Information note

Call for public inputs on the standardization of the off-grid component of the "Tool to calculate the emission factor for an electricity system"

(Version 01.0)

I. Background

1. The Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) included in its 2012 management plan (MAP) a project on the top-down improvement of large-scale methodologies with the view to use standardized approaches (project 146). One part of the project is to revise the "Tool to calculate the emission factor for an electricity system" with the view to incorporate standardized approaches and to simplify this tool.

2. A procedure to estimate the contribution of off-grid generation to electricity emissions is provided in annex 2 of the "Tool to calculate the emission factor for an electricity system" version 02.2.1. This procedure allows project participants to incorporate off-grid power plants in the calculation of the grid emission factor in situations where the power generation of these plants is affected by the CDM projects feeding electricity in the grid or reducing electricity consumption from the grid. However, only few have applied a grid factor incorporating off-grid power generation; although, it is believed that quite a few CDM countries have significant off-grid generation. The procedure requires a considerable amount of data, which may deter project participants from incorporating off-grid components in estimating grid emission factors.

3. This note aims to provide background information for seeking public inputs with regard to possible ways of standardizing the off-grid component of the tool with the view to make it easier to apply.

4. The Methodologies Panel (panel) is especially considering methods that estimate the off-grid generation without relying on data on off-grid generation, which is difficult to have publicly available, or surveys on off-grid generation, which potentially may be burdensome to undertake. The note first outlines the definition of off-grid generation, it then raises specific questions with regard to the application of the current tool and finally seeks feedback on a potential way to standardize the current tool.

II. Definition of off-grid power generation

5. An off-grid plant is defined as a plant that supplies electricity to users connected to the grid when the grid fails to supply electricity. For example, this may be a diesel generator that switches on when the power supply from the grid fails. The definition in the tool is as follows:

> **"Off-grid power plant/unit**. A power plant/unit that supplies electricity to specific consumers through a dedicated **distribution** network which is not used by any other power plants. For a power plant to be categorized as off-grid, the following conditions need be fulfilled:
>
> (a) A grid (or grids) capable of supplying power to the specific consumer(s) to which the off-grid facility is connected, must exist;
>
> (b) The off-grid facility is not connected to the grid(s) and cannot supply power to the grid(s), but only to the consumer(s) to which it is connected;
>
> (c) Under normal conditions, the consumer(s) are supplied their power requirements from the grid only, the off-grid plant(s) which is connected to the consumer(s) is a standby

on-site facility(ies) that is only used when power supply from the grid fails (or in many cases, when the quality of power supply to the end-user is below acceptable quality);

(d) To ensure a proper shift from the grid supply to the off-grid supply, the consumer has in place a change-over-switch system (which may be manual or automatic)."

III. Questions

6. In simplifying the tool, it is important to determine which information is needed to reasonably conclude how many and which sources of off-grid generation exist as well as whether such information can be expected to be collected by potential project participants.

7. In particular, the panel would like to seek information on the following aspects:

(a) In which countries is off-grid power generation relevant and significant for inclusion in the "Tool to calculate the emission factor of an electricity system"?

(b) What information required by the current off-grid procedure in the tool could be simplified or standardized?

(c) Have you tried to apply the off-grid component of the tool? If yes, describe your experience;

(d) What barriers, if any, have prevented you from applying the off-grid calculation component of the grid tool?

(e) What data is typically available on off-grid power generation, in particular in least developed countries?

IV. Possible new approaches

8. The panel identified two potential new approaches to include off-grid power generation in the grid emission factor and would like to seek feedback on these two approaches.

A. Inference from load characteristics

9. One possible approach is to infer the existence of off-grid components from load characteristics of the relevant grid, similar to a manner proposed by the proposed new methodology NM0208 "Afam Integrated Gas and Power (AIGP) project". The approach first looks at the load curve, and then measures the duration of time where the load curve is flat, implying that grid electricity generation is at full capacity (see figure below). While this proposed methodology was rejected due to shortcomings in this specific approach, the panel believes that the generic idea could be further developed.

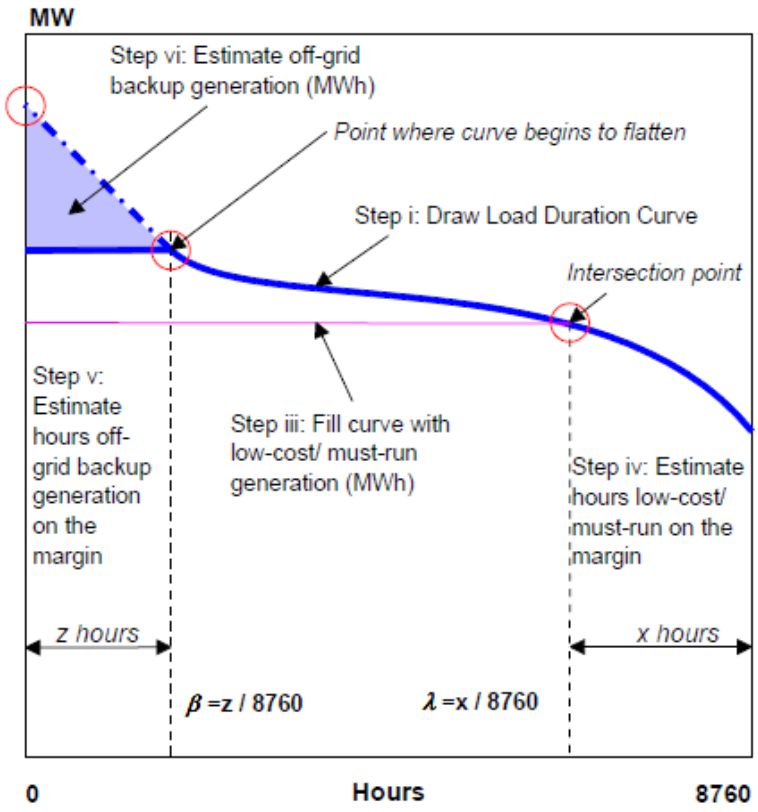
10. Relevant questions are the following:

(a) Are data to derive a load curve readily available in locations with significant off-grid generation?

(b) Do load curves for grids in locations with significant off-grid generation actually demonstrate the characteristics illustrated in the figure below?

(c) How would it be possible to account for the effect that the installed power capacity could not represent limitations on grid electricity generation, but rather, for example, that the grid could contain a significant amount of hydropower where water supply is variable (and limited) or that the grid has significant transmission constraints?

Figure 2: Illustration of Lambda and Beta Calculations for Simple Adjusted OM with Off-grid Backup Method



B. Use of data on the deficit in electricity supply

11. Another approach could be to allow the grid operator to estimate the deficit in electricity supply and assume that a percentage of it would be met by off-grid units.

12. Relevant questions are the following:

(a) How should the deficit in electricity supply be defined and quantified?

(b) Does the grid operator collect and analyze information about the deficit in electricity supply?

(c) How can the type of fuels used by the off grid units be determined?

(d) How can the percentage of the deficit that would be generated by off-grid power plants be determined?

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History of the document

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