CLEAN DEVELOPMENT MECHANISM

ASB0035

Standardized baseline

Baseline woody biomass consumption for household cookstoves in Kenya

Version 01.0

United Nations
Framework Convention on
Climate Change

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1. Introduction

1.1. Background

1. This standardized baseline provides the values for baseline woody biomass consumption per person for household cookstoves to estimate emission reduction from project activities for efficient cookstoves in Kenya.

2. Scope, applicability, and entry into force

2.1. Scope and applicability

2. The scope of the standardized baseline covers the values of baseline woody biomass consumption per person for household cookstoves in Kenya.

3. Clean development mechanism (CDM) project activities can apply this standardized baseline under the following conditions:

   (a) The project activity is implemented in Kenya; and

   (b) The approved CDM methodology that is applied to the project activity is small-scale methodology AMS-II.G "Energy efficiency measures in thermal applications of non-renewable biomass" and/or small-scale methodology AMS-I.E "Switch from non-renewable biomass for thermal applications by the user"; and

   (c) The standardized values are applicable to households using only firewood and/or charcoal in the pre-project scenario as a cooking fuel; households using LPG and/or kerosene in the pre-project scenario as a cooking fuel are not eligible to apply the standardized values in this document[1];and

   (d) The standardized values are not applicable to standalone renewable energy based water treatment technologies under AMS-I.E.

4. Project participants who do not wish to use this standardized baseline may alternatively estimate their own values, by applying the latest applicable version of the methodology.

2.2. Entry into force and validity

5. This standardized baseline enters into force upon adoption by the CDM Executive Board on 27 February 2017. This standardized baseline is valid from 27 February 2017 to 26 February 2020.

3. Normative references

6. This standardized baseline is based on the proposed top-down standardized baseline TSB0005 "Baseline woody biomass consumption for cookstoves in Kenya".

[1] One way to demonstrate this condition is to check and record fuel use at the time of distribution of the project stove.

7. This standardized baseline is derived from small-scale methodology AMS-II.G “Energy efficiency measures in thermal applications of non-renewable biomass” and small-scale methodology AMS-I.E “Switch from non-renewable biomass for thermal applications by the user”.

8. For more information regarding proposed new standardized baselines as well as their consideration by the CDM Executive Board please refer to <http://cdm.unfccc.int/methodologies/standard_base/index.html>.

4. Definitions

9. The definitions contained in the Glossary of CDM terms shall apply.

10. The definitions contained in the latest version of AMS-II.G and AMS-I.E shall apply.

11. The standardized baseline values are expressed as:

    (a) **Per person** values based on **woodfuel users**, i.e. residents of households that use firewood and/or charcoal as a cooking fuel in the pre-project scenario;

    (b) **Tonnes of air-dry woody biomass equivalent** (i.e. firewood as such and wood used for the production of the charcoal).

12. The following definitions shall be applied in accordance with FAO Unified Bioenergy Terminology[2].

    (a) **Woodfuel:** "All types of biofuels originating directly or indirectly from woody biomass". In this document, firewood and wood-for-charcoal are grouped as woodfuel;

    (b) **Charcoal:** "Solid residue derived from carbonization distillation, pyrolysis and torrefaction of firewood";

    (c) **Firewood (fuelwood):** "Woodfuel where the original composition of the wood is preserved";

5. Parameters and values

13. This standardized baseline shall be used together with the methodologies AMS-II.G (version 08.0) and/or AMS-I.E (version 07.0)[3]. For the estimation of baseline emissions of project activities, the provisions in the methodology AMS-II.G version 8.0 or AMS-I.E version 7.0 for determining the values of the parameters listed in Table 1 below, do not apply. Instead, standardized values provided in the Table 1 below shall be used.

[2] FAO (2004): Unified Bioenergy Terminology (UBET)

Accessed on 16 January 2017 from http://www.fao.org/docrep/007/j4504e/j4504e00.htm

[3] The standardized baseline can be used together with future versions of methodologies AMS-II.G or AMS-I.E as long as the requirements related to the parameter mentioned in Table 1 do not change.

Table 1. Standardized values for AMS-II.G and AMS-I.E

<table>
<tr><th>Parameter</th><th>Unit</th><th>Description</th><th>Applicable values</th><th>Source</th></tr>
<tr><td>B_{old,p} under AMS-II.G</td><td>tonnes/ person/ year</td><td>Annual quantity of woody biomass that would have been used per person in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project devices</td><td rowspan="2">The following conditions apply:
(a) Use values in the table below, according to the location of households (i.e. urban areas or rural areas);
Annual per capita consumption values (tonnes/person/year)<table><tr><td>Urban areas</td><td>Rural areas</td></tr><tr><td>0.83</td><td>0.76</td></tr></table>(b) Use the classification included in official documents or government publications to identify urban and rural areas.</td><td rowspan="2">See appendix</td></tr>
<tr><td>BC_{BL,PP,y} under AMS-I.E</td><td>tonnes/ person/ year</td><td>Average annual consumption of woody biomass per person before the start of the project activity</td></tr>
</table>

Appendix. Rationale and justifications for the standardized value for baseline woody biomass consumption

1. Introduction

1. This appendix provides the rationale and justification for the standardized values of baseline woody biomass consumption per person in Kenya ($B_{old,p}$ under AMS-II.G and $BC_{BL,PP,y}$ under AMS-I.E). The relevant data quality objectives of the "Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines" have been followed while developing the proposed standardized baselines.

2. The standardized values can be used to determine the parameter $BC_{BL,PP,y}$ under AMS-I.E (Average annual consumption of woody biomass per person before the start of the project activity) and the parameter $B_{old,p}$ under AMS-II.G (annual quantity of woody biomass that would have been used per person in the household in the absence of the project activity to generate useful thermal energy equivalent to that provided by the project device).

2. Standardization of baseline woody biomass consumption - Analysis

3. Taking into account national circumstances in Kenya, the DSB has defined a country-specific default value for baseline woodfuel consumption per person, according to the usage of fuels and the location of households (i.e. urban areas or rural areas), based on a review of literature and project design documents (PDDs) and programme design documents (PoA-DDs) available for the country.

4. The registered PDDs and PoA-DDs from the country as well as literature such as national studies and reports were reviewed. The values reported in the registered PDDs and PoA-DDs and in the literature are shown in Table 1. A detailed explanation of values reported in the literature, PDDs and PoA-DDs is included in paragraphs below.

5. The sources provide the data in a variety of formats (total consumption in all sectors, tons/household-year, kg/person-day as average for whole population or for all users or for main users only, etc.). For easy comparison, all the data for firewood and for charcoal are presented as woody biomass equivalent in tonnes (air-dry)/person-year representative of main users[1], after appropriate conversion. To convert the charcoal consumption value into the woody biomass equivalent of charcoal consumed, a default value (6 kg of wood input per kg of charcoal) provided by the methodology is used[2].

[1] The standardized values are based on data derived in the literature for main users, therefore, the standardized values are applicable to households that use exclusively biomass (woodfuel and/or charcoal) for cooking in the pre-project scenario. Therefore, CDM project activities/PoAs may apply the standardized values for the households that use exclusively biomass in the pre-project scenario.

[2] The methodology AMS-II.G provides two options: i) a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis); ii) credible local conversion factors determined from a field study or literature.

Table 1. Average annual consumption of woody biomass per person reported in PDDs, PoA-DDs and literature reviewed for Kenya

			Standardized values for main users in tonnes air-dry per capita					
			Urban areas			Rural areas		
Source	remarks	Ref. year	Annual **firewood** consumption	Annual **charcoal** consumption (wood eq.)	Annual total **woodfuel** (wood eq.)	Annual **firewood** consumption	Annual **charcoal** consumption (wood eq.)	Annual total **woodfuel** (wood eq.)
Ministry of Energy, Kenya, 2002. [1]		2002	**0.691**	**0.912**		**0.741**	**0.936**	
Kituyi et al (2001) [2]		2001	**0.543**			**0.915**		
PA 6549 "Nairobi River Basin Biogas Project"	The above reports [1] and [2] are referred.							**0.925**[3]
PoA 5341 "Improved Cooking Stoves Programme of Activities in Africa"	The above reports [1] and [2] are referred.			**0.912**			**0.936**	
PoA 9384 "Kenya Improved woodstoves project"	Own survey	2010				**1.295**		
PoA 9265 "Top Third Ventures Stove Programme"	The above report [1] is referred.		**0.768**			**0.768**		
PoA 7734 "SimGas Biogas Programme of Activities"					**1.209**			**1.614**
PoA 5336 "Efficient Cook Stove Programme: Kenya"	Own survey (Cluster 1)	2010				**1.03**		
	Own survey (Cluster 2)	2010				**0.76**		
	Own survey (Cluster 3)	2010				**0.32**		
	Own survey (Cluster 4)	2010				**0.75**		

References and notes:

1. Ministry of Energy (2002): Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small scale Industries and Service Establishments. Kamfor Consultants, Nairobi, Kenya.
2. E. Kituyi et al. (2001): "Biofuel Consumption Rates and Patterns in Kenya," Biomass and Bioenergy 20.

6. The following provides more details of the data sources in Table 1:

(a) **Ministry of Energy (2002):** A study titled "Study on Kenya's Energy Demand, Supply and Policy Strategy for Households, Small scale Industries and Service Establishments" was conducted by Kamfor Consultants in 2002. According to the study, for fuelwood, the average annual per capita consumption for main users[4] was approximately 0.741 (tonnes/capita-year) and 0.691 (tonnes/capita-year) for rural and urban households respectively. For charcoal, per capita consumption for main users was 0.156 (tonnes/capita-year) in urban areas and 0.152 (tonnes/capita-year) in rural areas.

(b) **Kituyi et al (2001):** According to the baseline survey conducted by Kituyi et al, fuelwood consumption in rural Kenya is 0.780 (tonnes/capita-year) and 0.051

[3] Average wood fuel consumption of 4.257 (tonnes/household-year) was divided by assumed average household size of 4.6.

[4] Total consumption divided by the population who use wood or charcoal, excluding the population that use other fuels

(tonnes/capita-year). Based on recent information publicly available[5], the percentages of households using fuelwood is 85.2% in rural areas and 9.4% in urban areas. These values were converted to the values for main users. Accordingly, per capita fuel consumption is 0.915 (tonnes/capita-year) in rural areas and 0.543 (tonnes/capita-year) in urban areas.

(c) **PA 6549 "Nairobi River Basin Biogas Project":** The above studies (a) and (b) were used for calculation.

(d) **PoA 5341 "Improved Cooking Stoves Programme of Activities in Africa":** The above studies (a) and (b) were used for calculation.

(e) **PoA 9384 "Kenya Improved woodstoves project":** The baseline survey was conducted in June 2010 for rural households in 7 locations of Mbeere district, Kenya. The per capita consumption in rural areas was found to be 1.295 (tonnes/capita-year).

(f) **PoA 9265 "Top Third Ventures Stove Programme":** The above study (a) was used for calculation. For both urban and rural areas, total wood fuel consumption of 3.38 (tonnes/household-year) was divided by average household size of 4.4.

(g) **PoA 7734 "SimGas Biogas Programme of Activities":** For urban areas, total wood fuel consumption of 4.72 (tonnes/household-year) was divided by average household size of 3.9. For rural areas, total wood fuel consumption of 7.42 (tonnes/household-yea) was divided by average household size of 4.6.

(h) **PoA 5336 "Efficient Cook Stove Programme: Kenya":** The baseline survey to estimate the average firewood (fuelwood) consumption across relevant clusters (4 clusters) in rural areas was conducted in 2010. Survey results shows that the per capita consumption values are 1.03 (tonnes/capita-year) in cluster 1, 0.76 (tonnes/capita-year) in cluster 2, 0.32 (tonnes/capita-year) in cluster 3 and 0.75 (tonnes/capita-year) in cluster 4 respectively.

3. Recommendation

7. In analysing all available data sources in the Table 1, it is considered that the most reliable data source should be selected, taking into account several factors such as i) whether it is primary or secondary data, ii) what is the geographical coverage of the survey, iii) what is the vintage of the survey, iv) whether it is conservative.

8. The study conducted by Ministry of Energy, Kenya has been often cited and used in some of the registered PDDs and PoA-DDs as a basis of calculating the wood fuel consumption, and the values are comparable to other studies. While this study was carried out some time ago in 2002, the reported values still may be considered relevant, as surveys carried out in 2010 by recent PoAs have reported comparable values.

9. Based on the above analysis, the following values are recommended as standardized values for the baseline woody biomass consumption per person in Kenya based on the study cited in paragraph 8 above.:

[5] The DHS Program- Demographic and Health surveys- STATcompiler (www.statcompiler.com) accessed on 16 January 2017 (step 1: Choose country as Kenya, step 2: Choose 'complete list', step 3: Choose 'household characteristics')

(a) Use values in Table 2 below, according to the location of households (i.e. urban areas or rural areas). Recommended values for urban and rural areas were calculated as a weighted-average values combining the use of firewood and charcoal, based on the penetration rates reported in recent studies (i.e. database published by USAID[6]).;

Table 2. Annual per capita consumption values (tonnes/person-year)

Urban areas			Rural areas		
Firewood	Charcoal (wood equivalent)	**Recommended value for urban areas**	Firewood	Charcoal (wood equivalent)	**Recommended value for rural areas**
0.69	0.91	**0.83**	0.74	0.94	**0.76**

(b) Use the classification included in official documents or government publications to identify urban and rural areas.

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Document information

Version	*Date*	*Description*
01.0	27 February 2017	Initial publication. This standardized baseline is approved by CDM Executive Board in accordance with the "Procedure for development, revision, clarification and update of standardized baselines" (CDM-EB63-A28-PROC).

Decision Class: Regulatory
Document Type: Standard
Business Function: Methodology
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[6] The same database mentioned in footnote 5.