Switch from Non-Renewable Biomass to Renewable Energy for Thermal Applications by the User

Technology/ Measure

This category comprises the switch from wood-based non-renewable biomass (such as fuelwood or charcoal) to renewable sources of energy. Technologies include biogas stoves, use of solar cookers, renewable-based electricity (hydro, wind, PV etc) and measures that involve the switch to renewable non-woody biomass.

Boundary

The project boundary is the physical, geographical area of the use of non-renewable biomass or the renewable energy.

Baseline

It is assumed that in the absence of the project activity, the baseline scenario would be the mix of non-renewable biomass and fossil fuel use expected to be used in the baseline, during the project period, by the local consumers, for meeting similar thermal energy needs. Specifically, at the beginning of the project a "population" of equipment is chosen that uses woody non-renewable biomass. In the baseline it is assumed that a certain fraction of this population would have switched to a cleaner, fossil-fuel using equipment, according to regional trends.

Project proponents must demonstrate that the biomass used in the baseline is indeed non-renewable, following the EB 23 Annex 18 definition of "renewable biomass" (by inversion). This is done using the following steps:

Step 1: identify a "woody biomass production area" (area) which should the larger of the following two areas: a) all forests and woodlands from which the project participants derive their wood fuel in the baseline, b) all forests and woodlands from which project participants could realistically obtain biomass, given means of transport, acessability and daily time available for transporting biomass.

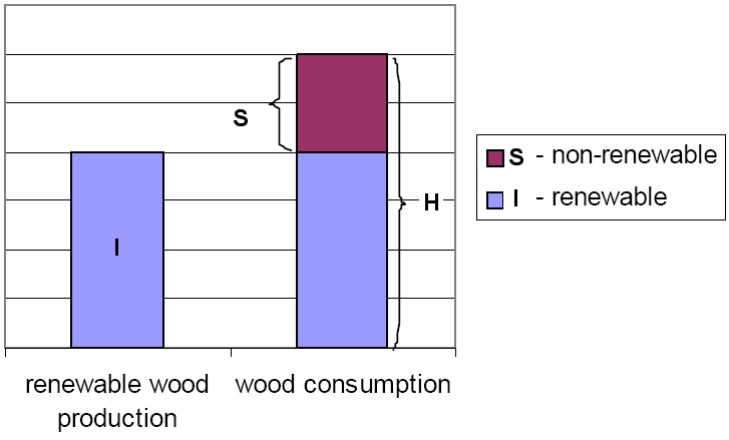
Step 2: For the area estimated in step 1, estimate the average annual wood fuel increment (I) which could be harvested, consistent with the definition of "renewable biomass". For this purpose, tools like satellite data, regional or IPCC allometric equations to estimate the above ground biomass increment etc. may be used.

Step 3: estimate the average harvest of wood fuels derived from this area (H)

Step 4: calculate the shortage of woody biomass in the area: S = H – I.

Step 5: Demonstrate that the amount of woody biomass used in the project baseline, at time zero, is less than S. If this is not the case, set the amount of woody biomass that can be included in the baseline to S.

Step 6: Demonstrate that the type of wood-based biomass occurring in the baseline (e.g., cooking fuel) is a significant share [20%] of H in the area analysed. That is, use for cooking fuel (in this example) is a significant end-use category.



Where,

A	Area from which woody biomass is produced (the larger of the following two areas: a) all forests and woodlands from which the project participants derive their wood fuel in the baseline, b) all forests and woodlands from which project participants could realistically obtain biomass, given means of transport, acessability, and daily time available for transporting biomass).
I	Annual biomass increment (tons/year) on area A
H	Annual biomass harvest (tons/year) on area A
S	Net shortage of wood on area A.

To avoid incentives for enhancing deforestation and forest degradation in order to meet the conditions of "non-renewable biomass", project proponents can only claim emission reduction from the total amount biomass that could be defined as non-renewable at the time of, or before, the adoption of this methodology (e.g., December 2006).

Emission Reductions

Annual Emission reductions are calculated as:

$$ER_y = BE_y - (PE_y + Leakage)$$

Where,

ER_y	Annual emission reductions in tCO_2
BE_y	Annual baseline emissions in tCO_2
PE_y	Annual project activity emissions in tCO_2

$$BE_y = \frac{1}{2} \cdot (BE_{start} + BE_{end})$$

$$PE_y = 0$$

$$Leakage = 0.15 \,.\, BE_y$$

Where,

BE_{start}	Annual baseline emissions at the start of the project period, in tCO_2
BE_{end}	Annual baseline emissions at the end of the project period, in tCO_2

Due to the selection of the project boundary in such a way that it only includes biomass-using equipment at the project start, there is no use of fossil fuels at time zero.

$$BE_{start} = B_y \cdot NCV_{biomass} . EF_{CO2,\, biomass}$$

Where,

B_y Quantity of non-renewable biomass that is annually substituted or displaced in tonnes, calculated as:

(i) the product of the number of appliances multiplied by the estimate of average annual consumption of non-renewable biomass per appliance (tonnes/year). This can be derived from historical data or a survey of local usage.

OR

(ii) The annual amount of renewable biomass used in the project activity corrected for differences in calorific values.

In the case of charcoal the quantity of non-renewable biomass going into the charcoal making process should be used (IPCC default: 6 kg wood per kg charcoal, reference manual of 1996 Guidelines page 1.45) or an appropriate

carbon emissions factor applicable for the charcoal production process applicable in the project baseline.

If agricultural biomass is replaced due to the project, it must be excluded from By, since this this methodology deals with wood-based non-renewable biomass.

$NCV_{biomass}$ Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel, 15 MJ/kg
(IPCC default for Charcoal , 29,5 MJ/kg

$EF_{CO2, biomass}$ CO_2 emission factor for the biomass fuel; 109.6 tCO_2/TJ (default for biomass from IPCC 1996 GL).

At the end of the project duration, the baseline contains a mix of non-renewable biomass and fossil fuels according to regionally prevailing trends.

$$BE_{end} = B_y .NCV_{biomass} . [\ (1 - X) \cdot EF_{CO2, biomass} + X . \frac{\varepsilon_{fossil}}{\varepsilon_{biomass}} . EF_{CO2, fossil}\ )\ ]$$

Where,

$EFCO_2$, fossil CO_2 emission factor for the fossil fuel; 71.5 tCO_2/TJ for Kerosene, 63.0 tCO_2/TJ for LPG or the IPCC default value of the fossil fuel commonly observed with local consumers

$\varepsilon_{biomass}$ Average efficiency of appliances using biomass

ε_{fossil} Average efficiency of appliances using fossil fuels

X X is the share of biomass used in the baseline at the project start that would be replaced with fossil fuels by the end of the project, according to historical and/or current trends. X is determined as part of the PDD, using regional data, where possible stratified into urban and rural areas.

Method 1, using trends in fossil-fuel shares of primary energy
For example, if the market share of fossil fuels is predicted to increase from 20 to 30% during the project period, it means that $1/8^{th}$ (12.5%) of the biomass used in the baseline at the project start would be replaced by fossil fuel in the baseline, so X is 0.125.

Method 2, using trends in shares of fossil fuel-based equipment
For example, if the market share of fossil-fuel stoves is predicted to increase from 20 to 30% during the project period, it means that $1/8^{th}$ (12.5%) of the biomass stoves in the baseline at the project start would be converted to fossil fuels, so X is 0.125.

Leakage

If there is a possibility that the savings of non-renewable biomass due to the project activity lead to greater use of non-renewable biomass outside the project boundary, then a leakage deduction of 15% shall be applied. This standard leakage deduction is set so that it includes the net of negative and positive leakage. If the leakage deduction of 15% is not applied, monitoring shall demonstrate that greater use of non-renewable biomass outside the project boundary does not occur.

Monitoring

Monitoring shall consist of an annual check of all appliances or a representative sample thereof to ensure that they are still operating or replaced by an equivalent in service appliance. Monitoring shall confirm the complete displacement or substitution of the non-renewable biomass at each location. In the case of appliances switching to renewable biomass the quantity of renewable biomass used shall be monitored.