodology AMS III.AV, the number of functional appliances will be determined based on representative sample at least once every two years. It will be checked that the appliances are still operating or replaced by an equivalent service appliance. The sampling will be conducted as per the requirements of "Standard for sampling and surveys for CDM project activities and programme of activities", version 02,Annex 4, EB 69 and Guidelines for sampling and surveys for CDM project activities and programme of activities", Annex 5, EB 69.<br><br>The CPA Implementer will assess the appliances which are in functional for each CPA. |
| **Monitoring frequency** | Monitoring of functional appliances will be done annually (90/10). |
| **QA/QC procedures** | If any of the project appliances is found to be non functional then the correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| **Purpose of data** | The data is used to estimate the project emission (quantity of purified water $QPW_y$) |
| **Additional comments** | -- |

| Data / Parameter | QPWy |
|---|---|
| Unit | Litre |
| Description | Quantity of purified water in year y |
| Source of data | Annual survey report |
| Value(s) applied | XX |
| Measurement methods and procedures | As per para 12 of AMS –III.AV The quantity of purified water in year *y* shall be monitored for each CPA as per the following options:<br><br>a) On a representative sample mentioned in section B.7.2 and<br>b) Derived from the capacity of the equipment established by manufacturers' specifications and the number of functional project appliances,<br>The measurement of the quantity of purified water in year y will be carried out by CPA Implementer. |
| Monitoring frequency | Monitoring on quantity of water purified will be done annually (90/10). |
| QA/QC procedures | If there is change in quantity of purified water then the correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| Purpose of data | The data is used to estimate the baseline emission. |
| Additional comments | -- |

| Data / Parameter | $P_y$ |
|---|---|
| Unit | Numbers |
| Description | Total persons supplied with purified water |
| Source of data | Annual survey report |
| Value(s) applied | XX |
| Measurement methods and procedures | Sampling will be conducted to determine the total population and quantity of water to be purified based on the "Standard for sampling and surveys for CDM project activities and programme of activities", version 02,Annex 4, EB 69 and Guidelines for sampling and surveys for CDM project activities and programme of activities", Annex 5, EB 69.<br><br>Based on the survey conducted, the CPA Implementer will determine the total number of persons supplied with purified water. |
| Monitoring frequency | Monitoring will done annually (90/10). |
| QA/QC procedures | If there is change in the total persons serviced by the project equipments then the correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| Purpose of data | The data is used to estimate the baseline emission |
| Additional comments | -- |

| Data / Parameter | $f_{NRB}$ |
|---|---|
| Unit | Fraction |
| Description | Fraction of woody biomass used in the absence of the project activity in year y |
| Source of data | surveys or government data |
| Value(s) applied | XX |
| Measurement methods and procedures | The fraction is calculated based on the DRB & NRB component by the following formula satisfying the conditions given in para 7 & 8 of AMS I.E version 05.<br><br>$f_{NRB,y} = \frac{NRB}{NRB + DRB}$<br><br>DRB – Demonstrably renewable biomass<br>NRB – Non renewable biomass<br><br>The fuel wood availability and fuel wood demand was calculated to estimate the fraction of NRB.<br>DRB value = Mkcal i.e. Fuel wood availability<br>NRB value $= B_y$ – DRB Mkcal<br>$= B_y$ – XX<br>NRB = XX Mkcal<br>$f_{NRB,y} = \frac{NRB}{NRB + DRB}$ |
| Monitoring frequency | The fraction of woody biomass used in absence of project activity is monitored annually. |
| QA/QC procedures | Data collected from survey or government data and hence no need for QA/QC |
| Purpose of data | The data is used to estimate the baseline emissions. |
| Additional comments | -- |

| Data / Parameter | Existence of public distribution network of safe drinking water |
|---|---|
| Unit | |
| Description | Existence of public distribution network of safe drinking water in year y |
| Source of data | official data such as publicly available statistical data from a government agency or an independently commissioned study by an international organization or an university; or Using survey methods (use 90/10 confidence/precision for sampling) |
| Value(s) applied | No |
| Measurement methods and procedures | Monitoring shall include annual check if a public distribution network is installed.<br>Based on the survey conducted, the CPA Implementer will determine the existence of public distribution network of safe drinking water. |
| Monitoring frequency | Monitoring of existence of public distribution network of safe drinking water will done on annual basis. |
| QA/QC procedures | If it is found that public distribution network existed/newly started then the correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| Purpose of data | The data is used to estimate the baseline emission |
| Additional comments | -- |

| Data / Parameter | $B_y$ |
|---|---|
| Unit | tonnes |
| Description | Quantity of woody biomass that is substituted or displaced in tonnes. |
| Source of data | Annual Survey report |
| Value(s) applied | XX |
| Measurement methods and procedures | Based on the survey conducted, the CPA Implementer will determine the total quantity of woody biomass that is substituted or displaced. |
| Monitoring frequency | Monitoring of quantity of woody biomass on annual basis |
| QA/QC procedures | If there is change in the total quantity of woody biomass substituted or displaced, correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| Purpose of data | The data is used to estimate the baseline emission |
| Additional comments | - |

| Data / Parameter | **Proportion of total population for which the common practice of water boiling is or would have been water boiling** |
|---|---|
| **Unit** | Percentage |
| **Description** | Total population for which the common practice is or would have been water boiling |
| **Source of data** | Annual survey report |
| **Value(s) applied** | XX |
| **Measurement methods and procedures** | Ex ante survey is conducted to determine the proportion of population for which the common practice of water boiling is or would have been water boiling |
| **Monitoring frequency** | The monitoring will be performed annually (90/10)..<br><br>The proportion of population practising boiling will be determined based on the survey conducted in each CPA by CPA Implementer. |
| **QA/QC procedures** | If there is change in the proportion of total population practising boiling then the correction factor will be applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| **Purpose of data** | The data is used to estimate the baseline emission |
| **Additional comments** | -- |

| Data / Parameter | **Average volume of drinking water per person per day** |
|---|---|
| **Unit** | Litres/person/day |
| **Description** | Average volume of drinking water per person per day |
| **Source of data** | Annual survey report |
| **Value(s) applied** | XX |
| **Measurement methods and procedures** | Survey conducted in the project region to determine the average consumption of drinking water. |
| **Monitoring frequency** | The monitoring will be performed annually (90/10).<br><br>The survey conducted in each CPA by CPA Implementer. |
| **QA/QC procedures** | If there is change in average volume of drinking water per person per day then the correction factor will applied for parameter in accordance with the sampling guidelines or sampling plan mentioned in section B.7.2 of Part II of revised PoA DD. |
| **Purpose of data** | The data is used to estimate the baseline emission. |
| **Additional comments** | -- |

| Data / Parameter | Water quality |
|---|---|
| Unit | |
| Description | Water quality |
| Source of data | Test report by NABL approved lab |
| Value(s) applied | As described in national standard for different parameters[52] |
| Measurement methods and procedures | Water quality is defined in IS 10500:2012 (2nd revision) or latest revision/standard/amendment if any.. |
| Monitoring frequency | Monitoring will be done annually (90/10).<br><br>The measurement of parameters for testing the water quality will be performed by trained staffs of NABL approved laboratory. |
| QA/QC procedures | |
| Purpose of data | The data is used to estimate the baseline emission |
| Additional comments | -- |

| Data / Parameter | Fossil fuel |
|---|---|
| Unit | Litres or kg |
| Description | Fossil fuel used during operation of project devices |
| Source of data | Records maintained by CPA Implementer. |
| Value(s) applied | XX |
| Measurement methods and procedures | The fossil fuel consumption in the project region will be determined based on the survey report. |
| Monitoring frequency | Monitoring will be done on annual basis (90/10) |
| QA/QC procedures | |
| Purpose of data | The data is used to estimate the project emission |
| Additional comments | -- |

| Data / Parameter | Electricity Consumption |
|---|---|
| Unit | kWh |
| Description | Electricity consumption during operation |
| Source of data | Electronic meter |
| Value(s) applied | XXX |
| Measurement methods and procedures | The electricity consumption data recorded by the meter installed. |
| Monitoring frequency | The monitoring of electricity consumption will be done annually. |
| QA/QC procedures | Calibration of metering device on annual basis to estimate the accurate consumption data. |
| Purpose of data | The data is used to estimate the project emission |
| Additional comments | |

[52] If parameter in national standard is revised, this will be checked in each CPA.

**B.7.2. Description of the monitoring plan for a generic CPA**

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Each CPA will implement the monitoring methodology AMS-III. AV Version 02 *Low greenhouse gas emitting water purification systems*.

The following parameters has to be monitored in each SSC CPA

- $QPW_y$ – Quantity of purified water in year y
- $N_{P,y}$ – Number of functional project appliances
- $B_y$ – Quantity of woody biomass that is substituted or displaced in tonnes
- $f_{NRB}$ – Fraction of woody biomass used in the absence of project activity
- Existence of public distribution network in the project region
- For case 2
    - Proportion of total population for which he common practice of water boiling is or would have been water boiling
    - $q_y$ - Average volume of drinking water per person per day
    - Number of person supplied with purified water from each of functional project appliances
- Water quality
- $F_y$ - Fossil fuel consumption in year y
- $E_y$- Electricity consumption in year y

The CME of the proposed PoA will oversee the implementation of the monitoring plan for each CPA under the PoA annually.

As per para 11 of AMS III.AV Monitoring shall consist of checking of all appliances or a representative sample thereof, atleast once every two years (biennial) to ensure that they are still operating ($N_{P,y}$) or are replaced by an equivalent in service appliance as per the relevant sampling requirements of AMS-I.E.

As per para 12 of AMS III.AV The quantity of purified water in year y $QPW_y$ shall be monitored as per the following options:

(a) On continuous basis or a representative sample thereof;

(b) Derived from the capacity of the equipment established by manufacturers' specifications and the number of functional project appliances.

As per para 13 of AMS III.AV Monitoring shall include annual check if a public distribution network is installed.

As per para 14 of AMS III.AV For Case 2 in paragraph 4 (b), as indicated in equation (1), an *ex ante* survey is required to establish:

(a) The proportion of total population for which the common practice of water boiling is or would have been water boiling;

(b) Average volume of drinking water per person per day($q_y$)based on baseline campaign (survey with 90/10 confidence/precision level) subject to a cap of 5.5 litres per person per day.

As per para 15 of AMS III.AV for case in paragraph 4 (b), survey is done at least once every two years (biennial) to check the number of persons supplied with purified water from each of the functional project appliances.

As per para 16 of AMS III.AV the water quality monitoring on sample basis as per paragraph 3 (b) which states that "It shall be demonstrated that the application of the project technology/equipment achieves compliance with "protective"[53] performance target as per .Evaluating household water treatment options:

[53] Protective default performance target is defined by a 2 log10 reduction of bacteria, a 3 log10 reduction of viruses and a 2 log10 reduction of protozoa (.protective.). The reference pathogens shall be C. Jejuni, Cryptosporidium, and rotavirus.

Health based targets and microbiological performance specifications. (WHO, 2011) or a comparable national standard or guideline".

As per para 17 of AMS III.AV The total fuel and electricity consumption in year *y* shall be monitored as per the relevant provisions of the tool .Tool to calculate project or leakage $CO_2$ emissions from fossil fuel combustion. and the tool .Tool to calculate baseline, project and/or leakage emissions from electricity consumption respectively.

The non-renewable biomass factor, $f_{NRB,y}$, will be assessed for each verification period as per the guidelines of paragraphs 7, 8 of AMS-I.E. Version 05.

**Sampling:**

As per paragraph 11 of AMS III.AV which refers to para 17 of AMS I.E. version 05, A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per the relevant requirements for sampling in the "Standard for sampling and surveys for CDM project activities and programme of activities". When biennial inspection is chosen a 95% confidence interval and a 10% margin of error requirement shall be achieved for the sampling parameter. On the other hand when the project proponent chooses to inspect annually, a 90% confidence interval and a 10% margin of error requirement shall be achieved for the sampled parameters. In cases where survey results indicate that 90/10 precision or 95/10 precision is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value may be chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision.

Parameters determined through a representative sample will perform sampling as specified by the *"Standard for sampling and surveys for CDM project activities and programme of activities",version 03.0, Annex 4EB 69 and "Guidelines for sampling & surveys for CDM project activities and programme of activities", version 02.0, Annex 5, EB 69.*

Objective

To determine the number of functional appliances, quantity of purified water, existence of public distribution network, proportion of total population practicing boiling, average volume of drinking water per person per day, number of persons supplied with purified water, water quality will be assessed using a 90/10 confidence/precision if assessed annually or 95/10 confidence/precision if assessed biennially basis during the verification.

**Field Measurement and Data to be collected:**

- Monitoring of appliances in operation ($N_{P,y}$) on a sample basis and visually assess if the appliance is presently operational and/or replaced (Monitoring will be done annually and paragraph 17 of AMS I.E will be followed for sampling).
- Quantity of purified water in year y ($QPW_y$) shall be monitored on continuous basis or representative sample (Monitoring will be done annually and paragraph 17 of AMS I.E will be followed for sampling).
- Monitoring will be done annually to determine the existence of public distribution network in the region.
- Monitoring the proportion of total population for which the common practice is or would have been water boiling.
- Average volume of drinking water per person per day ($q_y$) based on survey conducted with 90/10 confidence/precision level.
- Determination of water quality by testing the water samples in recognized laboratory

- Fossil fuel & electricity consumption by project activity

**Target Population:**

The target population is the complete list of households where the appliances are distributed and recorded during project construction. The sample of appliances checked will be randomly selected from the complete list of distributed appliances.

**Sample Method:**

The sample method will be a simple random sample since the population of water purifiers is homogenous.

**Sample Size:**

The type of parameter of interest is proportion value (para 11, annex 2, EB 65)

The determination of sample size will be done either manually or using appropriate statistical software as described in EB 69, Annex 4.

As per *"Guidelines for sampling & surveys for CDM project activities and programme of activities", version 02.0, annex 5, EB 69,* for sample size calculation for small scale projects 90% confidence and margin of error of 10% is required.

The illustration of sample size calculation using the formula given in above guidelines is shown below:

**Illustration for 90/10 level:**

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

Where:

| | |
|---|---|
| n | Sample size |
| N | Total number of households |
| p | Our expected proportion (0.50) |
| 1.645 | Represents the 90% confidence required |
| 0.1 | Represents the 10% relative precision (0.1x0.5 = 0.05 = 5% points either side of p) |

This gives sample size = 176 for 500 number of water purifiers with 90/10 confidence level. Assuming that 10% of the beneficiaries' does not respond. In that case approach of scale up will be used as follows:

No of samples after scale up = 176/0.9 = 195[54]

**Assessment of parameters:**

The parameter $N_{py}$ will be assessed through household visits of the randomly selected sample of household annually. The households selected will be visited by the CPA Implementer. During each visit, the existence and functionality of the appliance is confirmed through a visual assessment of the appliance with the unique ID clearly visible. During the household visit, a household representative is asked if

[54] Similar approach will be followed if more number of respondents do not turn up during sampling process for response

he/she is willing to participate in the sampling of additional parameters. Otherwise, a new household is randomly selected for sampling. Scale up can be used for sampling as explained above.

The parameter $QPW_y$ will be calculated as mentioned in para 7 of AMS III.AV which states that it is derived from number of total population practising boiling of water multiplied by maximum volume of drinking water per person per day set at 5.5 litres per person per day. The assessment of total population practising boiling of water and average volume of drinking water per person per day ($q_y$) can be done by conducting a sampling and survey in the project region annually.

$B_y$ will be determined based on the sampling method annually using 90/10 confidence/precision.

The existence of public distribution network in the region will be assessed based on sampling method annually using 90/10 confidence/precision.

The number of persons supplied with purified water from each of the functional appliances is assessed based on the survey conducted in the region.

The monitoring will be done to ensure that the cartridges are replaced after its lifetime and the ouput water quality will be tested in NABL accredited laboratory as per IS 10500:2012 or latest revision/standard/amendment.

The fossil fuel & electricity consumption is monitored by recording the meter readings installed in the project region. The energy meter is calibrated on periodical basis.

The parameter, the non-renewable biomass factor, $f_{NRB,y}$, will be assessed in each CPA for each verification period as per para 8 of AMS I.E.

$$f_{NRB,y} = \frac{NRB}{NRB + DRB}$$

which will satisfy the following conditions of para 7 of AMS I.E version 05

**Demonstrably Woody biomass (DRB):**

Calculation of DRB is done by option I of para 7 of AMS I.E

9. Woody[55] biomass is "renewable" if following conditions is satisfied:

    I. The woody biomass is originating from land areas that are forests[56] where:

(a) The land area remains a forest; and

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

(c) Any national or regional forestry and nature conservation regulations are complied with.

[55] In cases of charcoal produced from woody biomass, the demonstration of renewability shall be done for the areas where the woody biomass is sourced.

[56] The forest definitions as established by the country in accordance with the decisions 11/CP.7 and 19/CP.9 should apply.

This will be conservatively considered based on available national or regional data from survey results, national or local statistics, studies, maps and other source of information.

**Non-renewable biomass (NRB):**

NRB will be determined as per para 7 of AMS I.E Non-renewable woody biomass (*NRB*) is the quantity of woody biomass used in the absence of the project activity ($B_y$) minus the *DRB* component, as long as at least two of the following supporting indicators are shown to exist:

- A trend showing an increase in time spent or distance travelled for gathering fuelwood, 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;
- Survey results, national or local statistics, studies, maps or other sources of information, such as remote-sensing data, that show that carbon stocks are depleting in the project area;
- Increasing trends in fuel wood prices indicating a scarcity of fuel-wood;
- Trends in the types of cooking fuel collected by users that indicate a scarcity of woody biomass.

The determination of NRB will be done at CPA level showing that any two supporting indicators mentioned above exists.

**Data Archiving and Uncertainty:**

The data collected during the monitoring and baseline justification for all the parameters is archived for entire lifetime of PoA (28+2years) and the database is maintained by CME. This data will used to calculate the emission reduction of the project. The uncertainty in any data will be corrected by applying the alternate correction factor depending on the parameters.

**Implementation:**

Staff/third party agency appointed by the CPA Implementer conducts the sampling and determines the various monitoring parameters in individual CPAs.

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

| | |
|---|---|
| **Organization** | General Carbon Advisory Services Pvt. Ltd |
| **Street/P.O. Box** | 5th floor, Sir P.M Road |
| **Building** | Great Social Building |
| **City** | Mumbai |
| **State/Region** | Maharashtra |
| **Postcode** | 400 001 |
| **Country** | India |
| **Telephone** | 022-22663201 |
| **Fax** | -- |
| **E-mail** | -- |
| **Website** | www.general-carbon.com |
| **Contact person** | Betsy Vincent |
| **Title** | Vice President |
| **Salutation** | Ms. |
| **Last name** | Vincent |
| **Middle name** | -- |
| **First name** | Betsy |
| **Department** | -- |
| **Mobile** | +91-9619942202 |
| **Direct fax** | -- |
| **Direct tel.** | -- |
| **Personal e-mail** | betsy.vincent@general-carbon.com |

## Appendix 2: Affirmation regarding public funding

No public funding will be involved in the proposed PoA

## Appendix 3: Application of methodology(ies)

The applicability of methodology is described in section B.3 of Part I of this document.

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

**Determination of fraction of non renewable biomass $f_{NRB}$**

According to the methodology AMS I.E. ver. 05, *the share of renewable and non-renewable woody biomass (NRB) in By (the quantity of woody biomass used in the absence of the project activity) can be determined by using nationally approved methods (e.g. surveys or government data if available), this would lead to determining the* $f_{NRB,y}$. The following are the definitions as per the methodology:

Woody biomass is "renewable" if any one of the two conditions described in para 9 of the methodology is satisfied:

I. The woody biomass is originating from land areas that are forests where:

(a) The land area remains a forest; and

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

(c) Any national or regional forestry and nature conservation regulations are complied with.

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

(a) The land area remains as non-forest or is reverted to forest; and

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

(c) Any national or regional forestry, agriculture and nature conservation regulations are complied with.

**In the method that we deployed in this PoA, CME chooses Option I to arrive at the DRB component at each CPA level.**

**Non-renewable biomass:**

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

• Trend showing increase in time spent or distance travelled by users (or fuel-wood suppliers) for gathering fuel wood or alternatively trend showing increase in transportation distances for the fuel wood transported into the project area;

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

• Increasing trends in fuel wood price indicating scarcity;

• Trends in the type of cooking fuel collected by users, suggesting scarcity of woody biomass.

**In the method that we deployed in this PoA, the NRB component used in the absence of project activity at each CPA level will be quantity of woody biomass used in the absence of the project activity minus the DRB component after checking whether any two of the supporting indicators outlined above exist.**

**Fraction of non renewable biomass $f_{NRB}$:**

The fraction of woody biomass saved by the project activity in year y that can be established as non-renewable is

$$f_{NRB,y} = \frac{NRB}{NRB + DRB}$$

**In the method that we deployed in this PoA, for CPA we use the values of NRB and DRB as determined by using the above definitions and arrive at $f_{NRB}$.**

**Methodology:**

Further, In the method that we deployed in this PoA, for each CPA, we determine Bio Energy Availability and Demand as below:

The CPA will be conducted in a group of villages within a taluk. Forest Cover details and data may not available at taluk level. Hence, the district or the state in which the CPA project area is located will be the region for calculating the bio energy availability and demand.

**Bio-energy availability:**

Bio–energy availability = ∑ (Forest area type * Productivity of Forest type) * Energy Equivalent of Fuel wood

*Sources of Data:*

Forest Cover by Forest Type is available at Country/State/District level from Forest Survey of India and it is normally updated bi annually and the data delay is of two years. Hence most recent available data may be used.

Alternatively, satellite imagery data, analysed by a third and competent party shall be used.

**Bio-energy Demand:**

Bio-energy demand = Rural population * per capita fuel wood consumption * Energy equivalent of firewood

*Sources of Data:*

Rural population data from Census of India report published which provides the population at Country/state/district level. Latest available authentic census data will be used

**Non-renewable woody biomass (*NRB*)**

Non-renewable woody biomass (*NRB*) is the quantity of woody biomass used in the absence of the project activity ($B_{old}$) minus the *DRB* component.

**NRB = Bio-energy demand – Bio-energy availability**

The determination of $f_{NRB}$ will be done based on the availability of data at

a.) country or
b.) state or
c.) District or

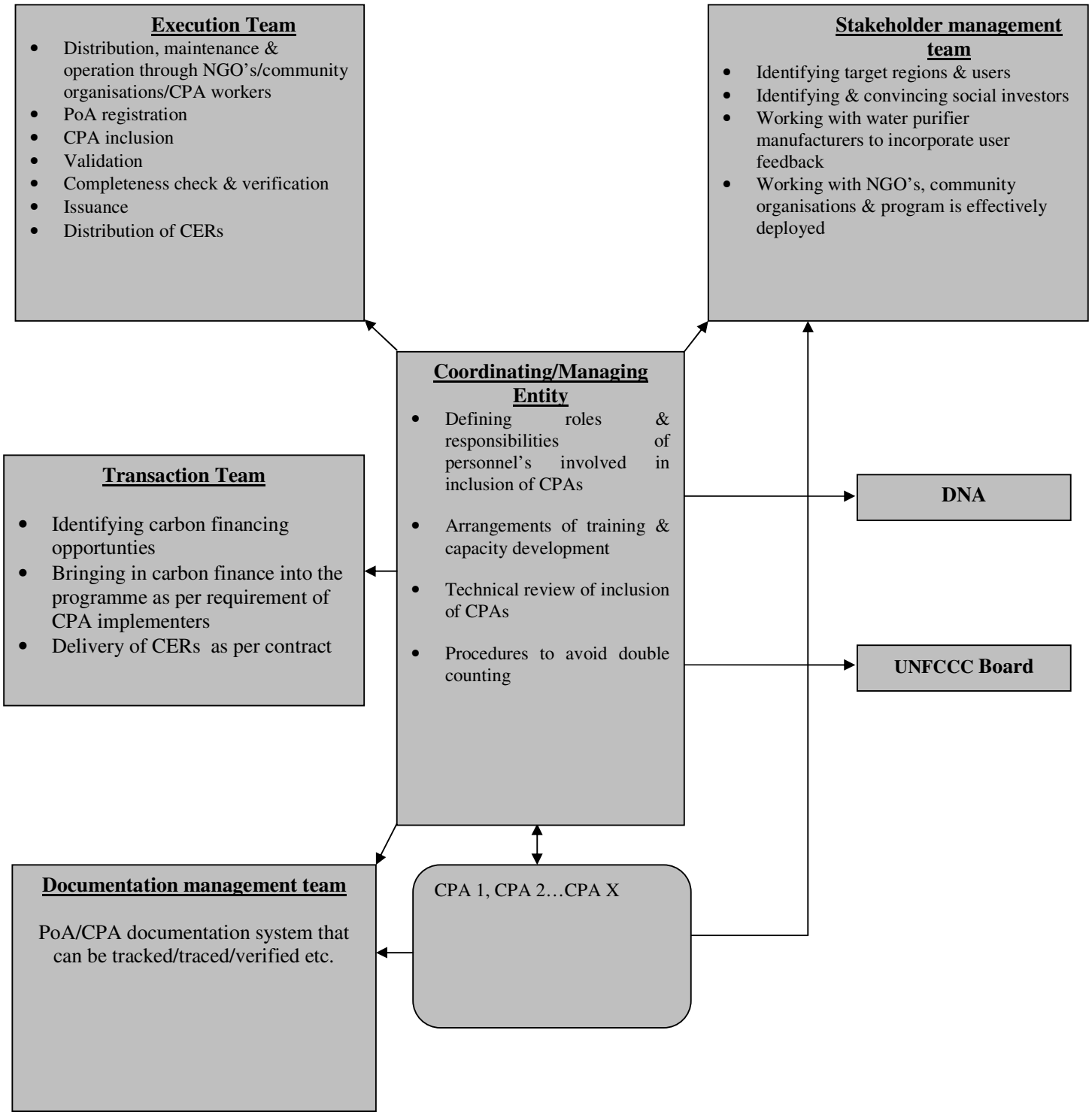
The most conservative value will be taken for the purpose of determination of emission reduction.

Further background information on the ex-ante calculation of emission reduction shall be provided on CPA level, for each individual CPA (where applicable).

**Appendix 5: Further background information on the monitoring plan**

Further background information on the monitoring plan shall be provided on CPA level, for each individual CPA (where applicable).

**Appendix 6: Management Plan**



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**History of the document**

| Version | Date | Nature of revision(s) |
|---|---|---|
| 02.0 | EB 66<br>13 March 2012 | Revision required to ensure consistency with the "Guidelines for completing the programme design document form for small-scale CDM programmes of activities" (EB 66, Annex 13). |
| 01 | EB33, Annex43<br>27 July 2007 | Initial adoption. |
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