A methodological approach to estimate CO_2 emission reductions from switching non-renewable biomass to renewable biomass use

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I. Introduction

In accordance with Annex 8 (EB20), a distinction must be made between the increase in stock associated with the establishment of vegetation as a source of renewable biomass (as contemplated in Decision 19/CP9), and the displacement of the consumption of non-renewable sources of energy (as contemplated in Decision 17/CP7).

In response to the call from the Executive Board for submissions of *alternative methods for calculating emission reductions for small-scale project activities that propose the switch from non-renewable to renewable biomass…while not accounting for any net increase of carbon pools compared to what would occur in the absence of the project activity*, please find below the following considerations:

This simplified methodology is applicable to small scale projects. Nonetheless, its concept is applicable to any CDM project activity that aims at switching from use of non-renewable biomass to the use of renewable biomass, regardless of scale.

This methodology is only applicable to projects that do not claim CERs from any net increase in carbon stocks in the carbon pools, relative to that which would occur in the absence of the project activity. If project participants wish to claim such credits, then a separate methodology should be used, according to Annex 8 (EB20).

In summary, the CO_2 emission reductions that result from switching from non-renewable biomass to renewable biomass are equal to the CO_2 emissions that result from the use of the non renewable biomass, since the emissions from the renewable biomass are, by definition, equal to zero.

In accordance with the recommendation of the AR Working Group on the definition of renewable biomass, the biomass from dead organic matter is to be considered as renewable. It follows that the emission reductions are equal to the emissions originated from the use of biomass from a non renewable source, minus the portion that corresponds to the use of dead organic matter.

II. Methodological Approach

II.1. Assumptions

The methodology is based on the following assumptions:

- The definition of renewable biomass follows that proposed by the CDM AR WG at its 6th session (Annex 7), with the understanding that emissions and removals

from the land areas originating the renewable biomass cancel out each other at the end of the crediting period. This implies that no changes in carbon stocks in the carbon pools in these land areas are expected to occur.

- The use of non-renewable biomass originating from dead organic matter that naturally accumulates does not result in CO_2 emissions to the atmosphere.

- The methodology assumes that there are no decreases in the carbon stock in the soil organic carbon pool from the use of non-renewable biomass. Hence, the reduction in CO_2 emissions from switching non-renewable to renewable biomass considers only the carbon stock in living biomass (above and belowground biomass). This implies a conservative approach to the estimation of the reduction in CO_2 emissions.

II.2. CO_2 Emission Reduction Estimate

The annual CO_2 emission reduction resulting from the switch of non-renewable to renewable biomass is estimated using Equation 1:

$$T_{CO2(NR-R)} = AC_{NR} \bullet F_{dm} \bullet F_{oxid} \bullet CF \bullet \frac{44}{12} \qquad \text{Equation 1}$$

Where:

$T_{CO2(NR-R)}$ = annual reduction of CO_2 emissions from switching from non-renewable biomass to renewable biomass; tonnes CO_2 yr^{-1}

AC_{NR} = total annual consumption of non-renewable biomass (excluding dead organic matter); tonnes green matter yr^{-1}

F_{dm} = factor to convert green matter to dry matter; (tonnes dry matter)(tonnes green matter)$^{-1}$

F_{oxid} = fraction of dry matter that oxidizes; dimensionless

CF = carbon fraction of dry matter, (tonnes C)(tonnes dry matter)$^{-1}$

$\frac{44}{12}$ = ratio of molecular weight of carbon dioxide to carbon, dimensionless

The total CO_2 reduction from the CDM project activity is equal to the annual reduction of CO_2 emissions (Equation 1) times the crediting period.

The total annual consumption of non-renewable biomass, AC_{NR}, shall include only biomass from the living biomass pools (above and below-ground), excluding any fraction that corresponds to biomass in the dead organic matter pool (litter and dead wood); i.e.

$$AC_{NR} = Total \bullet (1 - f_{DOM})$$

Where:

AC_{NR} = total annual consumption of non-renewable biomass; tonnes green matter yr^{-1}

$Total$ = total annual amount of non-renewable biomass, tonnes green matter yr^{-1}

f_{DOM} = fraction of biomass in dead organic matter pool in the total amount of non-renewable biomass, dimensionless

The values of F_{dm} and F_{oxid} shall be based on national data, if available. Else, the default values provided in the IPCC 1996 Guidelines or Good Practice Guidance and Uncertainty Management (IPCC, 2000) shall be used. The IPCC default value of 0.5 (tonnes C)(tonnes dry matter)$^{-1}$ shall be used for the carbon fraction of dry matter (CF).