Verified Carbon Standard

VCS Methodology

VMR0006

ENERGY EFFICIENCY AND FUEL SWITCH MEASURES IN THERMAL APPLICATIONS

Version 1.2

6 July 2023

Sectoral Scope 3

The original CDM methodology *AMS-II.G. Energy Efficiency Measures in Thermal Applications of Non-Renewable Biomass v1.0* was adopted on 1 February 2008. It has been further revised over time. Version 13 was adopted on 8 September 2022. This methodology revision must be used with the latest version of AMS-II.G. available on the CDM website.

Version 1.0 of this methodology revision was developed by C-Quest Capital. It was approved on 8 September 2020.

Version 1.1 of this methodology revision was developed by C-Quest Capital. It was approved on 22 July 2021.

Version 1.2 of this methodology revision was developed by Verra. It was approved on 6 July 2023.

CONTENTS

1 SOURCES

This methodology revision applies to CDM small-scale methodology *AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass*. Project proponents must use this methodology revision in conjunction with the latest version of AMS-II.G.

This methodology uses the following sources:[1]

- The latest version of the CDM small-scale methodology *AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass*
- The latest version of the CDM *General guidelines for SSC CDM methodologies*
- The latest version of the CDM *Standard for sampling and surveys for CDM project activities and programme of activities*
- The latest version of the CDM *TOOL30 Calculation of the fraction of non-renewable biomass*
- The latest version of the CDM *TOOL33 Default values for common parameters*
- The latest version of the CDM *TOOL16 Project and leakage emissions from biomass*
- The latest version of the Clean Cooking Alliance protocol *The Water Boiling Test*

2 SUMMARY DESCRIPTION OF THE METHODOLOGY

Additionality and Crediting Method	
Additionality	Activity Method
Crediting Baseline	Project Method

The CDM methodology AMS-II.G. is applicable to project activities that introduce energy efficiency measures in thermal applications (including cookstoves, ovens, and dryers) to reduce the consumption of non-renewable biomass.

This methodology revision (VMR0006) expands the methodology's scope to include the switch from fossil fuel to renewable biomass in these thermal applications.

[1] Links to the latest reference documents have been provided in Section 10 "References".

VMR0006 must be used with the latest version of AMS-II.G. The procedures and requirements of AMS-II.G. must be applied unless VMR0006 indicates otherwise.

3 DEFINITIONS

The definitions in AMS-II.G. and the latest version of the *VCS Program Definitions* apply for this methodology, unless this methodology or the *VCS Program Definitions* indicate otherwise.

4 APPLICABILITY CONDITIONS

This methodology applies to project activities that introduce energy efficiency and fuel switch measures in thermal applications (including cookstoves, ovens, and dryers) that:

1) Increase thermal efficiency to reduce the consumption of non-renewable biomass; or

2) Switch from fossil fuel (coal or kerosene) to renewable biomass in new or existing improved thermal energy generation units.

This methodology is applicable to both 'Projects' and 'Large Projects' under the following conditions:

1) All applicability conditions of the latest version of AMS II.G. must be met.

2) The project activities must be implemented in households, community-based kitchens, institutions (e.g., schools), or small and medium-sized enterprises (SMEs).

For fuel switch activities, the following additional conditions must be met:

3) Projects must exclusively use renewable biomass[2], and meet the following additional conditions:

    (a) If biomass residues are used, they have been left for decay or burned without energy recovery before the implementation of the project activity.

    (b) If biomass residues from a production process are used, the implementation of the project does not result in an increase of the processing capacity of raw input or any other substantial changes (e.g., product change) in this process.

    (c) If biomass from dedicated plantations is used, the applicability conditions of TOOL16 "Project and leakage emissions from biomass" must be satisfied.

[2] Refer to EB 23 Annex 18 for definition of renewable biomass

4) The renewable biomass sources must be documented in the project description and monitoring periods, including origin, quantities, and pre-project conditions. If the biomass is sourced from a third-party, proof of purchase must be provided (e.g., contractual agreements or purchase receipts).

5) More than one type of biomass may be used (e.g., briquettes and wood chips).

VMR0006 must be used in conjunction with the latest version of AMS-II.G. All the procedures and requirements of AMS-II.G. must be applied unless VMR0006 indicates otherwise.

5 PROJECT BOUNDARY

The project boundary must be determined following the procedure provided in the latest version of AMS-II.G.

Fuel switch projects must include the processing of renewable biomass (e.g., shredding, briquetting), cultivation of biomass in dedicated plantations, and the transport of renewable biomass in the project boundary.

The greenhouse gases (GHGs) included in, or excluded from, the project boundary are shown in Table 1.

Table 1: GHG sources included in or excluded from the project boundary

Source		Gas	Included?	Justification/Explanation
Baseline	Use of non-renewable biomass/fossil fuel	CO_2	Yes	Major source
		CH_4	Yes	Major source
		N_2O	Yes	Major source
Project	Use of non-renewable biomass	CO_2	Yes	Major source
		CH_4	Yes	Major source
		N_2O	Yes	Major source
	Cultivation of renewable biomass in a dedicated plantation[3]	CO_2	Yes	Major source
		CH_4	No	Minor source
		N_2O	Yes	Major source
		CO_2	Yes	Major source

[3] Emissions result from soil management, energy consumption, clearance and burning of biomass, and transport of biomass. The procedures of the latest version of CDM TOOL16 must be followed.

	Thermal and/or mechanical processing of renewable biomass (e.g., shredding, briquetting)[4]	CH_4	No	Minor source
		N_2O	No	Minor source
	Transport of renewable biomass[4]	CO_2	Yes	Major source
		CH_4	No	Minor source
		N_2O	No	Minor source

6 BASELINE SCENARIO

The baseline scenario is the target population's continued use of non-renewable biomass (i.e., firewood or charcoal) or fossil fuel (i.e., coal or kerosene) to meet similar thermal energy needs, as provided by project devices.

7 ADDITIONALITY

This methodology uses an activity method and a project method for the demonstration of additionality.

Step 1: Regulatory Surplus

Project proponents must demonstrate regulatory surplus, following the rules and requirements regarding regulatory surplus set out in the latest version of the *VCS Standard,* and ensure that the project is not mandated by any law, statute or other regulatory framework, or for UNFCCC non-Annex I countries, any systematically enforced law, statute or other regulatory framework.

Step 2: Positive List

Projects are on the positive list if they meet all applicability conditions plus the following criteria:

1. The project activity installs or distributes the project devices at zero cost to the end-user and has no other source of revenue other than carbon credits.
2. The project activity is not implemented as part of a government scheme or supported by multilateral funds.

[4] Relevant for processing of biomass residues and biomass from a dedicated plantation.

The positive list was established using an activity method (Option C: Revenue Streams based on *Methodology Requirements v4.3*).

Step 3. Project Method

Project activities not on the positive list must apply the investment analysis as per the latest version of the *CDM Tool for the Demonstration and Assessment of Additionality.*

8 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

8.1 Baseline Emissions

This methodology does not determine baseline emissions. It directly quantifies emission reductions based on the reduced consumption of non-renewable biomass or fossil fuels. The approach is the same as under AMS-II.G.

8.2 Project Emissions

This methodology quantifies emission reductions based on the reduced consumption of non-renewable biomass or fossil fuels. The approach for non-renewable biomass is the same as under AMS-II.G.

Fuel switch projects using renewable biomass must follow the procedures of the latest version of CDM TOOL16 to determine the following project emissions:

- Projects using biomass from dedicated plantations must determine project emissions resulting from the cultivation of biomass in a dedicated plantation ($PE_{BC,y}$), including:
  - Project emissions resulting from soil management ($PE_{SM,y}$)
  - Project emissions resulting from energy consumption ($PE_{EC,y}$). This includes energy consumption from cultivation and thermal and/or mechanical processing;
  - Project emissions resulting from burning of biomass ($PE_{BB,y}$)
  - Project emissions resulting from transport of biomass ($PE_{TR,y}$)

- Projects using biomass residues must determine project emissions from utilization of biomass residues ($PE_{BR,y}$), including:[5]
  - Project emissions resulting from energy consumption ($PE_{EC,y}$). This includes energy consumption from thermal and/or mechanical processing.
  - Project emissions from transport of renewable biomass ($PE_{TR,y}$)

The resulting project emissions must be applied for Equation (1).

8.3 Leakage

Projects must apply an adjustment factor to account for leakage related to the non-renewable woody biomass saved by the project activity (Adj_{LE}). The procedures from the latest version of AMS-II.G. must be applied. Adj_{LE} is fixed at validation.

Charcoal projects must apply the procedures included in the latest version of AMS-II.G. to determine leakage.

Fuel switch projects using biomass from a dedicated plantation must apply the procedures of the latest version of the CDM TOOL16 to determine leakage due to the shift of pre-project activities from biomass cultivation ($LE_{BC,y}$).

Fuel switch projects using biomass residues must apply the procedures of the latest version of the CDM TOOL16 to determine leakage due to the diversion of biomass residues from other applications ($LE_{BR,y}$).

8.4 Net GHG Emission Reductions

Project activities that are replacing baseline devices using non-renewable biomass must apply the equations of AMS-II.G. (except Equations 1, 2 and 3) to determine net GHG emission reductions.

The following equation replaces Equations 1 and 2 of AMS-II.G.:

$$ER_y = \sum_i \sum_j B_{y,savings,i,j} \times N_{0,i,j} \times n_{y,i,j} \times \mu_y \times f_{NRB,y} \times NCV_{biomass} \times \left(EF_{wf,CO2} + EF_{wf,non\ CO2}\right) \times Adj_{LE} \times (1 - u_d) \quad (1)$$

[5] Version 3.0 of the CDM TOOL16 uses the same parameter ($PE_{BC,y}$) for project emissions from cultivation and biomass residues. However, $PE_{BR,y}$ must be used for project emissions from the use of biomass residues when applying this methodology, to distinguish the different emission sources.

Where:

ER_y	=	Emission reductions in year y (tCO_2e)
$B_{y,savings,i,j}$	=	Quantity of woody biomass that is saved per project device i and batch j in year y (tonnes)
$N_{0,i,j}$	=	Number of project devices of type i and batch j commissioned (number)[6]
$n_{y,i,j}$	=	Proportion of commissioned project devices of type i and batch j ($N_{0,i,j}$) that remain operating in year y (fraction)
μ_y	=	Adjustment to account for any continued use of pre-project devices during the year y
$f_{NRB,y}$	=	Fraction of woody biomass that can be established as non-renewable biomass (%)
$NCV_{biomass}$	=	Net calorific value of the non-renewable woody biomass that is substituted or reduced (TJ/tonne)[7]
$EF_{wf,CO2}$	=	CO_2 emission factor for non-renewable woody biomass (tCO_2/TJ)
$EF_{wf,non\ CO2}$	=	Non-CO_2 emission factor for non-renewable woody biomass (tCO_2e/TJ)
Adj_{LE}	=	Adjustment factor to account for leakage related to the non-renewable woody biomass saved by the project activity (fraction)
u_d	=	Uncertainty deduction for fnrb (%)

$B_{y,savings,i,j}$ must be determined by applying the procedures and requirements of AMS-II.G.

Project activities that are switching from fossil fuel to renewable biomass must use the following equations to determine the net GHG emission reductions:

$$ER_y = \sum_i \sum_j \left(Q_{RB,i,y} \times N_{0,i,j} \times n_{y,i,j} \times \mu_y \times \eta_{PJ/BL} \times NCV_{biomass} \times EF_{ff}\right) \quad (2)$$
$$-PE_{BC,y} - PE_{BR,y} - LE_{BC,y} - LE_{BR,y}$$

Where:

$Q_{RB,i,y}$	=	The quantity of renewable biomass consumed by project device i in year y (t)
$\eta_{PJ/BL}$	=	Efficiency ratio of project and baseline devices (fraction)
$NCV_{biomass}$	=	Net calorific value of renewable biomass (TJ/tonne)
EF_{ff}	=	GHG emission factor for fossil fuel j (tCO_2e/TJ)

[6] Project devices may be commissioned in batches. See latest version of AMS-II.G.

[7] The value from the latest version of AMS-II.G must be used.

$PE_{BC,y}$ = Project emissions resulting from cultivation of biomass in a dedicated plantation in year y (tCO_2)

$PE_{BR,y}$ = Project emissions from utilization of biomass residues year y (tCO_2)

$LE_{BC,y}$ = Leakage due to shift of pre-project activities from biomass cultivation in year y (tCO_2)

$LE_{BR,y}$ = Leakage due to diversion of biomass residues from other applications y (tCO_2)

$$EF_{ff} = EF_{ff\_CO2} + EF_{ff\_CH4} \times GWP_{CH4} + EF_{ff\_N2O} \times GWP_{N2O} \quad (3)$$

Where:

EF_{ff_CO2} = CO_2 emission factor for fossil fuel as per Table 2 (tCO_2/TJ)

EF_{ff_CH4} = CH_4 emission factor for fossil fuel j as per Table 2 (tCH_4/TJ)

EF_{ff_N2O} = N_2O emission factor for fossil fuel j as per Table 2 (tN_2O/TJ)

GWP_{CH4} = Global warming potential of CH_4 (number)

GWP_{N2O} = Global warming potential of N_2O (number)

Table 2: Default values for GHG emissions factors of fossil fuels

Emission factor	Kerosene	Coal
CO_2 emission factor (tCO_2/TJ)	71.9	94.6
CH_4 emission factor (tCH_4/TJ)	0.01	0.3
N_2O emission factor (tN_2O/TJ)	0.0006	0.0015

9 MONITORING

Project proponents must follow the monitoring procedures of the latest version of AMS-II.G. and apply the changes indicated in this section.

9.1 Data and Parameters Available at Validation

The following changes must be applied to the data and parameters of the latest version of AMS-II.G.

Projects and grouped projects that use historical data or a sample survey to determine $B_{old,p}$ and $B_{old,HH}$ must apply the following steps, in addition to the requirements in the latest version of AMS-II.G.:

1. If the project devices are distributed in regions with heterogenous conditions (e.g., regional variations of temperature or cooking practices), the project devices must be divided into groups with homogeneous conditions.

2. The project proponent must use appropriate historical data or sample surveys for each group of project devices. Sample surveys must be conducted for each group, and the sampling must achieve a confidence/precision level of 90/10 for each separate group.

The following monitoring parameters are included in VMR0006 in addition to the monitoring parameters in AMS-II.G.

Data / Parameter	$EF_{wf,CO2}$
Data unit	tCO_2/TJ
Description	CO_2 emission factor for non-renewable woody biomass
Equations	(1)
Source of data	The average value from the latest IPCC guidelines must be applied
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	Default value from IPCC
Purpose of data	Calculation of emission reductions
Comments	The value of the 2006 IPCC guidelines is 112 tCO_2/TJ. The value of the most recent IPCC guidelines must be applied at validation.

Data / Parameter	$EF_{wf,non-CO2}$
Data unit	tCO_2e/TJ
Description	Non-CO_2 emission factor for non-renewable woody biomass
Equations	(1)
Source of data	The lower bound for CH_4 and N_2O from the latest IPCC guidelines must be applied. The global warming potential (GWP) of the most recent

	version of the *VCS Standard* must be used to convert to tCO_2e/TJ and combine in a single non-CO_2 emission factor.
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	Default value from IPCC
Purpose of data	Calculation of emission reductions
Comments	The value of the 2006 IPCC guidelines is 9.46 tCO_2/TJ. The value of the most recent IPCC guidelines must be applied at validation.

Data / Parameter	Adj_{LE}
Data unit	fraction
Description	Adjustment factor to account for leakage related to the non-renewable woody biomass saved by the project activity
Equations	(1)
Source of data	The procedures from the latest version of AMS-II.G. must be applied.
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	Procedure of underlying methodology AMS-II.G.
Purpose of data	Calculation of emission reductions
Comments	Adj_{LE} is fixed at validation.

Data / Parameter	u_d
Data unit	%
Description	Uncertainty deduction for fnrb
Equations	(1)
Source of data	Estimated based on uncertainty requirements

Value applied	The following uncertainty deduction must be applied, depending on the procedure for frnb used from AMS-II.G.: 1) If the default value for fnrb from TOOL33 is applied: $u_d = 0$ 2) If fnrb is calculated as per TOOL30: $u_d = 26\%$ 3) If fnrb from an approved standardized baseline is applied: $u_d = 26\%$
Justification of choice of data or description of measurement methods and procedures applied	Conservative discount factor based on uncertainty for fnrb
Purpose of data	Calculation of emission reductions
Comments	-

Data / Parameter	GWP_{CH4}
Data unit	Number
Description	Global warming potential of CH4
Equations	(3)
Source of data	The value of the latest version of the *VCS Standard* must be applied
Value applied	-
Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of data	Calculation of emission reductions
Comments	-

Data / Parameter	GWP_{N2O}
Data unit	Number
Description	Global warming potential of N_2O
Equations	(3)
Source of data	The value of the latest version of the *VCS Standard* must be applied
Value applied	-

Justification of choice of data or description of measurement methods and procedures applied	-
Purpose of data	Calculation of emission reductions
Comments	-

9.2 Data and Parameters Monitored

If projects and grouped projects include new project devices during the crediting period, and use historical data or a sample survey for $B_{old,p}$ and $B_{old,HH}$, the project proponent must re-assess the appropriateness of the historical data or sample surveys for the project devices. The re-assessment must be conducted based on steps 1 and 2 in Section 9.1. Including new project devices may require additional historical data or sample surveys to comply with the requirements.

Further, the following monitoring parameters are included in VMR0006 in addition to the monitoring parameters in AMS-II.G.

Data / Parameter	$Q_{RB,i,y}$
Data unit	tonnes
Description	The quantity of renewable biomass consumed by project device i in year y
Equations	(2)
Source of data	Survey
Description of measurement methods and procedures to be applied	Minimum sample size of each type i and batch j must be in line with the latest version of the "Standard for sampling and surveys for project activities and programme of activities". The quantity of renewable biomass must be determined through measurement campaigns at representative households and/or sample surveys. Sample surveys based on questionnaires may be conducted if the following conditions are satisfied: (i) Renewable biomass is only used for project devices in the households; and (ii) Baseline devices have been completely decommissioned.
Frequency of monitoring/recording	Annual

QA/QC procedures to be applied	
Purpose of data	Calculation of emission reductions
Calculation method	
Comments	The questionnaires must be stored together with other project documentation.

Data / Parameter	$\eta_{PJ,BL}$
Data unit	Fraction
Description	Efficiency ratio of project and baseline devices
Equations	(2)
Source of data	Measured
Description of measurement methods and procedures to be applied	The efficiencies of the project devices (PJ) and baseline devices (BL) must be measured prior to validation. The project must use one of the following options: (a) Test results from accredited laboratories following national or international standards; or (b) Water Boiling Test (WBT): a minimum of three project devices with three tests per device must be conducted by a third-party (manufacturer or accredited laboratory). The same testing procedure must be applied for both PJ and BL.
Frequency of monitoring/recording	Once prior to validation
QA/QC procedures to be applied	
Purpose of data	Calculation of emission reduction
Calculation method	
Comments	

Data / Parameter	$NCV_{biomass}$
Data unit	TJ/tonne
Description	Net calorific value of renewable biomass
Equations	(1), (2)
Source of data	Default or measured

Description of measurement methods and procedures to be applied	1) For non-renewable biomass, the procedures from AMS-II.G. must be applied. 2) For fuel switch projects using renewable biomass (e.g., briquettes), the NCV must be determined for dry biomass by an independent laboratory following relevant national/international standards. Alternatively, data or test reports from the supplier may be used.
Frequency of monitoring/recording	Annual
QA/QC procedures to be applied	For fuel switch projects using renewable biomass, the values must be cross-checked against previous measurements, relevant data sources (e.g., values in the literature, values used in the national GHG inventory), and default values by the IPCC. If there is significant difference (higher than +/- 5%), a justification must be provided and assessed by the validation/verification body (VVB). Alternatively, additional testing must be done, or the previous measurements may be used (if conservative).
Purpose of data	Calculation of emission reduction
Calculation method	
Comments	

9.3 Description of the Monitoring Plan

All monitoring requirements of AMS-II.G. must be followed, unless otherwise indicated in VMR0006.

Project proponents should use the non-binding best practice examples for monitoring and non-binding survey questionnaire of the latest version of AMS-II.G.

For fuel switch activities, the following additional monitoring requirements apply:

1) The source of renewable biomass must be documented in the monitoring reports, including origin, quantities, and pre-project conditions.

2) The project proponent must demonstrate that all renewable biomass complies with the applicability conditions of this methodology. If new renewable biomass sources are included in the project activity during the crediting period, the project proponent must demonstrate they also comply with the applicability conditions of this methodology.

3) If the biomass is sourced from a third-party, proof of purchase must be provided (e.g., contractual agreements or purchase receipts).

10 REFERENCES

The following list provides the weblinks to the referenced documents (available at the time of publication of this methodology). The most recent versions must be used when applying this methodology.

CDM methodology *AMS-II.G. Energy efficiency measures in thermal applications of non-renewable biomass*
https://cdm.unfccc.int/methodologies/DB/GNFWB3Y6GM4WPXFRR2SXKS9XR908IO

CDM *General guidelines for SSC CDM methodologies*
https://cdm.unfccc.int/Reference/Guidclarif/index.html

CDM *Standard for sampling and surveys for CDM project activities and programme of activities*
https://cdm.unfccc.int/Reference/Standards/index.html

CDM *TOOL30 Calculation of the fraction of non-renewable biomass*
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v1.pdf/history_view

CDM *TOOL33 Default values for common parameters*
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-33-v1.pdf/history_view

CDM *TOOL16 Project and leakage emissions from biomass*
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v2.pdf/history_view

The Water Boiling Test (Clean Cooking Alliance)
https://cleancooking.org/research-evidence-learning/standards-testing/protocols/#:~:text=The%20Water%20Boiling%20Test%20(WBT,of%20emissions%20produced%20while%20cooking

APPENDIX 1: ACTIVITY METHOD

Over the years, studies have established that exposure to indoor air pollution (IAP) from the inefficient combustion of solid fuels in low-quality stoves is a significant public health hazard (Smith and others 2009; Venkataraman and others 2010). There is still much to be done in order to tackle this global scourge that shortens and diminishes the quality of life for women, and in many cases children. Despite the recognized benefits of clean cookstoves for health, the local environment, and climate change, their large-scale adoption and sustained use are not yet occurring.

Among the reasons are, affordability, ease of use, poor access to technology in rural and peri-urban areas, and cultural resistance. Cookstove technologies have rarely met the multiple demands placed on them to be simultaneously energy-efficient, safe, durable, fit for use according to myriad traditional cooking practices, and low-priced. Without the right technology, and faced with limited markets for such stoves, financing for them has proven scarce. Amidst these barriers, efficient cookstove projects do not find many takers. In addition to these, there are other factors. Most often, as the target population cannot afford these stoves, project promoters have to heavily subsidize them or give them away free of charge. Another aspect is the design of the stoves, which has to match the requirements of the population in question, hence the promoter also has to invest in customization of the stove according to each project region, which increases the financial burden on the project promoter. While the expenses are numerous, revenues from these projects are limited and uncertain. Despite being energy efficiency projects, the savings in terms of reduced fuel use are passed on to the stove user and not the promoter. Thus, a project promoter seeking to invest in acquiring the stoves, funding their customization, distribution and installation has no substantial revenue source other than from the sale of carbon credits.

Financial calculations of projects implemented in Sub-Saharan Africa (SSA) and South-East Asia demonstrate that, without the sale of GHG credits, providing stoves at zero cost to end-users is financially unattractive as there are no sources of revenue. The project examples include fixed stoves in Zambia and Malawi that cost $30 per stove and portable stoves in Lao PDR and Cambodia that cost $29.50 per stove. The price per stove includes the cost of the stove technology itself as well as the cost to install/distribute the stove to the end-user. No carbon related costs have been included in the financial analysis. Without any revenues, the project activity's gross annual revenue (including cost savings), excluding the sale of GHG credits, does not exceed five percent of capital expenditure throughout the crediting period, and therefore any project which does not charge the users for the improved cookstove provided to them is deemed additional.

Common Practice Analysis

According to a World Health Organization (WHO) report published in 2016[8], the number of people relying on solid fuel for cooking has remained static at around 2.7 to 2.8 billion over the last three

[8] https://www.who.int/bulletin/volumes/94/3/15-155812/en/

decades. This is despite the fact that enormous efforts have been undertaken by various government and non-governmental organizations to, on the one hand, displace the use of solid fuel, and on the other hand to introduce clean cookstoves to tackle the problem of indoor air pollution. Eventually, WHO acknowledged the fact that efforts required to bring down household air pollution levels have been slow, under-funded, and ineffective. This in essence sums up the fact that greater efforts need to be put in place to achieve satisfactory levels of penetration and uptake of clean cooking technologies.

While a considerable number of improved cookstoves have been distributed in developing countries in the last three decades, the problem of indoor air pollution does not show any downward trend. This can be attributed primarily to two or three reasons, the primary one being economic constraint. The adoption of improved cookstoves faces substantial obstacles[9], such as limited ability of consumers to afford high quality clean cookstoves and lack of awareness. Moreover, large gaps in financial and technical capacity across stove and fuel supply chains, and gaps in the enabling environment for both fuel and stove markets, including the continued absence of coherent quality and performance standards, present additional challenges.

Classification of ICS Technology

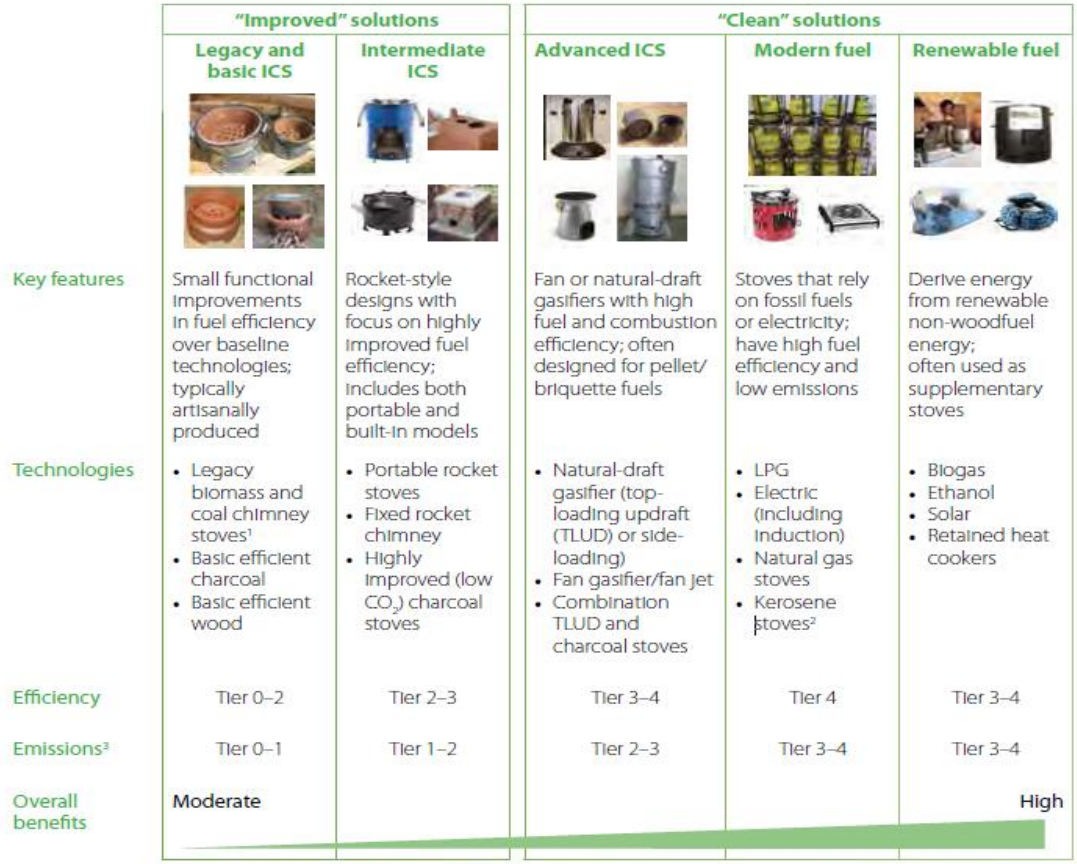
The ISO technical committee formulated voluntary performance targets to provide guidance on the performance of clean cookstoves. There are five indicators covered by these targets: thermal efficiency, fine particulate matter emissions, carbon monoxide emissions, safety, and durability. For each indicator, lab test results are rated along six tiers (0: lowest performing to 5: highest performing). Tier 0 represents performance typical of open fires and the simplest cookstoves.[10]

Tier	Thermal Efficiency (%)	Carbon Monoxide Emissions (gram/megajoule delivered)	Fine Particulate Matter Emissions (milligram/megajoule delivered)	Safety (score)	Durability (score)
5	≥50	≤3.0	≤5	≥95	<10
4	≥40	≤4.4	≤62	≥86	<15
3	≥30	≤7.2	≤218	≥77	<20
2	≥20	≤11.5	≤481	≥68	<25
1	≥10	≤18.3	≤1031	≥60	<35
0	<10	>18.3	>1031	<60	>35

Using this performance benchmark, the clean cooking technologies can be divided under following categories:

[9] Clean and Improved Cooking in Sub Saharan Africa. (second edition, November 2014)

[10] https://www.cleancookingalliance.org/technology-and-fuels/standards/iwa-tiers-of-performance.html



To establish a less than 20% penetration rate of the ICS technology, the UN SDG 7 progress report[11] has been used as a reference. Sections dealing with access to clean fuel and clean technology have been attached below. However, based on the above classification, the ICS applicable under this methodology belong to Tier 2 and above category, meaning either intermediate or advanced cooking solutions. Hence, for some of the countries, while penetration of improved cooking solutions may be higher than 20%, the penetration of intermediate ICS and advanced ICS may be still very low. Project promoters may use other sources to establish a less than 20% penetration rate for respective technologies.

2019 THE ENERGY PROGRESS REPORT TRACKING SDG7[12]

[11] https://sustainabledevelopment.un.org/content/documents/2019_Tracking_SDG7_Report.pdf

[12] https://sustainabledevelopment.un.org/content/documents/2019_Tracking_SDG7_Report.pdf

TOTAL ACCESS TO CLEAN FUELS AND TECHNOLOGIES FOR COOKING

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Afghanistan	7	19	32	21	34	45	71	88	>95	<5	12	28
Albania	41	65	78	49	80	95	70	92	>95	21	65	95
Algeria	88	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
American Samoa												
Andorra	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Angola	34	44	48	36	49	62	64	78	90	<5	8	15
Anguilla												
Antigua and Barbuda	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Argentina	>95	>95	>95	94	>95	>95	95	>95	>95	66	93	>95
Armenia	83	95	>95	88	>95	>95	95	>95	>95	76	>95	>95
Aruba												
Australia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Austria	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Azerbaijan	73	93	>95	89	>95	>95	94	>95	>95	73	95	>95
Bahamas	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Bahrain	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Bangladesh	7	13	19	13	19	28	31	50	70	<5	6	15
Barbados	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Belarus	92	>95	>95	68	>95	>95	76	>95	>95	63	>95	>95
Belgium	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Belize	78	84	86	78	87	93	92	>95	>95	57	78	92
Benin	<5	<5	6	<5	6	13	<5	9	18	<5	<5	<5
Bermuda												
Bhutan	27	61	76	55	79	94	77	>95	>95	46	75	92
Bolivia (Plurinational State of)	63	76	81	74	83	90	94	>95	>95	32	52	71

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Bosnia and Herzegovina	39	53	62	43	63	80	45	70	92	23	58	89
Botswana	42	53	58	31	59	74	42	73	93	21	41	63
Brazil	87	94	>95	88	>95	>95	94	>95	>95	56	79	92
British Virgin Islands												
Brunei Darussalam	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Bulgaria	66	84	90	61	91	>95	30	94	>95	13	85	>94
Burkina Faso	<5	6	9	<5	10	17	17	30	44	<5	<5	<5
Burundi	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Cambodia	<5	11	18	11	20	30	53	66	77	<5	7	16
Cameroon	10	18	24	9	25	36	33	46	60	<5	<5	7
Canada	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Cabo Verde	58	69	75	37	75	83	71	92	>95	27	40	49
Cayman Islands												
Central African Republic	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	<5
Chad	<5	<5	<5	<5	<5	6	5	14	25	<5	<5	<5
Channel Islands												
Chile	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
China	49	54	58	30	58	83	66	82	91	12	32	60
Colombia	79	90	94	84	94	>95	94	>95	>95	37	61	80
Comoros	<5	<5	8	<5	10	23	<5	20	43	<5	<5	17
Democratic Republic of the Congo	<5	<5	<5	<5	<5	11	<5	9	20	<5	<5	5
Congo	9	17	24	11	25	43	20	37	55	<5	<5	13
Cook Islands	84	85	84	54	84	>95	57	95	>95	<5	62	>95
Costa Rica	88	92	94	85	95	>95	93	>95	>95	58	83	>95
Côte d'Ivoire	16	18	20	8	21	40	32	47	62	<5	<5	8
Croatia	84	90	92	79	93	>95	80	>95	>95	50	89	>95
Cuba	77	86	89	10	90	>95	31	94	>95	<5	77	>95

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Curaçao												
Cyprus	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Czechia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Denmark	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Djibouti	5	8	10	<5	10	37	17	18	19	<5	<5	14
Dominica	78	87	91	79	91	>95	88	>95	>95	46	81	>95
Dominican Republic	80	87	90	83	91	>95	90	>95	>95	46	74	93
Ecuador	88	95	>95	91	>95	>95	>95	>95	>95	66	91	>95
Egypt	85	>95	>95	>95	>95	>95	>95	>95	>95	86	>95	>95
El Salvador	57	79	88	79	89	95	89	95	>95	52	79	95
Equatorial Guinea	14	29	37	<5	37	70	11	42	76	<5	9	34
Eritrea	<5	12	17	<5	18	45	15	31	51	<5	<5	9
Estonia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Ethiopia	<5	<5	<5	<5	<5	10	7	16	29	<5	<5	<5
Faroe Islands												
Fiji	32	43	48	7	51	82	18	67	93	<5	17	50
Finland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
France	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
French Polynesia												
Gabon	60	76	81	33	81	94	75	92	>95	24	43	60
Gambia	<5	<5	<5	<5	<5	9	<5	<5	16	<5	<5	<5
Georgia	41	66	78	60	79	93	89	>95	>95	6	33	73
Germany	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Ghana	6	16	23	16	25	36	30	41	51	<5	8	18
Gibraltar												
Greece	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Greenland												

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Grenada	94	>95	>95	91	>95	>95	63	>95	>95	73	>95	>95
Guam												
Guatemala	37	41	43	33	43	53	7	50	94	2	32	81
Guinea	<5	<5	<5	<5	<5	<5	<5	<5	24	<5	<5	5
Guinea-Bissau	<5	<5	<5	<5	<5	<5	<5	<5	28	<5	<5	<5
Guyana	36	62	75	59	77	90	57	84	>95	50	71	87
Haiti	<5	<5	<5	<5	<5	11	<5	12	46	<5	<5	18
Honduras	30	45	52	37	54	70	40	82	>95	6	25	53
China, Hong Kong Special Administrative Region												
Hungary	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Iceland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
India	22	36	44	26	45	65	63	78	88	12	22	35
Indonesia	7	42	63	42	65	82	70	85	93	38	51	64
Iran (Islamic Republic of)	87	>95	>95	95	>95	>95	>95	>95	>95	87	>95	>95
Iraq	72	>95	>95	94	>95	>95	>95	>95	>95	84	>95	>95
Ireland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Isle of Man												
Israel	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Italy	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Jamaica	72	86	91	84	92	>95	86	>95	>95	62	85	>95
Japan	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Jordan	>95	>95	>95	>95	>95	>95	94	>95	>95	91	>95	>95
Kazakhstan	85	94	>95	88	>95	>95	88	>95	>95	71	95	>95
Kenya	<5	7	13	6	14	26	12	28	48	<5	<5	6
Kiribati	<5	<5	6	<5	6	29	<5	14	48	<5	<5	16
Democratic People's Republic of Korea	<5	6	10	<5	11	33	5	15	33	<5	<5	14

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Republic of Korea	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Kosovo												
Kuwait	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Kyrgyzstan	53	73	81	58	83	>95	67	95	>95	48	74	94
Lao People's Democratic Republic	<5	<5	5	<5	5	21	5	14	27	<5	<5	7
Latvia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Lebanon												
Lesotho	16	27	32	17	33	51	67	82	92	9	17	28
Liberia	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Libya												
Liechtenstein												
Lithuania	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Luxembourg	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
China, Macao Special Administrative Region												
The former Yugoslav Republic of Macedonia	41	59	65	47	66	83	70	87	95	15	45	76
Madagascar	<5	<5	<5	<5	<5	<5	<5	<5	5	<5	<5	<5
Malawi	<5	<5	<5	<5	<5	5	6	10	16	<5	<5	<5
Malaysia	95	>95	>95	37	>95	>95	84	>95	>95	14	95	>95
Maldives	32	87	>95	72	>95	>95	82	>95	>95	85	>95	>95
Mali	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	<5
Malta	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Marshall Islands	7	57	65	36	66	87	61	91	>95	<5	7	29
Mauritania	30	39	44	30	46	58	39	71	85	8	21	29
Mauritius	94	>95	>95	89	>95	>95	84	>95	>95	88	>95	>95
Mexico	81	84	86	79	86	91	88	93	>95	40	55	72
Micronesia (Federated States of)	11	12	12	5	12	27	6	75	>95	<5	9	49

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Republic of Moldova	68	89	94	81	94	>95	92	>95	>95	62	92	>95
Monaco	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Mongolia	15	29	38	6	41	60	25	57	78	<5	11	29
Montenegro	55	62	65	44	66	87	51	77	>95	18	50	83
Morocco	91	>95	>95	93	>95	>95	>95	>95	>95	74	94	>95
Mozambique	<5	<5	<5	<5	<5	7	<5	9	21	<5	<5	<5
Myanmar	<5	10	19	7	20	38	28	54	74	<5	6	22
Namibia	32	40	44	<5	44	58	49	75	89	5	12	21
Nauru	72	89	92	35	92	>95	69	91	>95	<5	27	>95
Nepal	14	22	29	18	29	43	41	65	84	7	15	25
Netherlands	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
New Caledonia												
New Zealand	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Nicaragua	34	45	52	44	54	63	69	79	87	<5	13	32
Niger	<5	<5	<5	<5	<5	8	<5	8	22	<5	<5	<5
Nigeria	<5	<5	6	<5	7	12	6	14	26	<5	<5	5
Niue	75	89	93	81	93	>95	67	>95	>95	73	94	>95
Northern Mariana Islands												
Norway	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Oman	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Pakistan	23	35	43	29	44	62	77	92	>95	<5	14	35
Palau	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Panama	79	86	89	82	90	>95	95	>95	>95	53	75	92
Papua New Guinea	6	9	11	<5	12	30	19	47	74	<5	<5	22
Paraguay	46	58	65	56	66	75	73	83	90	25	38	53
Peru	35	66	74	66	76	84	80	90	>95	17	29	43
Philippines	36	42	44	29	44	61	42	64	83	11	21	33

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Poland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Portugal	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Puerto Rico												
Qatar	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Romania	67	83	88	59	89	>95	74	>95	>95	45	80	95
Russian Federation	93	>95	>95	91	>95	>95	93	>95	>95	74	>95	>95
Rwanda	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Samoa	16	26	31	17	31	45	42	65	81	12	24	43
San Marino	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Sao Tome and Principe	<5	<5	<5	<5	<5	12	<5	<5	15	<5	<5	5
Saudi Arabia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Senegal	34	33	31	17	31	46	34	55	74	<5	6	13
Serbia	52	67	74	43	74	93	63	86	>95	18	57	89
Seychelles	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Sierra Leone	<5	<5	<5	<5	<5	<5	<5	<5	9	<5	<5	<5
Singapore	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Sint Maarten (Dutch part)												
Slovakia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Slovenia	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Solomon Islands	6	8	8	<5	8	20	21	39	59	<5	<5	15
Somalia	<5	<5	<5	<5	<5	6	<5	5	14	<5	<5	11
South Africa	55	76	84	72	86	93	85	95	>95	56	73	85
South Sudan	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Spain	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Sri Lanka	14	22	27	14	28	43	48	66	80	8	20	36
Saint Kitts and Nevis	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Saint Lucia	87	95	>95	92	>95	>95	84	>95	>95	85	>95	>95

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Sint Maarten (Dutch part)												
Saint Vincent and the Grenadines	>95	>95	>95	91	>95	>95	84	>95	>95	80	>95	>95
Sudan	13	29	41	30	44	57	56	70	83	7	30	58
Suriname	80	87	90	79	91	>95	86	95	>95	60	81	95
Swaziland	27	42	50	39	51	64	74	87	94	20	33	46
Sweden	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Switzerland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Syrian Arab Republic	>95	>95	>95	>95	>95	>95	>95	>95	>95	84	>95	>95
Tajikistan	38	68	81	61	83	95	90	>95	>95	37	74	95
United Republic of Tanzania	<5	<5	<5	<5	<5	7	5	11	22	<5	<5	<5
Thailand	65	73	78	61	78	90	76	88	>95	60	73	84
Timor-Leste	<5	5	10	<5	11	21	15	25	36	<5	5	13
Togo	<5	<5	7	<5	8	14	8	18	28	<5	<5	<5
Tonga	49	54	55	34	55	74	68	85	>95	23	49	74
Trinidad and Tobago	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Tunisia	93	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Turkey	90	94	>95	91	>95	>95	>95	>95	>95	71	88	>95
Turkmenistan	>95	>95	>95	>95	>95	>95	>95	>95	>95	59	>95	>95
Turks and Caicos Islands												
Tuvalu	20	44	52	12	52	77	18	75	>95	<5	32	95
Uganda	<5	<5	<5	<5	<5	<5	<5	<5	6	<5	<5	<5
Ukraine	89	95	>95	82	>95	>95	94	>95	>95	74	93	>95
United Arab Emirates	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
United Kingdom of Great Britain and Northern Ireland	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
United States of America	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95
Uruguay	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95

Country	Total (%)						Urban (%)			Rural (%)		
	2000	2010	2016	2017 (L)	2017 (M)	2017(U)	2017 (L)	2017 (M)	2017 (U)	2017 (L)	2017 (M)	2017 (U)
Uzbekistan	80	89	92	77	92	>95	90	>95	>95	60	91	>95
Vanuatu	12	12	11	<5	11	22	16	35	57	<5	<5	11
Venezuela (Bolivarian Republic of)	>95	>95	>95	92	>95	>95	92	>95	>95	64	88	>95
Viet Nam	14	46	67	55	70	81	80	92	>95	35	60	76
United States Virgin Islands												
State of Palestine												
Yemen	55	60	63	52	63	75	90	>95	>95	26	48	71
Zambia	14	15	16	10	16	24	24	38	55	<5	<5	7
Zimbabwe	32	30	29	19	29	37	61	78	90	<5	5	11
World	50	57	60	54	61	67	29	34	40	79	83	85
Northern America (M49) and Europe (M49)	>95	>95	>95	>95	>95	>95	92	>95	>95	>95	>95	>95
Latin America and the Caribbean (MDG=M49)	78	85	88	85	88	90	55	62	68	92	94	>95
Central Asia (M49) and Southern Asia (MDG=M49)	26	38	45	33	46	60	16	23	32	70	79	87
Eastern Asia (M49) and South-eastern Asia (MDG=M49)	46	55	60	44	61	77	25	38	55	73	82	89
Sub-Saharan Africa (M49)	9	11	13	12	14	15	3	4	5	27	30	33
Oceania (MDG) / Oceania (M49) excluding Australia and New Zealand (M49)	11	14	16	8	17	30	2	7	21	34	52	70
Western Asia (M49) and Northern Africa (M49)	78	87	90	83	90	93	76	81	86	>95	>95	>95
Australia and New Zealand (M49)	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95	>95

Source: World Health Organization
Note:
L = 95% confidence interval lower bound
M = point estimate
U = 95% confidence interval upper bound

DOCUMENT HISTORY

Version	Date	Changes
v1.0	8 Sep 2020	Initial version of the revised CDM methodology AMS-II.G. • Expands the methodology's scope to activities that switch from fossil fuel to renewable biomass • Includes requirement that project stoves must have a thermal energy efficiency of at least 25% • Includes an activity method for additionality assessment (Option C: Revenue streams of *Methodology Requirements v4.0*)
v1.1	22 Jul 2021	Includes clarifications and general improvements
v1.2	6 July 2023	• Corrections to align with most recent versions of CDM methodology AMS-II.G., CDM TOOL30 and CDM TOOL33 • Alignment with most recent version of AMS-II.G. to allow the application of different monitoring options • Inclusion of applicability conditions, monitoring requirements, and accounting procedures for project emissions and leakage for renewable biomass • Procedures to account for uncertainty of fnrb • Clarifications and general improvements