Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

TYPE III - OTHER PROJECT ACTIVITIES

Project participants shall apply the general guidelines to the SSC CDM methodologies, information on additionality (attachment A to Appendix B) and abbreviations provided at: <http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html> *mutatis mutandis*.

III.B. Switching fossil fuels

Technology/measure

1. This methodology comprises fossil fuel switching in industrial, residential, commercial, institutional or electricity generation applications[1] (e.g. fuel switch from fuel oil to natural gas in an existing captive electricity generation or replacement of a fuel oil boiler by a natural gas boiler).

2. Fuel switch may be in a single element process or may include several element processes[2] within the facility.[3] Multiple fossil fuel switching in an element process however is not covered under this methodology.

3. This methodology is applicable for new facilities as well as for retrofit or replacement of existing installations.[4]

4. 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 a Type II methodology.

5. 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 guidelines to SSC CDM methodologies.[5] The requirements concerning demonstration of the remaining lifetime of the replaced equipment shall be met as described in the general guidelines to 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.

6. 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

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

[2] 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 energy source. 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.

[3] For example fuel oil was used in one boiler and coal in another boiler in the baseline. The project plant used only natural gas in the boilers i.e. the project plant does not use more than one fuel in one equipment.

[4] It also includes installation of new energy generating facility to replace existing energy generating facility that is solely fuelled by liquid petroleum fuel such as diesel or fuel oil.

[5] Refer to the "General Guidelines to SSC CDM methodologies".

relevant Type I methodology shall be used for such project activities that generate renewable energy displacing fossil fuel use. This methodology is also not applicable to project activities involving the use of waste gas; these project activities might be eligible under AMS-III.Q.

7. The facility may involve grid connected elemental processes however this methodology does not cover emission reductions on account of shift from use of a grid electricity or electricity exported to a grid.[6]

8. This category is applicable to project activities where it is possible to directly measure and record the energy use/output (e.g. heat, steam and electricity) and consumption (e.g. fossil fuel) within the project boundary. In case of project activities that meet the criteria under paragraph 17 below, this methodology is applicable only where it is possible to directly measure and record at least the energy consumption in the element process (e.g. fossil fuel input).

9. Heat, steam 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 of electricity generation plants, the generated electricity may also be supplied to users via mini/isolated grid(s) system[7] exclusively supplied by fossil fuel units.

10. 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.

11. 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.

12. 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.

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

Boundary

14. The project boundary is the physical, geographical site where the switching of energy source takes place. It includes all installations, processes or equipment affected by the switching. In case energy produced by the project activity is delivered to another facility, the boundary also extends to the industrial, commercial facilities consuming energy generated by the system.[8]

[6] Grid here refers to national/regional grid.

[7] Stand alone or interconnected grid system that are not connected to a grid as defined above.

[8] In the case of electricity generated and supplied to distributed users (e.g. residential users) via mini/isolated grid(s) the project boundary may be confined to physical, geographical site of generating

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

III.B. Switching fossil fuels (cont)

Baseline

15. In case of existing facilities, historical information (detailed records) on the use of fossil fuels and the energy output (e.g. heat, steam or electricity) in the element process from at least three 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, diesel use and steam generated by an industrial 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[9]). For facilities that are less than three years old, all historical data shall be available (a minimum of one year data would be required).

16. For existing facilities having no historical data/information on baseline parameters such as efficiency, energy consumption and output (e.g. the available data is not reliable due to various factors such as the use of imprecise or non-calibrated measuring equipment), the baseline parameters can be determined using a performance test/measurement campaign to be carried out prior to the implementation of the project activity. The project proponent may follow the relevant provisions from the "Tool to determine baseline efficiency of thermal and electricity systems". In the case of project activities that export to other facilities within the project boundary, historical data from the recipient plants is also required.

17. In case of project activities where the estimated annual emission reductions of each of the element processes are equal to or less than 600 tCO_2e per year per element process an alternative approach may be used to calculate baseline emissions as per paragraph 21 using equation 3 instead of applying equation 1.

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

$$BE_y = EF_{BSL} * Q_{PJ,y} \quad \textbf{(1)}$$

Where:

BE_y	Baseline emissions in the project activity in year y (tCO_2e)
EF_{BSL}	Emission factor for the baseline situation (tCO_2/MWh)
$Q_{PJ,y}$	Net energy output in the project activity in year y (MWh)

19. The net energy output in the project activity ($Q_{PJ,y\,y}$) is limited to the installed capacity in the baseline situation, unless it has been demonstrated in accordance with paragraph 5 that the new installation (Greenfield project) or the added capacity has the same baseline scenario.

units where it can be demonstrated that the users were or would have been supplied with electricity solely from higher carbon intensive source in the baseline via mini/isolated grid(s).

[9] 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.

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

III.B. Switching fossil fuels (cont)

20. 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 energy output (e.g. kg CO_2e/kWh).

$$EF_{BSL} = \sum_{i,j} FC_{i,j,BL,y} * NCV_j * EF_{CO2,j} / Q_{BSL,j} \quad \textbf{(2)}$$

Where:

EF_{BSL}	Emission factor for the baseline situation (tCO_2/MWh)
$FC_{i,j,BL,y}$	Amount of fuel *j* consumed by the element process *i* during the year *y* operating at the baseline energy scenario (mass or volume unit)
NCV_j	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)
$Q_{BSL,j}$	Net energy generated in the element process *j* in the baseline situation during the corresponding period of time for which the total fuel consumption was taken, in accordance with paragraph 15 (MWh)

21. In case of project activities where the estimated annual emission reductions of each of the element processes are equal to or less than 600 tCO_2e per year per element process the amount of fossil fuel consumed in the project activity in year *y*, FC_y, can be used as a proxy for determining baseline emissions using the following equation:

$$BE_y = FC_{PJ,y} * NCV_{FF,PJ,y} * EF_{FF,CO2,BL} \quad \textbf{(3)}$$

Where:

$FC_{PJ,y}$	Amount of fuel consumed in the project activity during year *y* (mass or volume unit)
$NCV_{FF,PJ,y}$	Net calorific value of the fossil fuel used in the project activity in TJ/mass or volume unit
$EF_{FF,CO2,BL}$	CO_2 emission factor of the fossil fuel used in the baseline activity (tCO_2/TJ)

22. For the emission factor ($EF_{CO2,j}$) and the net calorific value (NCV_j) of the fuels used, 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.

Project emissions

23. Project emissions from on-site consumption of fossil fuel should be calculated as follows:

$$PE_y = FC_{PJ,y} * NCV_{FF,PJ,y} * EF_{FF,CO2,PJ} \quad \textbf{(4)}$$

Where:

$EF_{FF,CO2,PJ}$	CO_2 emission factor of project fuel combusted in the project activity in tCO_2/TJ
$NCV_{FF,PJ,y}$	Net calorific value of the fossil fuel used in the project activity in TJ/mass or volume unit

Leakage

24. No leakage calculation is required.

Emission reductions

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

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

Where:

ER_y	Emission reductions in the year y (tCO_2e)

Monitoring

26. Monitoring shall include:

(a) Monitoring of the fossil fuel consumption (FC_y) and energy output of element process *i* after the project activity has been implemented ($Q_{PJ,y}$) - (e.g. gas use and heat output by a district heating plant, diesel use and steam generated by an industrial plant, gas use and electricity generated by a generating unit) for project activities under paragraphs 15 and 16;

(b) Monitoring of the fossil fuel consumption (FC_y) for project activities under paragraph 17;

Indicative simplified baseline and monitoring methodologies
for selected small-scale CDM project activity categories

III.B. Switching fossil fuels (cont)

(c) For electricity/thermal energy exported to other facilities, monitoring of the use of electricity and thermal energy shall be undertaken in the recipient end.[10]

Project activity under a programme of activities

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

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 "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.

- - - - -

History of the document *

Version	Date	Nature of revision
16.0	EB 66, Annex 56 2 March 2012	Revision to include a simplified approach for estimating emission reductions for small energy generation appliances with annual emission reduction less than 0.6 $ktCO_2e$/year.
15	EB 59, Annex 8 18 February 2011	To clarify issues related to the installation of new energy generating facility (low carbon intensive) to replace an existing energy generating facility (carbon intensive) connected to an isolated grid(s) system.
14	EB 47, Annex 23 28 May 2009	Broaden the applicability, for example, to cases involving multiple elemental processes using different fuels in the baseline shifting to single fuel use in the project; reference to combined tool for the selection of baseline scenario.
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 $ktCO_2e$/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.

[10] In the case of electricity generated and supplied to distributed users via mini/isolated grid(s) the 'recipient end' is defined as the mini/isolated grid.

Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories

III.B. Switching fossil fuels (cont)

08	EB 24, Meeting Report, Para, 64 12 May 2006	Introduced the interim applicability condition i.e. 25ktCO_2e/yr limit for all Type III categories.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		

* 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).
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		