VCS Draft Tool

M0325

ELECTRICITY SYSTEM EMISSION FACTOR

Draft version

3 October 2024

The original CDM *TOOL07 Tool to calculate the emission factor for an electricity system, v1.0* was adopted on 19 October 2007. It has been further revised over time.

TOOL07, v7.0 was adopted on 31 August 2018. This methodology revision must be used with the most recent version of TOOL07 available on the CDM website.

Version 1.0 of this tool revision was developed by Verra.

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1 SUMMARY DESCRIPTION

This tool is applied to calculate the CO_2 emission factor of an electricity system whose dispatch and generation are affected by a project activity. It provides the procedures and requirements for calculating the operating margin (OM), build margin (BM) and combined margin (CM) emission factors of an electricity system.

2 SOURCES

This methodology revision applies to the CDM *TOOL07 Tool to calculate the emission factor for an electricity system*.

3 DEFINITIONS

In addition to the definitions set out in TOOL07 and the *VCS Program Definitions*, the following definitions apply to this tool.

Operating margin (OM) emission factor
The emission factor representing existing power plants in the electricity system whose dispatch and generation would be displaced or affected by the project activity.

Build margin (BM) emission factor
The emission factor representing future power plants in the electricity system whose construction and subsequent dispatch and generation would be displaced or affected by the project activity.

Combined margin (CM) emission factor
The weighted average of the operating margin and build margin emission factors that represents the overall impact of the project activity on the emissions of the electricity system, where both the operating and the build margin are affected.

4 APPLICABILITY CONDITIONS

This tool is applied to calculate the CO_2 emission factor of an electricity system whose dispatch and generation are affected by a project activity. It is globally applicable.

All applicability conditions of the most recent version of TOOL07 must be met, except for applicability 5, which is removed under this revision:

In case of CDM projects the tool is not applicable if the project electricity system is located partially or totally in an Annex I country.

This tool must be used in conjunction with the most recent version of TOOL07. All the procedures and requirements of TOOL07 must be applied unless this tool indicates otherwise.

5 PROCEDURES

When TOOL07 refers to CDM projects, it must be read as "projects in the VCS and other GHG programs, including the CDM."

The following paragraphs replace the corresponding paragraphs from TOOL07:

Step 1: Identify the relevant electricity systems

16. Similarly, the project proponents must identify any connected electricity systems.

25. For the purpose of determining the operating margin emission factor, use one of the following options to determine the CO_2 emission factor(s) for net electricity imports from a connected electricity system:

(a1) 0 t CO_2/MWh for projects that supply electricity to the grid or projects that result in electricity savings from the grid;

(a2) 1.3 t CO_2/MWh for projects increasing the consumption of electricity from the grid;

(b), (c) and (d) As per TOOL07

26. ~~For imports from connected electricity systems located in Annex I country(ies), the emission factor is 0 tons CO_2 per MWh.~~ (paragraph removed)

39. Clarification: Any of the OM Methods may be selected with the restrictions mentioned in paragraphs 40 (simple OM) and 41 (dispatch data analysis).

Step 3: Select a method to determine the operating margin (OM)

42. For the simple OM, the simple adjusted OM and the average OM, the emissions factor can be calculated using either of the following data vintages:

a) **Ex-ante Option:** As per TOOL07. This option can only be applied for projects increasing the consumption of electricity from the grid.

b) **Ex-post Option**: As per TOOL07. All projects are allowed to apply this option and is mandatory for projects supplying electricity to the grid.

Step 5: Calculate the build margin (BM) emission factor

72. In terms of vintage data, project proponents can choose between one of the following two options:

(a) **Option 1 Ex-ante**: - As per TOOL07. This option can only be applied for projects increasing the consumption of electricity from the grid.

(b) **Option 2 Ex-post**: - The build margin emission factor must be updated annually, ex-post, including those units built up to the latest year for which information is available. The same is applicable for the second and third crediting periods. All projects are allowed to apply this option and is mandatory for projects supplying electricity to the grid.

75. The sample group of power units m used to calculate the BM must be determined as per the following procedure, consistent with the data vintage selected above:

    a) Identify the set of five power units that started to supply electricity to the grid most recently ($SET_{5\ units}$) and determine their annual electricity generation ($AEG_{SET-5\ units}$ in MWh). Include all units connected to the electricity system, including also those registered under the VCS Program and other GHG programs.

    b) Identify the set of power units that started to supply electricity to the grid most recently and that comprise 20 percent of the total annual electricity generation of the electricity system (AEG_{total}). Include all units connected to the electricity system, including also those registered under the VCS Program and other GHG programs. If 20 percent falls on part of the generation of a unit, the generation of that unit is fully included in the calculation ($SET_{>=20\ per\ cent}$). Determine their annual electricity generation ($AEG_{SET>=20\ per\ cent}$, in MWh).

    c) From $SET_{5\ units}$ and $SET_{>=20\ per\ cent}$ select the set of power units that comprises the larger annual electricity generation (SET_{sample}).

Ignore steps (d), (e) and (f) in TOOL07.

76. Figure 4 in TOOL07 is not applicable.

Step 6: Calculate the combined margin emissions factor

86. **Case 1**: The following values must be used for w_{OM} and w_{BM} for projects that supply electricity to the grid or projects that result in electricity savings from the grid:

    a) Wind and solar power generation project activities:

        i) For the first crediting period: w_{OM} = 0.50 and w_{BM} = 0.50

        ii) For the second crediting period: w_{OM} = 0.40 and w_{BM} = 0.60

iii) For the third crediting period: w_{OM} = 0.30 and w_{BM} = 0.70

b) All other projects, unless otherwise specified in the approved methodology which refers to the tool:

i) For the first crediting period: w_{OM} = 0.40 and w_{BM} = 0.60

ii) For subsequent crediting periods: w_{OM} = 0.25 and w_{BM} = 0.75

Case 2: the following values must be used for w_{OM} and w_{BM} for projects increasing the consumption of electricity from the grid:

a. For all crediting periods: w_{OM} = 1.0 and w_{BM} = 0.0

Paragraphs 87, 88 and 89 of TOOL07 are removed when applying this tool.

90. If the project activity is located in a Least Developed Country (LDC) the combined margin may be calculated with w_{OM} = 1 and w_{BM} = 0. (conditions (ii) and (iii) of TOOL07 are removed)

91. If the project activity is located in a non-LDC, the combined margin may be calculated using equation (16) above with the following provisions:

(a) Case 1: If the share of renewable energy in total installed capacity in a grid/project electricity system is less than or equal to 20 percent a default value of $EF_{grid,BM,y}$= 0.326 tCO2/MWh may be applied (NG-fired CCGT, based on best available technology).

The EF for oil-fired CCGT is not applicable.

(b) Case 2: As per TOOL07.

6   DATA AND PARAMETERS

6.1   Data and Parameters Available at Validation

Parameters available at validation remain the same as in the TOOL07

6.2   Data and Parameters Monitored

103. Some parameters listed under "data and parameters" will have different monitoring frequencies depending on the data vintage chosen, following the provisions in the baseline procedure and the guidance on "monitoring frequency" for the parameter.

106. Data / Parameter tables 1, 2, 3, and 4, Monitoring Frequency:

(a) As per TOOL07;

(b) As per TOOL07;

(c) BM: Either once ex-ante for each crediting period or annually ex-post, following the guidance included in Step 5.

7 REFERENCES

Clean Development Mechanism (CDM) *TOOL07 Tool to calculate the emission factor for an electricity system*, available at:
https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf/history_view

DOCUMENT HISTORY

Version	Date	Comment
v1.0 (draft)	3 Oct 2024	Draft version of this revision based on CDM TOOL07