CLEAN DEVELOPMENT MECHANISM

CDM-SSCWG45-A12

Draft Small-scale Methodology

AMS-III.AS: Switch from fossil fuel to biomass in existing manufacturing facilities for non-energy applications

Version 02.0 - Draft

Sectoral scope(s): 02

United Nations
Framework Convention on
Climate Change

COVER NOTE

1. Procedural background

1. Following the approval of the methodological tool “Project emissions from cultivation of biomass” at the seventy-fifth meeting of the Executive Board (hereinafter referred as the Board) of the clean development mechanism (CDM), the Small-Scale Working Group (SSC WG) requested a mandate from the Board to integrate this tool into SSC methodologies. Consequently, the Board mandated this task at its seventy-sixth meeting (EB 76, para 53).

2. Purpose

2. The draft revision:

   (a) Introduces the methodological tool “Project emissions from cultivation of biomass”, streamlining biomass cultivation procedures across small and large scale methodologies;

   (b) Streamlines upstream leakage emissions associated with fossil fuel use procedures;

   (c) Removes restrictions for application in a PoA.

3. Key issues and proposed solutions

3. None.

4. Impacts

   (a) Increased environmental integrity;

   (b) Simplified and streamlined procedures.

5. Subsequent work and timelines

4. The SSC WG, at its 45th meeting, agreed on the draft revised methodology. After receiving public inputs on the document, the SSC WG will continue working on the methodology, at its 46th meeting, for recommendation to the Board at a future meeting of the Board.

6. Recommendations to the Board

5. Not applicable (call for public input).

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1. Introduction

1.1. Background

1. The following table describes the key elements of the methodology:

Table 1. Methodology key elements

Typical project(s)	Activities for fuel switching (complete or partial) from the use of carbon intensive energy source (or a mix of energy sources) of fossil origin to renewable biomass or a mix of renewable biomass and fossil fuel in existing manufacturing facilities (e.g. steel, ceramics, aluminium, lime, clinker production)
Type of GHG emissions mitigation action	Fuel Switch. Complete or partial switch from fossil fuel to biomass in non-energy applications

2. Scope, applicability, and entry into force

2.1. Scope

2. The methodology comprises of activities for switching fossil fuel to a mix of fossil fuel and renewable biomass in existing manufacturing facilities.

2.2. Applicability

3. The methodology is applicable to project activities that involve switching (complete or partial) from the use of carbon intensive energy source (or a mix of energy sources) of fossil fuel origin to renewable biomass[1] or a mix of renewable biomass and fossil fuel in existing manufacturing facilities[2] (e.g. steel, ceramics, aluminium, lime, clinker production).

4. Fuel switching may also result in energy efficiency improvements, however the primary aim of project activity is to reduce emissions through fuel switching.

5. The methodology is applicable if the following requirements are met:

   (a) The baseline fossil fuel and the project biomass are consumed in thermal energy conversion equipment (e.g. furnaces, kilns, dryers) that are used in the manufacture of products (e.g. steel, ceramics, aluminium, lime, clinker). This is referred to as an element process[3] in this methodology;

[1] As per the definition of renewable biomass provided in Annex 18, EB 23.

[2] The fuel switch in manufacturing of bricks is not covered by this methodology. The project proponents shall explore applying AMS-III.Z.

[3] An element process is a process, with associated equipment, in which an energy source (or mix of energy sources) is used for production purposes to convert raw materials into intermediate or finished product using heat.

(b) It shall be demonstrated, with historical data, that for at least the immediately prior three year to the start date of project, only fossil fuels (no renewable biomass) were used in the production systems, which are being modified, retrofitted or replaced. In cases where small quantities of biomass were used for experimental purposes then this can be excluded;

(c) Regulations do not restrict the use of the baseline fossil fuel or require the use of project biomass and low carbon energy sources unless widespread non-compliance (less than 50% of manufacturing production activities comply in the country) of the local regulation is evidenced;

(d) The production process where the fuel switch takes place shall have a distinct energy input (i.e. specific fuels) and distinct output (i.e. intermediate or finished product). The output of each element process shall be an output for which an appropriate international/national standard or industrial norm exists;

(e) This methodology is not applicable to project activities where primary output of the processes is energy (e.g. heat, electricity) that can be directly measured;

(f) The product(s) (e.g. ceramic insulators, tiles, steel ingots, lime, aluminium cookware) produced in the industrial facility throughout the crediting period shall be equivalent to the product(s) produced in the baseline. For the purposes of this methodology, equivalent products are defined as products having the same use, the same general physical properties, and which function in a similar manner. In addition, products produced in the industrial facility throughout the crediting period shall provide the same level of service, or better, and be of the same level of quality, or better than the product(s) produced in the baseline. When national or international product standards apply to the product(s), product quality shall be as defined in such standards, otherwise the relevant industrial norms are to be followed;

(g) The type of input materials used in the project shall be homogeneous and similar to the input material that was used in the baseline and any deviation during the crediting period of input material type, composition, or amount used per unit of product output shall be within the range of ±15 per cent of the baseline characteristics and values;

(h) The facilities involving modification, retrofit and/or replacement shall not influence the production capacity beyond ±15 per cent of the baseline capacity.

6. Any emissions reduction derived from chemical processes[4] related to the transformation of raw materials in the industrial facilities are not eligible for claiming CERs. Examples include de-carbonisation of raw materials (i.e. $CaCO_3$ and $MgCO_3$ bearing minerals) in kiln producing clinker and utilization of biomass as a reducing agent in metal ore reduction processes using charcoal.

[4] For project activities involving the use of biomass to displace fossil fuel in industrial processes where the chemical energy of the fuel accomplishes thermo chemical transformation of raw materials into intermediate or final products, and where the fuel input is utilized as both energy source as well as feedstock (e.g. reducing agent) a revision of the methodology would be required to apportion the project energy input between energy and reduction/feedstock use.

7. The renewable biomass utilized by the project activity shall not be chemically processed (e.g. esterification to produce biodiesel, degumming and/or neutralization by chemical reagents) prior to the combustion but it may be processed mechanically (e.g. pressing, filtering)/thermally (e.g. gasification to produce syngas).[5]

8. This methodology is applicable to project activities that involve a retrofit[6] of (an) existing plant(s); or a replacement[7] of (an) existing plant(s) that must have been in operation for at least the immediately prior three years to the start date[8] of the project activity. This requirement is in order to ensure that adequate baseline performance data are available.

~~9.In cases where the project activity uses crops from renewable biomass origin as fuel, the crops should be cultivated at dedicated plantations and the following conditions have to be met:~~

~~(a) The project activity does not lead to a shift of pre-project activities outside the project boundary i.e. the land under the proposed project activity can continue to provide at least the same amount of goods and services as in the absence of the project;~~

~~(b) The plantations are established on a land:~~

~~(i) Which was at the start of the project implementation, classified as degraded or degrading as per the "Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities"; or~~

~~(ii) Area that is included in the project boundary of one or several registered A/R CDM project activities;~~

~~(c) Plantations established on the peatlands are not eligible even if qualifying under~~

~~9.~~ Farmer records shall be cross-checked with records from seed suppliers and synthetic nitrogen fertilizer suppliers. In case of discrepancies between farmer records and those from the respective suppliers, the most conservative value shall be taken.~~condition (i) and (ii) above.~~

[5] The syngas shall be derived from gasification of renewable biomass only and no methane emissions are to be released to the atmosphere demonstrating the complete use for combustion of the syngas in the project equipment.

[6] Retrofit (or Rehabilitation or Refurbishment). It involves an investment to repair or modify an existing unit, with the purpose to enable the fossil fuel switch to biomass without adding new plants or units. A retrofit restores the installed capacity to its original level. Retrofits shall only include measures that involve capital investments and not regular maintenance or housekeeping measures.

[7] Replacement. It involves investment in unit that replaces one or several existing unit(s) at the existing plant.

[8] As per the definition of start date provided in paragraph 67, EB 41.

10. In case biomass is sourced from dedicated plantations, the applicability criteria in the tool "Project emissions from cultivation of biomass" shall apply.

11. In cases where the project activity utilizes charcoal produced from renewable biomass as fuel, the methodology is applicable provided that:

    (a) Charcoal is produced in kilns equipped with methane recovery and destruction facility; or

    (b) If charcoal is produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be considered.

12. The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the most recent version of "General guidelines ~~to~~ for SSC CDM methodologies". If the remaining lifetime of the affected systems increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the affected systems would have been replaced in the absence of the project activity.

13. In cases where product output (e.g. hot/fused metal) cannot be measured, the input material used in the manufacturing process can be used as a proxy for determining baseline/project emissions.

14. Measures are limited to those that result in emission reductions of less than or equal to 60 kt CO_2 equivalent annually.

2.3. Entry into force

15. Not applicable (call for public input).

3. Normative references

16. Project participants shall apply the general guidelines to the SSC CDM methodologies, information on additionality (attachment A to Appendix B) and general guidance on leakage in biomass project activities (attachment C to appendix B) provided at <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> mutatis mutandis.

17. This methodology also refers to the latest approved versions of the following approved methodologies and tools:

    (a) "Project emissions from cultivation of biomass". ~~AM0042 "Grid-connected electricity generation using biomass from newly developed dedicated plantations";~~

    (b) "ACM0009: Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas";

    (c) "AMS-III.AK: Biodiesel production and use for transport applications";

    (d) "AMS-III.Z: Fuel Switch, process improvement and energy efficiency in brick manufacture";

(e) "Tool for the identification of degraded or degrading lands for consideration in implementing CDM A/R project activities";

(f) "Tool to calculate baseline, project and/or leakage emissions from electricity consumption";

(g) "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

4. Definitions

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

5. Baseline methodology

5.1. Project boundary

19. The project boundary is the physical, geographical site where the switching of energy sources takes place. It includes all installations, processes or equipment affected by the switching. In cases where the renewable biomass is sourced from dedicated plantations it also includes the area of the plantations. In cases involving thermo-mechanical processing of the biomass (e.g. charcoal; briquettes; syngas) the sites where these processes are occurring shall be within the project boundary.

5.2. Baseline

20. The baseline is related to the historical fossil fuel consumption associated with the element processes, affected by the project activity that would continue to occur in the absence of the project activity.

21. Project activities resulting in an annual emission reductions less than 20 kt CO_2 may apply Option 1 for baseline emissions calculations, whereas projects exceeding 20 kt CO_2 shall apply Option 2.

5.2.1. Option 1:

22. For projects that involve replacing, modifying or retrofitting systems in existing facilities, the average of the immediately prior three-year historical fossil fuel consumption data, for the existing facility, shall be used to determine an average annual baseline fossil fuel consumption value. Similarly, prior three-year historical production data (excluding abnormal years) for the existing facility, shall be used to determine an average annual historical baseline output production rate.

$$BE_y = P_{prod,y} \times EF_{CO2,BL} \quad \text{Equation (1)}$$

Where:

BE_y	=	The baseline emissions from fossil fuels displaced by the project activity in t CO_2e in year *y* (of the crediting period)
$EF_{CO2,BL}$	=	The baseline specific emission factor in t CO_2/kg or m3
$P_{prod,y}$	=	The annual net production of the facility in year *y*, in kg or m3

23. The baseline specific emission factor ($EF_{CO2,BL}$) can be calculated ex ante as follows:

$$EF_{CO2,BL} = \frac{\sum_i \left(FC_{FF,BL,i} \times NCV_{FF,i} \times EF_{CO2,FF,i} \right)}{P_{prod,BL}} \qquad \text{Equation (2)}$$

Where:

$FC_{FF,BL,i}$	=	Average annual baseline fossil fuel consumption value for fuel type *i*, using volume or weight units[9]
$NCV_{FF,i}$	=	Average net calorific value of fossil fuel type *i* combusted, GJ per unit volume or mass unit
$EF_{CO2,FF,i}$	=	CO_2 emission factor of fossil fuel type *i* combusted in t CO_2/GJ
$P_{prod,BL}$	=	Average annual historical baseline production in units of weight or volume, kg or m3

5.2.2. Option 2:

24. The baseline emissions from displacement of fossil fuels are calculated as follows:

$$\mathrm{BE}_y = \left[\sum_k \left(FC_{PJ,k,y} \times NCV_{k,y} \right) - FP_y \right] \times \mathrm{EF}_{\mathrm{CO2,BL,y}} \qquad \text{Equation (3)}$$

Where:

$FC_{PJ,k,y}$	=	Quantity of biomass type *k* used in the project plant in year *y* (tonnes)
$NCV_{k,y}$	=	Net calorific value of the biomass type *k* in year *y* (GJ/tonnes)
FP_y	=	Fuel penalty/bonus in year *y* (GJ)
$\mathrm{EF}_{\mathrm{CO2,BL,y}}$	=	Baseline emissions factor in year *y* (t CO_2/GJ). The parameter shall be estimated following paragraph ~~21~~ 28

25. A project specific fuel “penalty” or fuel “bonus” may be applied because the combustion of biomass/will affect the heat transfer efficiency in the manufacturing process (e.g. in

[9] Volume or weight units will be used depending on which best defines the fuel consumption requirements of the production process(es).

clinker production process). The project fuels may therefore require a greater or smaller heat input to produce the same quantity and quality of the process output.

26. This project specific fuel penalty/bonus (FP_y) should be determined as follows:

$$FP_y = P_{prod,y} \times (SEC_{prod,PJ,y} - SEC_{prod,BL}) \quad \text{Equation (4)}$$

Where:

$P_{prod,y}$ = Production in year *y* (tonnes)

$SEC_{prod,PJ,y}$ = Specific energy consumption of the plant in year *y* (GJ/t product)

$SEC_{prod,BL}$ = Specific energy consumption of the plant in the absence of the project activity (GJ/t product)

27. The specific energy consumption in the project is calculated based on the quantity of all fuels used in the project plant and the quantity of output produced in year *y*, as follows:

$$SEC_{prod,PJ,y} = \frac{\sum_i (FC_{PJ,i,y} \times NCV_{i,y}) + \sum_k (FC_{PJ,k,y} \times NCV_{k,y})}{P_{prod,y}} \quad \text{Equation (5)}$$

Where:

$SEC_{prod,PJ,y}$ = Specific energy consumption of the project plant in year *y* (GJ/t output)

$FC_{PJ,i,y}$ = Quantity of fossil fuel type *i* fired in the project plant in year *y* (tonnes)

$NCV_{i,y}$ = Net calorific value of the fossil fuel type *i* in year *y* (GJ/tonne)

$FC_{PJ,k,y}$ = Quantity of biomass type *k* used in the project plant in year *y* (tonnes)

$NCV_{k,y}$ = Net calorific value of the biomass type *k* in year *y* (GJ/tonne)

$P_{prod,y}$ = Production in year *y* (tonnes)

28. As a conservative approach, the specific energy consumption in the absence of the project activity should be calculated as the lowest annual ratio of fuel input per output production among the most recent three years prior to the start date of the project activity, as follows:

$$SEC_{prod,BL} = MIN\left[\frac{FC_{i,x} \times NCV_i}{P_{prod,x}}; \frac{FC_{i,x-1} \times NCV_{i,x-1}}{P_{prod,x-1}}; \frac{FC_{i,x-2} \times NCV_{i,x-2}}{P_{prod,x-2}}\right] \quad \text{Equation (6)}$$

Where:

$SEC_{prod,BL}$ = Specific energy consumption of the project plant in the absence of the project activity (GJ/t output)

$FC_{i,x}$ = Quantity of fossil fuel type *i* used in the project plant in year *x* (tonnes)

NCV_i = Net calorific value of the fossil fuel type *i* (GJ/tonne)

$P_{prod,x}$ = Production in year *x* (tonnes)

x = Year prior to the start of the project activity

i = Fossil fuel types used in the project plant in the last three years prior to the start date of the project activity

29. In cases where project activity involves partial fossil fuel switch to biomass, the baseline emissions factor ($EF_{CO2,BL,y}$) shall be calculated as the minimum of the ex ante emission factor ($EF_{CO2,BL,(ex-ante)}$) and ex post emission factor ($EF_{CO2,BL,y(ex-post)}$) determined as per the equations (7) and (8). In cases where project activity involves complete fossil fuel switch to biomass, only Option A shall be used for calculating the baseline emissions factor as per equation (7).

(a) **Option A:** The weighted average CO_2 emission factor for the fossil fuel(s) consumed during the most recent three years before the start of the project activity, calculated as follows:

$$EF_{CO2,BL,(ex-ante)} = \frac{\sum_i (FC_{i,x-2} + FC_{i,x-1} + FC_{i,x}) \times NCV_i \times EF_{CO2,FF,i}}{\sum_i (FC_{i,x-2} + FC_{i,x-1} + FC_{i,x}) \times NCV_i} \quad \text{Equation (7)}$$

Where:

$EF_{CO2,BL,(ex-ante)}$ = Ex ante emissions factor for the fossil fuels displaced in year *y* (t CO_2/GJ)

(b) **Option B:** The weighted average annual CO_2 emission factor of the fossil fuel(s) that are used in the project plant in year *y*, calculated as follows:

$$EF_{CO2,BL,y,(ex\text{-}post)} = \frac{\sum_i FC_{PJ,i,y} \times NCV_{i,y} \times EF_{CO2,FF,i,y}}{\sum_i FC_{PJ,i,y} \times NCV_{i,y}} \quad \text{Equation (8)}$$

Where:

$EF_{CO2,BL,y,(ex\text{-}post)}$ = Ex post emissions factor for the fossil fuels displaced in year *y* (t CO_2/GJ)

$EF_{CO2,FF,i,y}$ = Carbon dioxide emission factor for fossil fuel type *i* in year *y* (t CO_2/GJ)

30. For the determination of the emission factor ($EF_{CO2,FF,i}$) and the net calorific value ($NCV_{FF,i}$) for the fossil fuel used in the baseline scenario, guidance by the most recent version of the IPCC Guidelines for National Greenhouse Gas Inventories shall be followed where appropriate. Project participants may either conduct measurements or they may use accurate and reliable local or national data where available. In the case of coal, the data shall be based on test results for periodic samples of the coal purchased if such tests are part of the normal practice for coal purchases. Where such data is not available, IPCC default emission factors (country-specific, if available) may be used if they are deemed to reasonably represent local circumstances. All values shall be chosen in a conservative manner (i.e. lower values should be chosen within a plausible range) and the choice shall be justified and documented in the SSC-CDM-PDD. Where measurements are undertaken, project participants shall document the measurement results and the calculated average values of the emission factor or net calorific value for the baseline fuel ex ante in the SSC-CDM-PDD.

31. Where it can be demonstrated that the product output cannot be directly measured as per paragraph ~~10~~12, the $P_{prod,y}$ shall be substituted with input material $I_{prod,y}$ and $P_{prod,BL}$ shall be substituted with input material $I_{prod,BL}$ in the corresponding equations.

5.3. Leakage

~~32. Leakage emissions due to a shift of pre-project activities and competing use of biomass shall be accounted for as per the approved "General guidance on leakage in biomass project activities for small-scale project activities" (attachment C of Appendix B).~~

32. ~~If the equipment currently being utilised is transferred from outside the boundary to the project boundary, leakage is to be considered.~~ General guidance on leakage in biomass project activities shall be followed to quantify leakages pertaining to the use of biomass residues.

5.4. Project activity emissions

33. The project emissions should be calculated as follows:

$$PE_y = PE_{elec,y} + PE_{fossilfuel,y} + PE_{transporty} + PE_{cultivation,y} + PE_{CH4,y} \quad \text{Equation (9)}$$

Where:

PE_y = Project emissions in year *y* (t CO_2)

$PE_{elec,y}$ = Project emissions due to electricity consumption in year *y* (t CO_2)

$PE_{fossilfuel,y}$ = Project emissions due to fossil fuel consumption in year *y* (t CO_2)

$PE_{transporty}$ = Project emissions from transportation of the renewable biomass from the places of their origin to the manufacturing facility site in year *y* (t CO_2)

$PE_{cultivation,y}$	=	Project emissions from renewable biomass cultivation in year *y* (t CO_2e)
$PE_{CH4,y}$	=	Project emissions due to the production of charcoal in kilns not equipped with a methane recovery and destruction facility in year *y* (t CO_2e)

5.4.1. Calculation of $PE_{elec,y}$

34. The emissions include electricity consumption (including auxiliary use) $PE_{elec,y}$ associated with the biomass treatment and processing, calculated as per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

5.4.2. Calculation of $PE_{fossilfuel,y}$

35. The emissions include fossil fuel consumption (including auxiliary use) $PE_{fossilfuel,y}$ associated with the operation of manufacturing process and the biomass treatment and processing, calculated as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

5.4.3. Calculation of $PE_{transport,y}$

36. Project emissions from transportation of the renewable biomass from the places of its origin to the manufacturing production site shall be accounted following the procedures in "AMS-III.AK: Biodiesel production and use for transport applications" if the transportation distance is more than 200 km, otherwise they can be neglected.

5.4.4. Calculation of $PE_{cultivation,y}$

37. In case biomass is sourced from dedicated plantations, the procedures in the tool "Project emissions from cultivation of biomass" shall be used to calculate $PE_{cultivation,y}$ ~~In cases where the project activity utilizes biomass sourced from dedicated plantations the project emissions from renewable biomass cultivation shall be calculated as per relevant provisions of AMS-III.AK "Biodiesel production and use for transport applications"~~.

5.4.5. Calculation of $PE_{CH4,y}$

38. The project methane emissions from the charcoal produced in kilns not equipped with a methane recovery and destruction facility, methane emissions from the production of charcoal shall be accounted for as per the relevant procedures of AMS-III.K "Avoidance of methane release from charcoal production by shifting from traditional open-ended methods to mechanized charcoaling process". Alternatively, conservative emission factor values from peer reviewed literature or from a registered CDM project activity can be used, provided that it can be demonstrated that the parameters from these are comparable e.g. source of biomass, characteristics of biomass such as moisture, carbon content, type of kiln and operating conditions such as ambient temperature.

5.5. Emission reductions

39. Emission reductions in year *y* (ER_y) are calculated as follows:

$$\mathrm{ER}_y = BE_y - PE_y - LE_y \qquad \text{Equation (10)}$$

Where:

PE_y = Project emissions in year *y* (t CO_2/y)

LE_y = Leakage emissions in year *y* (t CO_2/y)

6. Monitoring methodology

40. Monitoring shall include the compliance of the performance level of the product to the appropriate national/international standard or industrial norms shall be proven by one of the following options:

(a) The project proponent shall have a quality management system to ensure the performance level of the product. The scope of quality management system shall cover all processes, materials and skills required to manufacture products which meet the national or international standard or relevant industrial norms. The documentation of the quality management system shall be made available to the DOE for validation and verification;

(b) The DOE shall conduct a site check of the testing facilities and procedures implemented to ensure the performance level of the product;

(c) The products shall be tested in nationally approved laboratories and test certificates on the performance level of the products shall be made available for verification.

41. Relevant parameters shall be monitored as indicated in ~~Table 1~~ section 6.1 below. The applicable requirements specified in the "General guidelines ~~to~~ for SSC CDM methodologies" (e.g. calibration requirements, sampling requirements) are also an integral part of the monitoring guidelines specified below and therefore shall be referred to by the project participants.

42. Parameters for determining project emissions from renewable biomass cultivation and from transportation of renewable biomass over distances of 200 km shall be monitored as per relevant provisions of AMS-III.AK.

43. Parameters for determining methane emissions from the charcoal produced in kilns not equipped with a methane recovery and destruction facility shall be monitored as per the relevant procedures of AMS-III.K.

6.1. Parameters to be monitored

Data / Parameter table 1.

Data / Parameter:	$I_{prod,y}$
Data unit:	tonnes/year
Description:	The annual net project raw material consumption in the element process *i* in year *y*
Measurement procedures (if any):	Raw material shall be weighed using calibrated scales or other measuring equipment before entering the processing facility (e.g. reheating furnace). Measurement results shall be cross-checked with records for purchased raw materials (e.g. invoices/receipts), inventory records and by performing a mass-balance
Monitoring frequency:	As per the established industrial practice
Any comment:	-

Data / Parameter table 2.

Data / Parameter:	$P_{prod,y}$
Data unit:	tonnes/year
Description:	The annual net project production of the element process *i* in year *y*
Measurement procedures (if any):	Measurements are undertaken using calibrated meters. Measurement results shall be cross-checked with records for sold production (e.g. invoices/receipts), inventory records and by performing mass-balance
Monitoring frequency:	As per the established industrial practice
Any comment:	-

Data / Parameter table 3.

Data / Parameter:	$EF_{CO2,FF,i,y}$
Data unit:	t CO_2e/GJ
Description:	CO_2 emission factor for the fossil fuel
Measurement procedures (if any):	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Monitoring frequency:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Any comment:	-

Data / Parameter table 4.

Data / Parameter:	$FC_{PJ,i,y}$
Data unit:	Mass or volume unit
Description:	Quantity of fossil fuel combusted in year *y*

Measurement procedures (if any):	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Monitoring frequency:	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Any comment:	-

Data / Parameter table 5.

Data / Parameter:	$EC_{elec,y}$
Data unit:	MWh/y
Description:	Quantity of electricity consumed in year y
Measurement procedures (if any):	Measurements are undertaken using calibrated energy meters. As per the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption"
Monitoring frequency:	Continuous monitoring, hourly measurement and at least monthly recording
Any comment:	-

Data / Parameter table 6.

Data / Parameter:	$NCV_{i,y}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value of fossil fuel
Measurement procedures (if any):	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
Monitoring frequency:	Annually
Any comment:	-

Data / Parameter table 7.

Data / Parameter:	$NCV_{k,y}$
Data unit:	GJ/mass or volume unit
Description:	Net calorific value of biomass type *k*
Measurement procedures (if any):	Measurement in laboratories according to relevant national/international standards. Measure the NCV based on dry biomass. Check the consistency of the measurements by comparing the measurement results with measurements from previous years, relevant data sources (e.g. values in the literature, values used in the national GHG inventory) and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, conduct additional measurements
Monitoring frequency:	Annually
Any comment:	-

Data / Parameter table 8.

Data / Parameter:	$FC_{PJ,k,y}$
Data unit:	Tonne
Description:	Net quantity of biomass type *k* consumed in year *y*
Measurement procedures (if any):	Use mass or volume based measurements. Adjust for the moisture content in order to determine the quantity of dry biomass. And/or perform an annual energy/mass balance that is based on purchased quantities and stock
Monitoring frequency:	Continuously or estimate using annual mass/energy balance
Any comment:	-

Data / Parameter table 9.

Data / Parameter:	**-**
Data unit:	% water
Description:	Moisture content of the biomass residues
Measurement procedures (if any):	On-site measurements. In case of dry biomass, monitoring of this parameter is not necessary
Monitoring frequency:	The moisture content of biomass of homogeneous quality shall be monitored at least on a monthly basis. The weighted average should be calculated for each monitoring period and used in the calculations
Any comment:	-

7. Project activity under a programme of activities

44. The following conditions apply for use of this methodology in a project activity under a programme of activities:

(a) Leakage emissions resulting from fuel extraction, processing, liquefaction, transportation, re-gasification and distribution of fossil fuels outside of the project boundary shall be considered, as per the methodological tool "Upstream leakage emissions associated with fossil fuel use"~~guidance provided in the leakage section of ACM0009 "Consolidated baseline and monitoring methodology for fuel switching from coal or petroleum fuel to natural gas".~~ In case leakage emissions in the baseline situation are higher than leakage emissions in the project situation, leakage emissions will be set to zero.

~~b.In the specific case of biomass project activities the applicability of the methodology is limited to either project activities that use biomass residues only or biomass from dedicated plantations complying with the applicability conditions of AM0042 "Grid-connected electricity generation using biomass from newly developed dedicated plantations".~~

~~(c) In the specific case of biomass project activities the determination of leakage shall be done following the general guidance on leakage in small-scale biomass~~

~~project activities (attachment C of Appendix B[10] of simplified modalities and procedures for small-scale clean development mechanism project activities; decision 4/CMP.1) or following the procedures included in the leakage section of AM0042.~~

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Document information

Version	*Date*	*Description*
Draft 02.0	5 September 2014	SSC WG 45, Annex 12 A call for public input will be issued on this draft revised methodology. The revision: • Introduces the methodological tool "Project emissions from cultivation of biomass", streamlining biomass cultivation procedures across small and large scale methodologies; • Streamlines upstream leakage emissions associated with fossil fuel use procedures; • Removes restrictions for application in a PoA.
01.0	18 February 2011	EB 59, Annex 1 Initial adoption.

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~~[10] Available on <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.~~