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

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.AG. Switching from high carbon intensive grid electricity to low carbon intensive fossil fuel

Technology/measure

1. This methodology comprises switch from a carbon intensive energy source (or mix of energy sources) to a single low carbon intensive energy source in existing and new industrial, residential, commercial, and institutional for electricity generation applications. This methodology is applicable only if the sole energy source or one of the energy sources in the baseline is high carbon intensive grid electricity (e.g., switch from a diesel based captive electricity generation complemented by a grid electricity import to a natural gas based captive electricity generation)[1].

2. Energy source switch may be in a single element process or may include several element processes within the facility[2]. Non-element processes (e.g., gas turbine with heat recovery) are also included under this methodology, provided that emission reductions are only claimed for one of the outputs i.e., electricity[3]. Multiple fossil fuels switching in an element process is not covered under this methodology; however project proponents may explore applying AMS-III.AH.

3. This methodology is applicable for retrofit or replacement of existing installations[4], as well as for Greenfield and capacity expansion project activities. ~~Cases involving Greenfield projects and capacity additions are not eligible under this methodology.~~

4. 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.

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. This methodology is not applicable to project activities utilising waste gas or energy; these project activities may consider applying AMS-III.Q.

[1] Cases involving shift to low GHG intensive grid electricity may be submitted through the request for revision process.

[2] An "*element process*" is defined as fuel combustion, energy conversion or energy use in single equipment. Each element process generates a single output (such as steam or electricity) 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] As an example gas firing combustion engines with heat recovery are not considered element processes as they produce electricity as well as recovered heat energy as output.

[4] i.e., the project capacity is within +10% and -10% of the baseline installed capacity.

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

7. Electricity ~~or heat~~ 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.

8. Export of electricity to a grid is not eligible under this category. That is, the project activity may physically connect to a grid but emission reduction can not be claimed by exporting electricity to the grid.

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

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.

11. For the purpose of this methodology, natural gas is defined as a gas which consists primarily of methane and which is generated from (i) natural gas fields (non-associated gas), (ii) associated gas found in oil fields. It may be blended up to 1% on a volume basis with gas from other sources, such as, *inter alia*, biogas generated in biodigesters, gas from coal mines, gas which is gasified from solid fossil fuels, etc, [5]

Boundary

12. The project boundary is the physical, geographical site where the fossil fuel switching takes place, and all installations affected by the switching.

13. 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.

[5] This limitation is included because the methodology does not provide procedures to estimate the GHG emissions associated with the production of gas from these other sources. Project activities that use gas that does not comply with this definition must apply for a revision of the methodology.

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Baseline

14. If during the crediting period, total annual production of electricity for existing system does not increase by more than 10% from the established baseline values[6] during the crediting period then the baseline scenario is the continuation of the operation of the existing systems.

15. If during the crediting period, total annual production of electricity for existing system does increase beyond 10% from the established baseline values then one of the following shall be used for determining baseline scenario:

(a) If it can be demonstrated, using the related and relevant procedures prescribed in the SSC general guidance, that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing applications then such applications can be continued to be used for determining baseline emissions.

(b) If it cannot be demonstrated that the most plausible baseline scenario for the supply of additional amounts of energy is the same as the existing applications then the Baseline Reference Plant Approach, as defined below shall be used.

16. If, irrespective of total annual energy production of baseline or project scenarios, it is determined that new and more efficient systems (as compared to the existing systems) would have been installed in the absence of the project activity (for example, due to the baseline equipment reaching the end of its useful life at any point during the crediting period) then the Baseline Reference Plant Approach, as defined below, shall be used.

17. Replacing system that would have been built: The project consists of the installation of a new system that replace the operation of systems that would have been built and utilized. In such cases the Baseline Reference Plant Approach, as defined below, shall be used to define the baseline scenario.

Baseline Reference Plant Approach

18. In cases where the baseline scenario consists of the installation of new systems and/or the utilization of new energy sources, a Reference Plant shall be defined as the baseline scenario. The Reference Plant shall be based on common practice for similar industrial, residential, commercial, and institutional or electricity generation applications energy generation systems and sources - in the same commercial sector and in the same country or region as the project. The identification of the Reference Plant should exclude plants implemented as CDM project activities. In cases where no such plant exists within the country, the economically most attractive technology and fuel type should be identified among those which provide the same service, that are technologically available, and that are in compliance with relevant regulations. The efficiency of the technology should be selected in a conservative manner, i.e., where several technologies could be used and are similarly economically attractive, the most efficient technology should be defined

[6] baseline emissions are established from the characteristics of the existing systems using data from the immediately prior three years as described in paragraph 19

as the baseline scenario. In addition, the least carbon intensive fuel type should be chosen in case of multiple fuels being possible choices.

19. For existing facilities, historical information (detailed records) on the use of energy sources (e.g., electricity, fossil fuel) and the plant output (i.e., ~~e.g., steam 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[7]). For facilities that are less than 3 years old, all historical data shall be available (a minimum of one year data would be required). In case of project activity exporting to other facilities included in the project boundary, the above historical information from the recipient plants are required.

20. Baseline emissions shall be determined as follows:

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

Where:

BE_y	Baseline emissions in the project activity in year y (tCO_2)
EF_{BL}	Emission factor for the baseline situation (e.g., tCO_2/MWh)
$Q_{PJ,y}$	Net electricity ~~energy~~ output in the project activity in year y (e.g., MWh)

21. The determination of the baseline emission factor for electricity generation depends on the baseline scenario identified.

22. If the identified baseline is the continuation of the current practice the emission factor ~~in the baseline situation for~~ of captive plants ($EF_{BL,captive}$) is determined based on the historical information as follows: ~~the coefficient for the fossil fuel used in the baseline expressed as emissions per unit of output (e.g., t CO_2e/MWh).~~

$$EF_{BL,catpive} = \frac{(FC_{BL,captive} * NCV_{FF} * EF_{FF,CO2})}{Q_{BL,catpive}} \quad \textbf{(2)}$$

Where:

$FC_{BL,captive}$	Amount of fuel consumed for captive electricity ~~energy~~ generation in the baseline situation in accordance with paragraph ~~13~~ 19 (mass or volume unit)
$EF_{FF,CO2}$	CO_2 emission factor for the baseline fossil fuel (tCO_2/TJ)

[7] 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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NCV_{FF}	Net calorific value for the baseline fossil fuel (TJ/ mass or volume unit)[8]
$Q_{BL,catpive}$	Net electricity ~~energy~~ output in the baseline situation during the corresponding period of time for which the total fuel consumption was taken, in accordance with paragraph ~~13~~ 19 (MWh)

23. ~~The minimum of the emission factors for the sources of electricity used in the baseline situation (captive and grid) shall be used:~~

~~$EF_{BL} = Min\,(EF_{BL,captive}, EF_{BL,grid})$ (3)~~

~~Where:~~

~~$EF_{BL,captive}$~~	~~Emission factor for electricity generation in captive power plants in the baseline situation (tCO_2/MWh)~~
~~$EF_{BL,grid}$~~	~~Emission factor for grid electricity in the baseline situation (tCO_2/MWh)~~

24. If the identified baseline scenario includes reference captive plant, (i.e., in the absence of the project activity, the electricity demand of consumers is met through a new captive fossil fuel fired power plant "reference plant")., the emission factor for the baseline electricity generation from the reference plant ~~Emission factor for captive electricity generation~~ ($EF_{BL,captive}$) is ~~can also be~~ calculated as per the procedures described in the latest version of "Tool to calculate baseline, project and/or leakage emissions from electricity consumption".

25. In the absence of the project activity, if electricity is sourced from grid the emission factor for the baseline electricity supply correspond to the grid emission factor. The baseline grid emission factor ($EF_{BL,grid}$) shall be estimated based on the procedures described under "Tool to calculate emission factor for an electricity system" ~~AMS-I.D.This determination will be made once at the validation stage based on an *ex ante* assessment, once again at the start of each subsequent crediting period (if applicable). BM and CM will be estimated *ex post*, as described in "Tool to calculate emission factor for an electricity system"~~

26. In the absence of the project activity, if electricity is sourced from the combination of the grid and captive power plant, a combined emission factor for an existing captive power plant and grid has to be determined. The share of contributions has to be determined using historical information over the three years period prior to the project activity, e.g., if the captive power plant provided 30% of the electricity and the grid 70%, the emission factor should be calculated based on this historical allocation. ($EF_{BL,weighted}$). For new facilities, the most conservative (lowest) emission factor of the two power sources should be used, as it is difficult to determine and justify the ratio sources of the hypothetical power supply.

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

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Project Activity Emissions

27. Project activity emissions consist of those emissions related with the use of fossil fuel after the fuel switch. Project emissions are to be determined as per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

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

~~Where:~~

~~PE_y~~	~~Project emissions in the project activity in year y (tCO_2e)~~
~~$FC_{PJ,y}$~~	~~Amount of fossil fuel consumed for captive energy generation in the project activity in year y (mass or volume unit)~~
~~$EF_{FF,CO2}$~~	~~CO_2 emission factor for fossil fuel (tCO_2/TJ)~~[5]
~~NCV_{FF}~~	~~Net calorific value for the fossil fuel (TJ/mass or volume unit)~~[5]

Leakage

28. If the energy generating equipment is transferred from another activity, leakage is to be considered.

Emission Reductions

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

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

Where:

ER_y	Emission reductions in the year y (tCO_2e)

30. ~~For the determination of the emission factor net calorific value of fossil fuel, guidance by the most recent version of 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 the net calorific value for the baseline fuel *ex ante* in the SSC-CDM-PDD~~.

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Monitoring

31. Monitoring shall include the following parameters as per the table 1 below:

~~(a) Monitoring of the fossil fuel use (FC_y) and output after the project activity has been implemented ($Q_{PJ,y}$) – e.g., gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit[9];~~

~~(b) Monitoring related to the determination of grid emission factor shall take place as per the "Tool to calculate emission factor for an electricity system";~~

~~(c) For electricity or steam energy exported to other facilities, monitoring of the use of electricity and thermal energy shall be undertaken in the recipient end.~~

~~(d) In the case of steam energy, direct measurement of flow, temperature, pressure is required to determine enthalpy of the steam~~

[9] 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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Table 1: The following parameters shall be monitored and recorded during the crediting period

No.	Parameter	Description	Unit	Monitoring/ recording Frequency	Measurement Methods and Procedures
1	$Q_{PJ,y}$	Net electricity output in the project activity in year *y*	MWh	Continuous monitoring, hourly measurement and at least monthly recording	Measurements are undertaken using energy meters. Calibration should be undertaken as prescribed in the related and relevant paragraph of General Guidelines to SSC Methodologies: http://cdm.unfccc.int/Reference/Guidclarif/ssc/methSSC_guid06.pdf
2	$EF_{BL, grid}$	CO_2 emission factor for the grid electricity in year *y*	t CO_2e/ kWh	As per the "Tool to calculate emission factor for an electricity system".	As per the "Tool to calculate emission factor for an electricity system".
3	$FC_{PJ,y}$	Quantity of fossil fuel combusted in year *y*	Mass or volume unit	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"	As per the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion".

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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:

32. 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 are higher than leakage emissions in the project situation, leakage emissions will be set to zero.

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History of the document

Version	Date	Nature of revision
02	EB xx, Annex # dd mm 2010	To include Greenfield project activities and to allow for non-element processes given that emission reductions are claimed for one output only.
01	EB 50, Annex 26 16 October 2009	Initial adoption.
Decision Class: Regulatory **Document Type**: Standard **Business Function**: Methodology		