Approved baseline and monitoring methodology/ methodological tool revision recommendation form (Version 02.0)

INFORMATION TO BE COMPLETED BY PANEL/ WG	
Date and number of Panel/ WG meeting:	MP 60, 19–22 August 2013
Title/Subject of the request for revision:	Revision of the leakage emissions formulae, to include the natural gas consumption in the baseline scenario for electricity generation
Reference number of the request for revision:	AM_REV_0249
Exact reference (number, title and version) of the methodology or methodological tool to which the request for revision applies:	"AM0102: Greenfield cogeneration facility supplying electricity and steam to a Greenfield Industrial Consumer and exporting excess electricity to a grid and/or project customer(s), version 01.0.0"

Summary of the request for revision:

In AM0102, version 01.0.0, the leakage emissions due to fugitive CH_4 emissions associated with extraction, processing, liquefaction, transportation, re-gasification and distribution of natural gas ($LE_{CH4,y}$) is calculated by defining the parameter $FC_{NG,LE,y}$ which reflects the additional NG consumption due to implementation of the project activity.

This Parameter ($FC_{NG,LE,y}$) is calculated by deducting the natural gas used to produce heat/steam of the Greenfield industrial consumer from the total amount of natural gas consumption of the project facility, as in the absence of the project activity, the heat/steam would be produced with the same fossil fuel(s) in a stand-alone boiler.

But, it should be noted that the project activity produces electricity which replaces the grid electricity and or captive power. Thus, effect of the project activity on the NG consumption for electricity generation in baseline should also be considered in calculation of the leakage emissions. This point has been considered in approved methodologies AM0029/Version 03 and AM0107/Version 02.0.0.

The proposed formulae for consideration of above mentioned point is as follows:

Fugitive methane emissions ($LE_{CH4,y}$)

Fugitive CH_4 emissions should be estimated as follows:

$$LE_{CH4,y} = FC_{NG,LE,y} \times NCV_{NG,y} \times EF_{NG,upstream,CH4} \times GWP_{CH4}$$

Where:

$LE_{CH4,y}$	=	Leakage emissions due to fugitive upstream CH_4 emissions in year *y* (tCO_2e/yr)
$FC_{NG,LE,y}$	=	Quantity of natural gas consumption to be included in the leakage emission calculations in year *y* (m^3/yr)
$NCV_{NG,y}$	=	Average net calorific value of the natural gas combusted during the year *y* (GJ/m^3)
$EF_{NG,upstream,CH4}$	=	Emission factor for upstream fugitive methane emissions of natural gas from production, transportation, distribution, and, in the case of LNG, liquefaction, transportation, re-gasification and compression into a transmission or distribution system ($t\ CH_4/GJ$)
GWP_{CH4}	=	Global warming potential of methane valid for the relevant commitment period ($t\ CO_2e/tCH_4$)

calculation of $FC_{NG,LE,y}$

$FC_{NG,LE,y}$ is the quantity of natural gas additionally consumed by the project in year *y* and is calculated as follows:

$$FC_{NG,LE,y} = FC_{NG,y} - FC_{NG,BL,ST,y} - FC_{NG,BL,EG,y}$$

Where:

$FC_{NG,LE,y}$	=	Quantity of natural gas consumption to be included in the leakage emission calculations in year *y* (m³/yr)
$FC_{NG,y}$	=	Quantity of natural gas combusted in the project plant in year *y* (m³/yr)
$FC_{,NG,BL,ST,y}$	=	Quantity of natural gas which would has been consumed for production of steam/heat by the reference boiler in the absence of the project activity in year *y* (m^3/yr)
$FC_{NG,BL,EG,y}$	=	Quantity of natural gas, which would have been consumed for electricity generation in the absence of the project in year *y* (m^3/yr)

$FC_{,NG,BL,ST,y}$ is calculated according to the equation below:

$$FC_{NG,BL,ST,y} = \frac{HG_{GIC,y} \times 1000}{\eta_{RB}} \times \frac{FC_{NG,y}}{\sum_i (FC_{i,y} \times NCV_{i,y})}$$

Where:

$FC_{,NG,BL,ST,y}$	=	Quantity of natural gas which would has been consumed for production of steam/heat by the reference boiler in the absence of the project activity in year *y* (m^3/yr)
$HG_{GIC,y}$	=	Quantity of steam/heat generated by the project facility that is supplied to the Greenfield industrial consumer in year *y* (TJ/yr)
η_{RB}	=	Design energy efficiency of the reference boiler (fraction)
$NCV_{i,y}$	=	Weighted average net calorific value of the fuel type *i* in year *y* (GJ/mass or volume unit), monitored as per "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
$FC_{i,y}$	=	Quantity of fuel type *i* combusted ~~in process *j*~~ during the year *y* (mass or volume unit/yr), monitored as per "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion"
$FC_{NG,y}$	=	Quantity of natural gas combusted in the project plant in year *y* (m³/yr)

$FC_{NG,BL,EG,y}$ is the natural gas consumption for electricity generation in the baseline. The project electricity could replace the grid electricity and also electricity demands of the Greenfield industrial consumer and project customers. Also, electricity demands of the Greenfield industrial consumer and project customers can be met by the grid, by captive power plants, or a combination of both in the baseline scenario. Hence, the natural gas consumption would have been occurred for electricity generation in grid and or captive power plants in the absence of the project activity. For simplicity and conservativeness, the baseline natural gas consumption for captive power generation is ignored and $FC_{NG,BL,EG,y}$ is calculated as follows:

$$FC_{NG,BL,EG,y} = EG_{grid,total,y} \times \left[0.5 \frac{\sum_i FC_{NG,i}}{\sum_i EG_i} + 0.5 \frac{\sum_j FC_{NG,j}}{\sum_j EG_j} \right]$$

Where:

$FC_{NG,BL,EG,y}$	=	Quantity of natural gas, which would have been consumed for electricity generation in the absence of the project in year *y* (m^3/yr)
$EG_{grid,total,y}$	=	Quantity of electricity produced by the project activity which replaced the grid electricity during year *y* (MWh/yr)
i	=	Plants included in the operating margin
$FC_{NG,i}$	=	Quantity of natural gas combusted in power plant *i* included in the operating margin
EG_i	=	Electricity generation in the plant *i* included in the operating margin (MWh/yr)
j	=	Plants included in the build margin
$FC_{NG,j}$	=	Quantity of natural gas combusted in power plant *j* included in the build margin (m^3/y)

EG_j	=	Electricity generation in the plant *i* included in the build margin (MWh/yr)
$FC_{NG,y}$	=	Quantity of natural gas combusted in the project plant in year *y* (m³/yr)

$EG_{grid,total,y}$ is calculated as follows:

$$EG_{grid,total,y} = EG_{grid,y} + EG_{GIC,y} + \sum_i EG_{PC,i,y}$$

Where:

$EG_{grid,total,y}$	=	Quantity of electricity produced by the project activity which replaced the grid electricity during year *y* (MWh/yr)
$EG_{Grid,y}$	=	Quantity of electricity generated by the project facility that is supplied to the grid in year *y* (MWh/yr)
$EG_{GIC,y}$	=	Quantity of electricity generated by the project facility that is supplied to the Greenfield industrial consumer in year *y* (MWh/yr)
$EG_{PC,i,y}$	=	Quantity of electricity generated by the project facility that is supplied to project customer *i* in year *y* (MWh/yr)

As the $EG_{grid,total,y}$ shall only include the grid electricity replaced by the project activity, hence:

If in the absence of the project activity, the electricity demand of the Greenfield industrial consumer would has been met by captive power plant, or a combination of grid and captive power, $EG_{GIC,y}$ shall be set to zero in equation above.

Also, if in the absence of the project activity, the electricity demand of any project costumer would have been met by captive power plant, or a combination of grid and captive power, $EG_{PC,i,y}$ of that costumer shall be set to zero in equation above.

Where total net leakage effects are negative ($LE_y < 0$), project participants should assume $LE_y = 0$.

Recommended decision to the Board on the request for revision

☐ Approve the proposed revised methodology or methodological tool ("A case")
☒ Reject the proposed revised methodology or methodological tool ("C case")

Type of the revision if the recommendation is A case

☐ The revision is a major revision
☐ The revision is a minor revision

Reasons for rejection if the recommendation is C case

The Methodologies Panel agreed to reject the request for revision for the following reasons:

(a) The proposed revision is not consistent with the approaches available in other referred methodologies such as AM0029 to account upstream leakage emissions associated with grid electricity displacement;

(b) No due justifications are provided how the proposed revision ascertain the conservativeness as compared to approaches available in the other similar methodologies, for example: the reason why relevant elements of AM0029 (e.g. select minimum between Build Margin and Combined Margin approach) would not be applicable for the underlying project;

The applicability of the proposed revision is restrictive to a specific situation where gas is predominantly used for electricity generation in a grid. While this may represent the situation of the host country, it is not suitable for other regions, and is not conservative.

Any other issues arising from the request for revision

N/A

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Document information

Version	*Date*	*Description*
02.0	18 July 2013	Revised to remove the row “Date and signature of the chair and vice chair of Panel/WG”
01.0	4 July 2013	Initial publication. This document supersedes and replaces the following documents: • Recommendation form for Small Scale Methodologies (F-CDM-SSCwg) (Version 01.1) • Recommendation Form for Small Scale A/R Methodologies and Procedures (F-CDM-SSC-AR) (Version 01.1)

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