JCM Proposed Methodology Form

Cover sheet of the Proposed Methodology Form

Form for submitting the proposed methodology

Host Country	The Kingdom of Cambodia
Name of the methodology proponents submitting this form	Tokyo Carbon Management Ltd (TCM)
Sectoral scope(s) to which the Proposed Methodology applies	3. Energy demand
Title of the proposed methodology, and version number	Energy Saving by Introduction of High Efficiency Firewood Cookstove to Replace Traditional Cookstove, version 01.0
List of documents to be attached to this form (please check):	☐The attached draft JCM-PDD: ☒Additional information:
Date of completion	31/12/2024

History of the proposed methodology

Version	Date	Contents revised
01.0	31/12/2024	First Edition

A. Title of the methodology

Energy Saving by Introduction of High Firewood Efficiency Cookstove to Replace Traditional Cookstove, version 01.0

B. Terms and definitions

Terms	Definitions
Traditional cookstove	The cookstove style in which three-stones are placed on the ground using firewood (not charcoal), or a cookstove with no improved combustion air supply or flue gas ventilation. Actually, efficiency of traditional cookstove is usually 10-15%.
Reference cookstove	A cookstove that uses woody fuel and is identified as an improved cookstove, which is the most realistic alternative to a traditional cookstove. These cookstoves are widely available in Cambodia and serve as an appropriate baseline for comparison.
Project cookstove (High Firewood Efficiency Cookstove)	Project cookstove is a cookstove that is more efficient than a reference cookstove. Project cookstove that reduces greenhouse gas (GHG) emissions from traditional baseline technologies through energy efficiency improvements and/or fuel switching to a less GHG-intensive fuel.

C. Summary of the methodology

Items	Summary
GHG emission reduction measures	The proposed project activity aims at reducing the use of and demand for non-renewable biomass that would have been used for cooking by distributing improved cookstove (ICS, project cookstove) to households and/or communities.
Calculation of reference emissions	Reference emissions are calculated by using the following parameters:

	• Quantity of fuel used per day for each project device of type *i* during the period *p* (tonnes or m^3/day) • Efficiency of project devices of type *i* in the period *p* (fraction) • Efficiency of reference devices that are replaced by project devices (fraction) • Net calorific value of project fuel used in project device type *i* (TJ/m^3) • Number of commissioned project devices of type *i* during the period *p* (number) • Proportion of commissioned project devices of type *i* during the period *p* (fraction) • Days of the monitoring period during the period *p* (number) • CO_2 emission factor for wood fuel use (tCO_2/TJ) • Non-CO_2 emission factor for wood fuel use (tCO_2/TJ) • Fraction of woody biomass that can be established as non-renewable biomass (fraction) • Discount factor to account for the potential source of emissions which may occur due to the use of biomass by non-project households/communities
Calculation of project emissions	Project emissions are calculated by using the following parameters: • Quantity of fuel used per day for each project device of type *i* during the period *p* (tonnes or m^3/day) • Net calorific value of project fuel used in project device type i (TJ/m^3) • Number of commissioned project devices of type *i* during the period *p* (number) • Proportion of commissioned project devices of type *i* during the period *p* (fraction) • Days of the monitoring period during the period *p* (number) • CO_2 emission factor for wood fuel use (tCO_2/TJ) • Non-CO_2 emission factor for wood fuel use (tCO_2/TJ) • Fraction of woody biomass that can be established as non-renewable biomass (fraction)

	• Discount factor to account for the potential source of emissions which may occur due to the use of biomass by non-project households/communities
Monitoring parameters	• Quantity of fuel used per day for each project device of type *i* during the period *p* (tonnes or m^3/day) • Number of commissioned project devices of type *i* during the period *p* (number) • Proportion of commissioned project devices of type *i* during the period *p* (fraction) • Days of the monitoring period during the period *p* (number) • Fraction of woody biomass that can be established as non-renewable biomass (fraction) • Efficiency of project devices of type i in the period *p* (fraction)

D. Eligibility criteria

This methodology is applicable to projects that satisfy all of the following criteria.

Criterion 1	The project distributes cookstoves to households or community (ies) where the baseline cookstove is three-stone fire.
Criterion 2	The project cookstoves exclusively use wood fuel.
Criterion 3	The methodology is applicable to the introduction of single pot or multi pot portable or in-situ cookstoves with rated efficiency of at least 26 per cent. The options for testing and certification of rated efficiency as well as supporting documentation (e.g. certificate issued by third party or test results) are available at the time of validation.
Criterion 4	Non-renewable biomass has been used in the project region since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.
Criterion 5	Each project cookstove is given an identifiable serial number to avoid double counting of emission reductions.
Criterion 6	The project has procedures to prevent double counting of emission reductions, for example to avoid that project stove manufacturers, wholesale providers or others claim credit for emission reductions from the project devices.

E. Emission Sources and GHG types

Reference emissions	
Emission sources	GHG types
Wood fuel consumption by reference cookstove	CO_2
	N_2O
	CH_4
Project emissions	
Emission sources	GHG types
Wood fuel consumption by project cookstove	CO_2
	N_2O
	CH_4

F. Establishment and calculation of reference emissions

F.1. Establishment of reference emissions

The reference emissions are calculated by multiplying quantity of fuel used by project device, the ratio of efficiency of project device and efficiency of reference device, net calorific value of project fuel, number of commissioned project devices, proportion of commissioned project devices, days of the monitoring period, CO_2 emission factor for wood fuel use, Non-CO_2 emission factor for wood fuel use, fraction of woody biomass that can be established as non-renewable biomass and discount factor to account for the potential source of emissions which may occur due to the use of biomass by non-project households/communities.

In order to ensure net emission reductions, conservative default value is established for efficiency of reference cookstove taking into account the highest efficiency of cookstove used in the rural of Cambodia.

F.2. Calculation of reference emissions

$$RE_p = \sum_i BC_{pro,i,p} \times \frac{\eta_{new,i,p}}{\eta_{ref}} \times NCV_{pro,i} \times N_{pro,i,p} \times \eta_{pro,i,p} \times Days_p \times (EF_{wf,CO2} + EF_{wf,nonCO2}) \times f_{NRB} \times 0.95$$

Where:

RE_p : Reference emissions during the period p (tCO_2/p)

$BC_{pro,i,p}$	: Quantity of fuel used per day for each project device of type *i* during the period *p* (tonnes or m^3/day)
$\eta_{new,i,p}$	: Efficiency of project devices of type *i* in the period *p* (fraction)
η_{ref}	: Efficiency of reference devices that are replaced by project devices (fraction)
$NCV_{pro,i}$	: Net calorific value of project fuel used in project device type *i* (TJ/m^3)
$N_{pro,i,p}$	: Number of commissioned project devices of type *i* during the period *p* (number)
$\eta_{pro,i,p}$	: Proportion of commissioned project devices of type *i* during the period *p* (fraction)
$Days_p$	: Days of the monitoring period during the period *p* (number)
$EF_{wf,CO2}$	: CO_2 emission factor for wood fuel use (tCO_2/TJ)
$EF_{wf,nonCO2}$	: Non-CO_2 emission factor for wood fuel use (tCO_2/TJ)
f_{NRB}	: Fraction of woody biomass that can be established as non-renewable biomass (fraction)
0.95	: Discount factor to account for the potential source of emissions which may occur due to the use of biomass by non-project households/communities
i	: Project device type

G. Calculation of project emissions

$$PE_p = \sum_i BC_{pro,i,p} \times NCV_{pro,i} \times N_{pro,i,p} \times \eta_{pro,i,p} \times Days_p \times (EF_{wf,CO2} + EF_{wf,nonCO2}) \times f_{NRB} \times 0.95$$

Where:

PE_p	: Project emissions during the period *p* (tCO_2/*p*)
$BC_{pro,i,p}$	: Quantity of fuel used per day for each project device of type *i* during the period *p* (tonnes or m^3/day)
$NCV_{pro,i}$	: Net calorific value of project fuel used in project device type i (TJ/m^3)
$N_{pro,i,p}$	: Number of commissioned project devices of type *i* during the period *p* (number)
$\eta_{pro,i,p}$	: Proportion of commissioned project devices of type *i* during the period *p* (fraction)
$Days_p$	: Days of the monitoring period during the period *p* (number)
$EF_{wf,CO2}$	: CO_2 emission factor for wood fuel use (tCO_2/TJ)

$EF_{wf,nonCO2}$	: Non-CO_2 emission factor for wood fuel use (tCO_2/TJ)
f_{NRB}	: Fraction of woody biomass that can be established as non-renewable biomass (fraction)
0.95	: Discount factor to account for the potential source of emissions which may occur due to the use of biomass by non-project households/communities
i	: Project device type

H. Calculation of emissions reductions

$$\boldsymbol{ER_p = RE_p - PE_p}$$

Where:

$\boldsymbol{ER_p}$	: Emission reductions during the period *p* (tCO_2/p)
$\boldsymbol{RE_p}$	: Reference emissions during the period *p* (tCO_2/p)
$\boldsymbol{PE_p}$	: Project emissions during the period *p* (tCO_2/p)

I. Data and parameters fixed *ex ante*

The source of each data and parameter fixed *ex ante* is listed as below.

Parameter	Description of data	Source
$EF_{wf,CO2}$	CO_2 emission factor for wood fuel use (tCO_2/TJ)	The following data sources may be used, listed in descending order of preference: • Option 1: Project-specific value • Option 2: Regional or national default values • Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
$EF_{wf,nonCO2}$	Non-CO_2 emission factor for wood fuel use (tCO_2/TJ)	The following data sources may be used, listed in descending order of preference: • Option 1: Project-specific value • Option 2: Regional or national default

		values • Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
$NCV_{pro,i}$	Net calorific value of project fuel used in project device type *i* (TJ/m^3)	The following data sources may be used, listed in descending order of preference: • Option 1: Project-specific values • Option 2: National default value • Option 3: Default value from the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories
η_{ref}	Weighted average efficiency of reference devices that are replaced by project devices (fraction) Default value: 0.26	Additional information
HHs	Average household size (person/household)	Baseline survey The campaign must achieve a confidence and precision of at least 90/10 for the target parameter of average household size