

CDM-MP74-A09

Draft Methodological tool

TOOLXX: Calculation of the fraction of non-renewable biomass

Version 02.0



DRAFT



United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. The Executive Board of the clean development mechanism (CDM) (hereinafter referred to as the Board), at its ninetieth meeting, considered the recommendations of the SSC WG in relation to the parameter fraction of non-renewable biomass (fNRB) included in methodologies “AMS-I.E: Switch from non-renewable biomass for thermal applications by the user” and “AMS-II.G: Energy efficiency measures in thermal applications of non-renewable biomass” and agreed that:
 - (a) The default country-specific fNRB values already approved by the Board shall expire five years from the date of their approval;
 - (b) In cases where Designated National Authorities (DNAs) decide to propose a renewal with an update to the fNRB values, they shall follow the “Procedure: Development, revision, clarification and update of standardized baselines” (standardized baseline procedures), including for the requirement related to the period of validity of the fNRB value;
 - (c) The SSC WG should initiate work to propose a revision to the method for the top down development of fNRB values for the consideration by the Board. Where a DNA has made a request for the top down development of fNRB values in accordance with the standardized baseline procedures, the secretariat should, after approval by the Board, initiate the work.
2. This document was prepared to address the Board’s mandate mentioned under paragraph 1(c) above. The document proposes methods which can be used for either i) by DNAs to submit region/country-specific default fNRB values, following the standardized baseline procedures, or ii) by project proponents to calculate project-specific fNRB values.
3. A call for public inputs was launched from 7 April to 21 April 2017. One input was received.¹
4. The Board, at its ninety-sixth meeting, considered the draft new methodological tool: “TOOLXX: Calculation of the fraction of non-renewable biomass”, and requested the MP to further work on the draft new tool.

2. Purpose

5. The tool aims to provide guidance and a step-wise procedure/method to calculate fNRB values.

3. Key issues and proposed solutions

6. Subsequent to approval of fNRB values by the Board, the SSC WG, at its 51th meeting, noted that new and comprehensive information on region-specific fNRB values based on long-term studies have now become available

¹ <https://cdm.unfccc.int/public_inputs/2017/0604_03/index.html>.

(<http://www.nature.com/nclimate/journal/v5/n3/full/nclimate2491.html>). The study conducted an assessment of woodfuel supply and demand, and using 2009 as a base year, quantified the extent to which woodfuel demand exceeds supply. While the study provided a useful and comprehensive assessment of fNRB values at region/country level, the SSC WG observed that there are also limitations such as the input data on household woodfuel consumption used by the study is not up to date. Furthermore, the definition of renewable biomass used by the study is not identical to the Board's definition on renewable biomass. Therefore, the approach of the study was considered for information purposes, but not applied directly in this tool.

7. The values and methods used in registered CDM PDDs and PoA-DDs/CPA-DDs were also reviewed. While default fNRB values approved by the Board have been used in most cases, other methods to estimate fNRB values have also been used. However, it is noticed that many of the approaches used in registered CDM PDDs and PoA-DDs/CPA-DDs may not fully meet the definition of Demonstrably Renewable Biomass (DRB) and NRB prescribed in the methodologies (AMS-I.E and AMS-II.G), for example:

(a) Managed and unmanaged forests are not differentiated. As per the definition agreed by the Board, the extent of forests should be only the managed forests where carbon stocks do not decrease over time, and where by-products are used or are accessible to meet the thermal energy (woodfuel) needs for households;

(b) Other managed land use categories (e.g. croplands, grasslands) that could also be used for the calculation of DRB are not taken into account.

8. The draft tool provides more clarity on the requirements and procedures to estimate fNRB values. The proposed tool includes a conservative default fNRB value of 0.3 as an alternative means to estimate country/region/project area specific fNRB values. This is proposed taking into account several recent studies, for example, 27-34% estimated by Bailis et al. (2015)² and 41-43% estimated by Cashman et al. (2016).³

9. The Board, at its ninety-sixth meeting, considered the draft new methodological tool: "TOOLXX: Calculation of the fraction of non-renewable biomass", and requested the MP to further work on the draft new tool, addressing the following issues:

(a) Modify the calculation of the mean annual increment of biomass to be applicable to all land areas from where biomass is sourced for cooking, not only to the land producing renewable biomass;

(b) Modify the calculations as necessary, e.g. amend equation 6 of the tool, or include a new equation to reflect the above.

10. The two issues above were considered by MP74 and the equation 6 of the tool was amended accordingly.

² Bailis, R.; Drigo, R.; Ghilardi, A. & Masera, O. (2015). The carbon footprint of traditional woodfuels. *Nature Climate Change*, 5(3), pp. 266–272.

³ Cashman S, Rodgers M, Huff M, Feraldi R, Morelli B. Life Cycle Assessment of cookstove fuels in India and China. Washington, DC U.S. Environmental Protection Agency; 2016.

4. Impacts

11. The tool to calculate fNRB values will reduce transaction costs and facilitate the implementation of CDM project activities and component project activities (CPAs) that displace the use of non-renewable biomass (e.g. cook stoves) which have significant relevance for underrepresented regions of the CDM.

5. Subsequent work and timelines

12. The tool is recommended by the **SSC-WG MP** for consideration by the Board. No further work is envisaged.

6. Recommendations to the Board

13. The **SSC-WG MP** recommends that the Board approve this draft methodological tool, to be made effective at the time of the Board's approval.

TABLE OF CONTENTS		Page
1. INTRODUCTION		6
2. SCOPE, APPLICABILITY, AND ENTRY INTO FORCE		6
2.1. Scope		6
2.2. Applicability		6
2.3. Entry into force		6
3. NORMATIVE REFERENCES		6
4. DEFINITIONS		6
5. PROCEDURE		7
5.1. Procedure to estimate consumption demand of for woody biomass (H and $B_{old,total}$)		8
5.2. Procedure to estimate DRB		10

1. Introduction

1. The methodological tool determines fraction of woody biomass that can be established as non-renewable biomass (fNRB).

2. Scope, applicability, and entry into force

2.1. Scope

2. This tool provides guidance and a step-wise procedure/method to calculate values of fNRB. The tool may be applied when calculating baseline emissions in applicable methodologies (e.g., AMS-I.E, AMS-II.G, AMS-III.Z, **AMS-III.AV**) for a project activity or a Programmes of Activities (PoA) that displaces the use of non-renewable biomass.

2.2. Applicability

3. This tool may be used by:
 - (a) DNAs to submit region/country-specific default fNRB values, following the procedures for development, revision, clarification and update of standardized baselines (SB procedures); or
 - (b) project proponents to calculate project or PoA-specific fNRB values.
4. For the case in paragraph 3 (a), DNAs shall provide justifications on the selected geographical disaggregation.
5. For the case in paragraph 3 (b), project proponents shall consider the area where biomass is sourced and justify the selection of the area in CDM project design documents.

2.3. Entry into force

6. The date of entry into force is the date of the publication of the EB 967 meeting report on **22 September 2017** ~~22 September 2017~~ **November 2017**.

3. Normative references

7. This methodology refers to the CDM methodological tool "Project and leakage emissions from biomass".

~~4. Definitions~~

- ~~8. The definitions contained in the "Glossary of CDM terms" shall apply.~~

9. For this tool, the following definitions apply:

(a) **Demonstrably renewable woody biomass (DRB):**⁴ Woody biomass is “demonstrably renewable” if either of the conditions (i) and (ii) below is satisfied:

(i) The woody biomass originates from land areas that are forests⁵ 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 stocks⁶ 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 woody biomass originates from non-forest areas (e.g. croplands, grasslands) where:

a. The land area remains cropland and/or grasslands 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.

5. Procedure

10. The shares of renewable and non-renewable woody biomass in the quantity of woody biomass consumption shall be determined following the steps described below. Alternatively, a conservative default fNRB value of 0.3 may be used.

11. The fraction of woody biomass that can be established as non-renewable, is:

$$fNRB = \frac{NRB}{NRB + DRB} \quad \text{Equation (1)}$$

Where:

fNRB = Fraction of non-renewable biomass (fraction or %)

⁴ This definition uses elements of EB 23, annex 18.

⁵ The forest definitions as established by the country in accordance with the decisions 11/CP.7 and 19/CP.9 should apply.

⁶ For the purpose of this tool, soil carbon does not need to be taken into account when estimating carbon stocks changes. Carbon stocks may be estimated following the procedures described in the CDM methodological tool “Project and leakage emissions from biomass”.

NRB = Quantity of non-renewable biomass (t/yr) determined as per paragraphs 12 and 13 below

DRB = Quantity of demonstrably-renewable biomass determined as per section 5.2 below (t/yr)

12. On a country- or region-specific basis, quantity of NRB shall be determined by calculating the total consumption of wood (H) in the country or region and then deducting the quantity of renewable biomass (DRB) from it.

$$NRB = H - DRB \quad \text{Equation (2)}$$

Where:

H = Total annual consumption of wood in the absence of the project activity, determined as per section 5.1 below (t/yr)

13. On a project-specific basis, a value of fNRB can be derived by calculating the total woody biomass consumption used in the absence of the project activity ($B_{old,total}$) and estimating the potential supply of renewable biomass (DRB).

$$NRB = B_{old,total} - DRB \quad \text{Equation (3)}$$

Where:

$B_{old,total}$ = Total annual consumption of wood in the project area in the absence of the project activity, as determined using the step wise procedure provided in the section 5.1 below (t/yr)

5.1. Procedure to estimate consumption demand of for woody biomass (H and $B_{old,total}$)

14. Estimate the overall consumption demand for woody biomass, using one of the following options:

(a) Official statistics or reports or peer-reviewed literature;

(b) Based on the number of households and other consumers of woody biomass in the country or region (H) or project area ($B_{old,total}$) as per the procedure in paragraph 15.

15. H is calculated using equation (4), accounting for all consumptions within the country/region (not only woodfuel but also timber and industrial consumption).

$$H = HW_{region} \times N_{region} + TI_{region} \quad \text{Equation (4)}$$

Where:

HW_{region} = Average household woodfuel consumption, including fuelwood and charcoal as per paragraph 17 below (t/yr/household)

TI_{region}	=	Non-domestic wood consumption for energy applications (e.g. commercial, industrial or institutional uses of wood in ovens, boilers etc.) and all wood consumption for non-energy applications (e.g. construction, furniture) that are extracted from forests or land areas in the country/region for which the estimate of fNRB is to be made (t/yr) ⁷
N_{region}	=	Number of households consuming woodfuel for thermal applications within the country/region (households) ⁷

16. Similarly, $B_{old,total}$ is estimated using equation (5), based on the overall wood consumption in the area where the project is proposed.

$$B_{old,total} = HW_{project} \times N_{project} + TI_{project} \quad \text{Equation (5)}$$

Where:

$HW_{project}$	=	Average household woodfuel consumption, including fuelwood and charcoal in the project area, as per paragraph 17 below (t/yr/household)
$TI_{project}$	=	Non-domestic wood consumption (e.g. commercial, industrial or institutional uses of wood either as energy sources (ovens, boilers, etc.) and all wood consumption for non-energy applications (construction, furniture, etc.) that are extracted from forests or land areas in the project area for which the estimate of fNRB is to be made (t/yr) ⁸
$N_{project}$	=	Number of households consuming woodfuel for thermal applications within the project area (households) ⁸

17. Average household consumption of woody biomass (HW_{region} and $HW_{project}$) shall be determined using one of the following options:
- Approved standardized baselines valid for the country/region/area; or
 - Official statistics or reports or peer-reviewed literature; or
 - Results of a sampling survey conducted as per the latest version of “sampling and surveys for CDM project activities and programme of activities”; or
 - Default values adopted within CDM framework valid for the country/region/area (e.g. a default value of 0.5 tonnes/capita per year under AMS-II.G).
18. For the purpose of this tool, wherever charcoal is used for domestic or non-domestic applications, the quantity of woody biomass related to it shall be determined by using a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis)⁹. Alternatively, credible local conversion factors (e.g. determined from a field study or literature) may be applied.

⁷ This parameter may be determined through existing studies or government data or surveys.

⁸ This parameter may be determined through surveys.

⁹ Refer to: <<http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>>. The term ‘wet basis’ assumes that the wood is ‘air-dried’ as is specified in the IPCC default table.

5.2. Procedure to estimate DRB

19. Estimate the potential supply of Renewable biomass (DRB) in the country/region/area is estimated based on:
- Estimates of the Mean Annual Increment of biomass (MAI) of the managed forests in the country/region/area; and
 - Estimates of the MAI of trees outside forests in managed lands (e.g. croplands, grasslands, rural and urban areas).
20. For the purpose of this tool, a land area is considered to be managed, available or accessible to meet household's thermal needs if:
- The land area is not defined as protected area or nature conservation area, that restricts or impedes the extraction of woody by-products; and
 - The conditions in paragraph 7 (a) (i) for forest areas and paragraph 7 (a) (ii) for non-forest areas (e.g. croplands, grasslands, rural and urban areas) are fulfilled.
21. In order to demonstrate fulfilment of conditions in paragraph 7 (a) (i) b and 7 (a) (ii) b with regard to sustainable management practices, official statistics for the changes of forest and non-forest resources may be used. For grasslands, it may be difficult to prove that sustainable management is undertaken, therefore the check may focus on the demonstration that carbon stocks are not decreasing.
22. Then, sum up the product of the MAI (t/ha/yr) and the extent of forest and non-forest that are classified as DRB using the equation below.

$$DRB = \sum (MAI_{forest,DRB,i} \times (F_{forest,DRB,i} - P_{forest})) + \sum (MAI_{other\ non\ forest,DRB,i} \times (NF_{other,DRB,i} - P_{other})) \quad \text{Equation (6)}$$

Where:

$MAI_{forest,DRB,i}$	=	Mean Annual Increment of woody biomass growth per hectare in sub-category i of forest areas that is concluded as renewable (DRB) (t/ha/yr)
$MAI_{other\ non\ forest,DRB,i}$	=	Mean Annual Increment of woody biomass growth per hectare in sub-category i of non-forest other wooded land areas that is concluded as renewable (DRB) (t/ha/yr)
$F_{forest,DRB,i}$	=	Extent of Forest (F) in sub-category i (ha) ¹⁰
$NF_{other,DRB,i}$	=	Extent of Non-Forest other wooded land (NF) in sub-category i (ha) ¹⁰

¹⁰ Managed forest and non-forest areas for which products or by-products are not available for meeting domestic thermal uses as per AMS-I.E and AMS-II.G (e.g. commercial forests for plate wood plywood or for industrial use, or dedicated pastures or agricultural areas not accessible to wood biomass collection) may be excluded in this estimate, as long as the products and by-products of these areas are also not accounted for in the estimation of the consumption demand for biomass in Section 5.1.

P_{forest}	=	Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within forest areas (ha) ¹¹
P_{other}	=	Extent of non-accessible area (e.g. protected area where extraction of wood is prohibited, geographically remote area) within other wooded land areas (ha) ¹¹
i	=	Sub-category i of forest areas and non-forest other wooded land areas that were considered as meeting the condition of demonstrable renewable (DRB)

23. For estimation of the extent of forest areas, other wooded land areas, and protected areas, the following data source may be used:

(a) Global Forest Resources Assessment 2015 by the Food and Agriculture Organization of the United Nations (FAO)

24. For estimation of Mean Annual Increment, the following data source may be used:

(a) Global Forest Resources Assessment 2000 by the FAO for “Distribution of total forest area by ecological zone” (Table 14); and/or

(b) 2006 IPCC Guidelines for National Greenhouse Gas Inventories for “Above-ground biomass growth rates (t/ha-yr) for different ecological zones” (Chapter 4, Table 4.9).

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Document information

Version	Date	Description
02.0	11 October 2017	MP 74, Annex 9 To be considered by the Board at EB 97. This document addressed the issues raised by the Board (EB 96 meeting report, para 35).
01.0	28 July 2017	SSCWG 54, Annex 6 To be considered by the Board at EB 96. The draft version of this document (CDM-SSCWG53-A06) was available for public input from 7 to 21 April 2017. It received one input.

Decision Class: Regulatory

Document Type: Tool

Business Function: Methodology

Keywords: biomass, fraction of non-renewable biomass, wood products

¹¹ Consideration of this parameter is optional. If DNAs or PPs wish to consider non-accessible areas, they shall provide justifications.