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TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall take into account the general guidance to the methodologies, information on additionality, abbreviations and general guidance on leakage provided at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html>.

III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source

Technology/measure

1. This methodology comprises ~~fossil fuel~~ switching of input energy source[1] in industrial, residential, commercial, institutional or electricity generation applications[2] (e.g. fuel switch from fuel oil to natural gas or switching from/to grid electricity, when the grid emission factor is higher/lower than the alternative energy source) ~~in an existing captive electricity generation, or replacement of or replacement of a fuel oil boiler by a natural gas boiler).~~ This methodology may be applied in one or several element processes[3].

2. ~~Retrofit or replacement of existing installations are eligible under this methodology.~~ This methodology is applicable for new facilities as well as for retrofit or replacement of existing installations.

3. ~~Fuel switching may also result in energy efficiency improvements. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this methodology. If fuel switching is part of a project activity focussed primarily on energy efficiency, the project activity falls under AMS II.D or II.E.~~ Switching of energy sources may also result in energy efficiency improvements of the facility, thus both the project activities with or without energy efficiency improvements are eligible under this category. Project activities for implementation of energy efficiency measures not-related to the switch of energy sources shall apply Type II SSC methodologies.

4. New facilities (Greenfield projects) and project activities involving capacity additions compared to the baseline scenario are only eligible if they comply with the related and relevant requirements in the General Guidance for SSC methodologies ~~concerning these topics~~. In addition the requirements for demonstration of the remaining lifetime of the equipment replaced shall be met as described in the general guidance. If the remaining lifetime of the plant increases due to the project activity, the crediting period shall be limited to the estimated remaining lifetime, i.e. the time when the existing equipment of the element process would have been replaced in the absence of the project activity.

[1] Energy source in the context of this category is a fossil fuel or electricity serving as input energy of an element process.

[2] Fuel switch in transportation technologies is not eligible under this methodology.

[3] An "*element process*" is defined as fuel combustion, energy conversion or energy use in a single equipment. Each element process generates a single output (such as electricity, steam, hot air) by using a single or multiple combinations of energy sources. This methodology covers switch of energy sources in several element processes, i.e. project participants may submit one CDM-PDD for fuel switch in several element processes within a facility.

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

5. This methodology is not applicable to project activities that propose switch from fossil fuel use in the baseline to renewable biomass, biofuel or renewable energy in the project scenario. ~~A relevant Type I methodology shall be used for such project activities that generate renewable energy displacing fossil fuel use.~~ This methodology is not applicable to project activities utilising waste gas or energy; these project activities may consider applying AMS-III.Q.

~~6. In case of existing facilities historical information (detailed records) on the use of fossil fuels and the plant output (e.g. heat or electricity) in the baseline captive energy generation plant from at least 3 years prior to project implementation shall be used in the baseline calculations, e.g. information on coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used *in lieu* of actual collecting baseline validation data[1]). For facilities that are less than 3 years old, all historical data shall be available (a minimum of one year data would be required).~~

6. This category is applicable to project activities where it is possible to directly measure and record the energy use (e.g. heat and electricity) and consumption (e.g. fossil fuel) within the project boundary.

~~7. Multiple fossil fuel switching is not covered under this methodology.~~

7. Heat or electricity produced under the project activity shall be for on-site captive use and/or export to other facilities included in the project boundary. In case energy produced by the project activity is delivered to another facility, or facilities, within the project boundary, a contract between the supplier and consumer(s) of the energy will have to be entered into specifying that only the facility generating the energy can claim emission reductions from the energy displacement. Export of electricity to the grid is not allowed under this category.

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

9. Regulations do not constrain the facility from using the energy sources cited in paragraph 1 before or after the fuel switch. Regulations do not require the use of low carbon energy source (e.g., natural gas or any other fuel) in the element processes.

10. The project activity does not result in integrated process change. The purpose is to exclude measures that affect other characteristics of the process besides switch of energy sources e.g. operational conditions, type of raw material processed, use of non-energy additives, change in type or quality of products manufactured etc.

Boundary

11. ~~9.~~ The project boundary is the physical, geographical site where the ~~fossil fuel~~ switching of energy source takes place ~~and~~. It includes all installations, processes or equipment

[1] ~~In the case of coal, the emission coefficient 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.~~

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

affected by the switching. The boundary also extends to the industrial, commercial or residential facilities consuming energy generated by the system.

12. In the case of displacement of grid electricity or the use of grid electricity, all power plants connected physically to the baseline grid as defined in "Tool to calculate emission factor for an electricity system" shall be included in the project boundary.

Baseline

~~10. The emission baseline is the current emissions of the facility expressed as emissions per unit of output. Baseline emissions shall be determined as follows:~~

13. Baseline emissions are determined as the lower of the following[1]:

(a) Historical emissions of existing facility (see paragraph 14), and

(b) Emissions from a technology that represents an economically attractive course of action (see paragraph 15).

14. In case of existing facilities historical information (detailed records) on the use of fossil fuels and the plant output (e.g. heat or electricity) in the baseline captive energy generation plant from at least 3 years prior to project implementation shall be used in the baseline calculations, e.g. information on coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used in lieu of actual collecting baseline validation data). For facilities that are less than 3 years old, all historical data shall be available.

15. The baseline scenario is the use of a high carbon intensive energy source (or mix of energy sources) that is the most attractive based on investment analysis. The baseline energy source shall be determined *ex ante* by comparison of the reasonable mix of energy sources for each element process. If the element process continues to consume more than one fuel or energy source during the crediting period, the investment analysis shall compare all reasonable scenarios.

16. The following procedures shall be used:

Step 1: Identify all energy mix scenarios that can potentially be used for the operation of the element process *i* during the crediting period including:

(a) Historic single energy source or mix of energy sources for the element process *i*, in case identical fuel mix has been used for at least the last three years;

(b) Each single energy source potentially available to supply the total energy demand of the element process *i* during the crediting period. For example in the case of grid connected project activities, where grid electricity is available to meet all the energy demand, this scenario shall be included;

[1] Greenfield projects shall use option (b) only

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

(c) If the *ex ante* identified energy source/s of element process *i* can not be used for any unavoidable reasons such as supply constraints (e.g. lack of availability during certain seasons, months etc) during the crediting period an alternative energy mix scenario shall be so chosen that the deficit is met by the least expensive of the remaining energy sources. Deviation from the projected scenario shall be justified with supporting data (e.g. supplier quotations, estimates of the deliverable amount of a fuel, etc.);

(d) A mix of energy sources that can potentially be used during the crediting period, combining the different energy sources for example considering the supply conditions and/or seasonal availability of the different energy sources. Each mix included into this category shall be properly justified.

Step 2: Apply "Step 3 - Investment analysis" of the latest version of the "Combined tool for identification of baseline scenario and demonstrate of additionality" to each of the scenarios identified in step 1. The analysis shall use the net present value (NPV) method, all the assumptions made for calculations shall be included in the PDD, and the analysis shall explicitly consider the following parameters:

- Investment requirements (including break-up into major equipment cost, required construction work, installation). For existing element processes, only investment costs associated with new installations due to the project activity shall be considered in the analysis. The scenario for an existing element process using single energy source or mix of energy sources that is identical to 3 year historic use, zero investment cost shall be assumed (i.e. the project has no need for an additional investment). This is justified even in the case of existing element process consuming more than one energy source historically, as changes in relative share of energy sources is unlikely to result in additional investment requirements. If investment costs are necessary only to the energy sources proposed to be included by the project activity (e.g. new burners to use the low carbon fuel, or to use electricity), they shall be considered only for this scenario. For greenfield projects, the full investment cost shall be considered to all identified alternative scenarios;
- A discount rate appropriate to the country and sector (use government bond rates, increased by a suitable risk premium to reflect private investment in fuel switching projects, as substantiated by an independent (financial) expert);
- Efficiency of each element process, taking into account any differences between energy sources, see below;
- Current price and expected future price (variable costs) of each alternative energy source mix. Estimates of the future prices have to be substantiated by a public and official publication from a governmental body or an intergovernmental institution. If such publications are not available, highlight the key logical assumptions and quantitative factors for determining the development of costs of each fuel (e.g. international market price, transport costs, level of taxes/subsidies, local price). State clearly which assumptions and factors have significant uncertainty associated with

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

them, and include these uncertainties in the sensitivity analysis in "Step 3 – investment analysis". Operating costs for each energy source (especially, handling/treatment costs);

- Lifetime of the project, that may be equal to the crediting period or to the remaining lifetime of the existing element process;
- Other operation and maintenance costs, e.g. of slag and ash disposal, environmental pollution fees etc.

The NPV calculation should take into account the residual value of the new equipment at the end of the lifetime of the project activity.

Outcome of Investment analysis: Ranking of the short list of alternative scenarios according to the NPV taking into account the results of the sensitivity analysis.

- If the sensitivity analysis is not conclusive, identify the baseline scenario alternative with the least emissions among the alternatives (i.e. the most conservative);
- If the sensitivity analysis is conclusive and confirms the result of the investment comparison analysis, then the most economically or financially attractive alternative scenario is considered as baseline scenario.

Step 3: Determine the baseline emissions during the year *y* of the crediting period:

~~$BE_y = EF_{BSL} * Q_y$~~ $$BE_y = \sum_{i,j} FC_{i,j,BL,y} * NCV_j * EF_{CO2,j} + EC_{i,el,BL,y} * EF_{CO2,el} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions ~~in the project activity in~~ during year *y* (tCO_2e)
~~EF_{BSL}~~ $FC_{i,j,BL,y}$	~~Emission factor for the baseline situation (tCO_2/MWh)~~ Amount of fuel *j* consumed by the element process *i* during the year *y* operating at the baseline energy scenario (liters, tons, etc.)
~~Q_y~~ NCV_j	~~Net output in the project activity in year y (MWh)~~ Net calorific value of the fuel type *j* (kJ/unit)
$EF_{CO2,j}$	CO_2 emission factor of the fuel type *j* (tCO_2/kJ)
$EC_{i,el,BL,y}$	Amount of grid electricity consumed by the element process *i* during the year *y* operating at the baseline energy scenario (kWh)
$EF_{CO2,el}$	CO_2 emission factor for grid electricity consumption (t CO_2/kJ), determined as per AMS-I.D

~~11. The net output in the project activity (Q_y) is limited to the installed capacity in the baseline situation, unless it has been demonstrated in accordance with paragraph 4 that the new installation (Greenfield project) or the added capacity has the same baseline scenario.~~

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

~~12. The emission factor in the baseline situation (EF_{BSL}) is the coefficient for the fossil fuel used in the baseline expressed as emissions per unit of output (e.g. kg CO_2e/kWh).~~

The amount of each fuel type *j* and of electricity consumption is calculated using the total monitored energy output of the element process *i* during year *y* and the share of each energy source in the identified baseline scenario:

~~$EF_{BSL} = (FC_{BSL} * EF_{CO2} * NCV) / Q_{BSL}$~~ $$FC_{i,j,BL,y} = \frac{EG_{i,y} * a_{i,j,BL}}{NCV_j * Eff_{i,BL,j}} \quad (2)$$

$$EC_{i,el,BL,y} = \frac{EG_{i,y} * a_{i,el,BL}}{Eff_{i,BL,el}} \quad (3)$$

Where:

~~FC_{BSL}~~ $EG_{i,y}$	~~Total amount of fossil fuel consumed for captive energy generation in the baseline situation in accordance with paragraph 6 (mass or volume unit)~~ Total monitored output (heat, electricity etc) of the element process *i* during year *y*
~~EF_{CO2}~~ $a_{i,j,BL}$	~~CO_2 emission factor for the baseline fossil fuel[1] (tCO_2/TJ)~~ Share of fuel *j* in the total input energy of the element process *i* for the identified baseline scenario (ratio).
~~*NCV*~~ $a_{i,el,BL}$	~~Net calorific value for the baseline fossil fuel (TJ/ mass or volume unit)~~[5] Share of grid electricity in the total input energy of the element process *i* for the identified baseline scenario (ratio)[2].
~~Q_{BSL}~~ $Eff_{i,BL,j}$	~~Net energy generated in the captive plant in the baseline situation during the corresponding period of time for which the total fuel consumption was taken, in accordance with paragraph 6 (MWh)~~ Conversion efficiency of the element process *i* when operating with fuel type *j* in the baseline scenario (output / kWh), see below.
$Eff_{i,BL,el}$	Conversion efficiency of the element process *i* when operating with grid electricity in the baseline scenario (output / kWh), see below.

The efficiency of the element process in the baseline scenario ($Eff_{i,BL,j}$ and $Eff_{i,BL,el}$) may be estimated using one of the following options:

(i) For an existing element process, that is able to utilize the baseline fuel or energy mix scenario, the efficiency directly determined by a measurement campaign for at

[1] ~~Reliable local or national data for the emission factor and NCV shall be used; IPCC default values should be used only when country or project specific data are not available or difficult to obtain.~~

[2] For example, if in the baseline scenario the element process *i* uses a single fuel *j*, $a_{i,j,BL}$ for this fuel is unity, and is zero for all other fuels and for electricity. In case the baseline scenario is the solely use of grid electricity, $a_{i,el,BL}$ is unity for grid electricity, and is zero for all other energy sources. For a scenario where only two fuels are used, each accounting for 50% of the total energy input (based on fuel energy content), $a_{i,j,BL}$ is 0.5 for both.

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

least 5 days at the beginning of the project activity. The measurement should be undertaken during a period that is representative for the typical operation conditions of the systems e.g. ambient conditions, type and quality (moisture, composition, etc.) of raw materials and fuels. Average values from the measurement campaign shall be used to determine $Eff_{i,BL,j}$ and $Eff_{i,BL,el}$. The campaign shall be repeated if changes occur in the element process during the project activity, so as to significantly increase its efficiency (more than 5%), and the newly established measured values shall be used from that point onwards.

(ii) For a baseline scenario where the efficiency cannot be directly measured (e.g. in case it is technically not feasible to operate the element process with the baseline mix of energy sources, or in case of greenfield projects), a conservative efficiency value shall be chosen from the following options, in decreasing order of preference: a) benchmark value obtained from historical data or from measurement campaign done in existing similar element processes found in other application(s), where the baseline fuel or energy source mix is used, or b) the value provided by the manufacturer of the element process as the highest attainable annual efficiency when using the baseline energy mix; or c) a conservative value of 100%.

17. The *ex ante* calculation of the baseline emissions shall be presented in the PDD based on the estimated production of the element process *i* during the crediting period. The *ex post* calculations are done based on measured output of the element process. The monitored production output will be capped to the levels considered in the PDD for the investment analysis.

Project Activity Emissions

18. ~~13.~~ Project activity emissions consist of those ~~emissions~~ related ~~with the~~ to use of fossil fuel ~~after the fuel switch. Project emissions are determined as follows:~~ and grid electricity in element processes *i* during the crediting period.

~~$PE_y = FC_y * EF_{CO2} * NCV$~~ $$PE_y = \sum_{i,j} FC_{PJ,i,j,y} \cdot NCV_j \cdot EF_{CO2,j} + EC_{i,el,PJ,y} * EF_{CO2,el} \quad (4)$$

Where:

PE_y	Project emissions ~~in~~ during the ~~project activity in year~~ year *y* (t CO_2e)
~~FC_y~~ $FC_{PJ,i,j,y}$	~~Amount~~ Quantity of ~~fossil~~ fuel ~~consumed for captive energy generation~~ type *j* combusted in element process *i* during the ~~project activity in year~~ year *y* (mass or volume unit)
~~EF_{CO2}~~ $EC_{i,el,PJ,y}$	~~CO_2 emission factor for fossil fuel (tCO_2/TJ)~~[5] Amount of grid electricity consumed by the element process *i* during the year *y* (kWh)
~~NCV~~	~~Net calorific value for the fossil fuel (TJ/mass or volume unit)~~[5]

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

Leakage

19. ~~14.~~ No leakage calculation is required.

Emission Reductions

~~Monitoring~~

~~15. The emission reduction achieved by the project activity will be calculated as the difference between the baseline emissions and the project emissions.~~

20. The emission reduction achieved by the project activity will be calculated as the difference between the baseline emissions and the project emissions. Emission reductions can be claimed only in case the project energy-mix has the lower emission factor as compared to the baseline energy-mix scenario, at any year *y* of the crediting period.

$$ER_y = BE_y - PE_y \quad \textbf{(5)}$$

Where:

ER_y Emission reductions in the year *y* (tCO_2e)

~~16. Monitoring shall include:~~

21. ~~(a) Monitoring~~ For the determination of the ~~fossil fuel use (FC_y~~ emission factor ($EF_{CO2,i}$) and the net calorific value (NCV_i) for the fuels used in the alternative scenarios, guidance by the 2006 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 for the baseline and higher values for the project 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, either for the *ex ante* investment analysis and efficiency determination, or for the *ex post* determination of the baseline and project emissions.

Monitoring

22. Monitoring shall include the energy source input ($FC_{PJ,i,j,y}$, NCV_j, $EC_{PJ,i,j,y}$), and output of the element process *i* after the project activity has been implemented ~~(Q_y)~~ – e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit.[1]

[1] ~~The necessary data are probably readily available, but may need to be organized into appropriate records and be supported by receipts for fuel purchases.~~

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

23. The efficiency of the element process *i* measured in the project scenario as the ratio between energy input and energy output shall be cross-checked with the efficiency considered in the determination of the baseline scenario. It shall be equal to or lower than the value adopted for the baseline when the same energy source or mix of energy sources is used in the baseline and project. In case the measured *ex post* efficiency of element process *i* in any year *y* is higher (more than 10%) than the efficiency used for the *ex ante* investment analysis, the analysis shall be repeated, to confirm that the low carbon energy source is not the most attractive scenario, compared with the high carbon scenarios. If it is found that the low carbon energy source is the most attractive scenario, no emission reduction may be claimed by the project activity from that year onwards.

24. For electricity/thermal energy exported to other facilities, monitoring of the use of electricity and thermal energy shall be undertaken in the recipient end.

25. Monitoring related to the determination of grid emission factor shall take place as per the "Tool to calculate emission factor for an electricity system".

Project activity under a programme of activities

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

26. ~~17.~~ 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 guidance provided in the leakage section of ACM0009. In case leakage emissions in the baseline situation is higher than leakage emissions in the project situation, leakage emissions will be set to zero.

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)

History of the document *

Version	Date	Nature of revision
14	EB 46, Annex # 25 March 2009	To extend the applicability of the methodology to include options to consider multiple fuel use in the baseline and the project case and grid electricity use/displacement. Additional guidance on determining baseline emissions for Greenfield facilities has been provided.
13	EB 41, Annex 18 02 August 2008	The applicability condition is expanded to new facilities and guidance on treatment of capacity expansions is included.
12	EB 35, Annex 33 19 October 2007	A Paragraph is added under technology/measures to provide clarity that the methodology is not applicable to project activities that generate renewable energy displacing fossil fuel use.
11	EB 33, Annex 30 27 July 2007	Revision of the approved small-scale methodology AMS-III.B to allow for its application under a programme of activities (PoA).
10	EB 28, Meeting Report, Para. 54 15 December 2006	Removed the interim applicability condition i.e. 25 ktCO2e/yr limit from all Type III categories.
09	EB 25, Annex 31 21 July 2006	Introduce the limit of 15 kilo tonnes of CO2 equivalent as annual project activity direct emissions.
08	EB 24, Meeting Report, Para, 64 12 May 2006	Introduced the interim applicability condition i.e. 25ktCO2e/yr limit for all Type III categories.

* This document, together with the 'General Guidance' and all other approved SSC methodologies, was part of a single document entitled: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities until version 07.

History of the document: Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities

Appendix B of the Simplified Modalities and Procedures for Small-Scale CDM project activities contained both the General Guidance and Approved Methodologies until version 07. After version 07 the document was divided into separate documents: 'General Guidance' and separate approved small-scale methodologies (AMS).

Version	Date	Nature of revision
07	EB 22, Para. 59 25 November 2005	References to "non-renewable biomass" in Appendix B deleted.
06	EB 21, Annex 22 20 September 2005	Guidance on consideration of non-renewable biomass in Type I methodologies, thermal equivalence of Type II GWhe limits included.
05	EB 18, Annex 6 25 February 2005	Guidance on 'capacity addition' and 'cofiring' in Type I methodologies and monitoring of methane in AMS-III.D included.
04	EB 16, Annex 2 22 October 2004	AMS-II.F was adopted, leakage due to equipment transfer was included in all Type I and Type II methodologies.
03	EB 14, Annex 2 30 June 2004	New methodology AMS-III.E was adopted.
02	EB 12, Annex 2 28 November 2003	Definition of build margin included in AMS-I.D, minor revisions to AMS-I.A, AMS-III.D, AMS-II.E.
01	EB 7, Annex 6 21 January 2003	Initial adoption. The Board at its seventh meeting noted the adoption by the Conference of the Parties (COP), by its decision 21/CP.8, of simplified modalities and procedures for small-scale CDM project activities (SSC M&P).

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III.B. Switching ~~fossil fuels~~ from high carbon to low carbon intensive energy source (cont)