Information note

Requests concerning the use of *ex-ante* dispatch analysis for estimating the operating margin

I. BACKGROUND

1. The CDM Executive Board (the Board), at its fifty-sixth meeting, requested the Meth Panel to perform further analysis to determine if the use of *ex-ante* dispatch analysis is suitable when compared with other methods of estimating the operating margin and revise the tool as appropriate (EB 56, paragraph 32). This note summarizes the steps taken by the Meth Panel in performing the analysis and the outcome of the analysis.

II. ANALYSIS

2. The analysis requested by the Board has been conducted through the following steps:

(a) It was assessed which projects use the dispatch analysis (DA) option for calculating the operating margin (OM);

(b) It was assessed whether the grid emission factor for the countries/systems where the DA is used is publicly available;

(c) The DA OM values for different periods of time were compared with other methods of estimating OM.

A. Assessment of projects that use the dispatch analysis

3. The most comprehensive information found on the application of the "Tool to calculate the emission factor for an electricity system" in CDM projects is contained in a database from the "Institute for Global Environmental Strategies", based in Japan.[1] The spreadsheet contains data from CDM projects that use the tool, including information on which methods for estimating the OM were used. The CDM projects that used the DA option are hosted by the following countries:

(a) Kenya (3 projects);

(b) India (1 project);

(c) Argentina (3 projects);

(d) Bolivia (2 projects);

(e) Brazil (20 projects);

(f) Chile (5 projects);

(g) Colombia (3 projects);

(h) Peru (15 projects);

(i) The Dominican Republic (1 project);

(j) Uruguay (3 projects).

[1] <http://www.iges.or.jp/en/cdm/report_grid.html>.

B. Assessment whether information on the grid emission factor is publicly available

4. In order to check whether the grid emission factor for the countries/systems where the DA option was used is publicly available, two sources were analyzed: (a) feedback on a questionnaire that was sent to designated national authorities (DNAs) by the secretariat regarding the applicability of the tool; and (b) the project design documents (PDDs) of the projects mentioned in section A above. In the questionnaire, DNAs were invited to report whether the grid emission factors have been published and are publicly available. In addition, PDDs were assessed. The results on data availability is presented in the table below:

Table 1: Data availability on the grid emission factor for the countries/systems where the DA option is used

Host country	Public availability of data to calculate the DA OM
Argentina	Data is available for the DA OM for the years 2008,2009 and 2010 and for the simple OM for the years 2006-2010<http://energia3.mecon.gov.ar/contenidos/verpagina.php?idpagina=2311>
Brazil	Data is available for the DA OM for the years 2006-2010 <http://www.mct.gov.br/index.php/content/view/307492.html>
Colombia	Data is available for the DA OM for the years 2008-2009 <http://www.siame.gov.co/Inicio/C%C3%A1lculofactordeemisi%C3%B3n/tabid/77/Default.aspx>
Kenya	According to the PDDs, data for the DA OM calculation is provided by dispatch center and is not publicly available
India	Data is available for Simple OM method at the website of the Central Electricity Authority but information on the DA is not provided <http://www.cea.nic.in/reports/planning/cdm_co2/cdm_co2.htm>
Bolivia	No publicly available data on DA calculations could be found
Chile	According to the PDDs, data for the DA OM calculation is provided by dispatch center and is not publicly available
Peru	Grid emission factors are not published. The emission factor is calculated by each CDM project
Dominican Republic	Grid emission factors are not published. The emission factor is calculated by each CDM project
Uruguay	Grid emission factors are not published. The emission factor is calculated by each CDM project

C. Comparison of emission factors

5. The following tables provide a comparison of the DA OM emission factors with other methods of estimating the OM. The information is provided for those countries for which the relevant data is available and for different periods of time.

Table 2: Argentina

	2006	**2007**	**2008**	**2009**	**2010**
Jan	n/a	n/a	0.872	0.864	0.698
Feb	n/a	n/a	0.934	0.855	0.688
Mar	n/a	n/a	0.905	0.826	0.835
Apr	n/a	n/a	0.910	0.860	0.873
May	n/a	n/a	1.017	0.845	0.795
Jun	n/a	n/a	1.009	0.726	0.645
Jul	n/a	n/a	0.980	0.758	0.659
Aug	n/a	n/a	1.017	0.783	0.717
Sep	n/a	n/a	0.901	0.758	0.790
Oct	n/a	n/a	0.639	0.659	0.876
Nov	n/a	n/a	0.736	0.663	0.751
Dec	n/a	n/a	0.742	0.635	0.861
Average DA	**n/a**	**n/a**	**0.889**	**0.769**	**0.766**
Simple OM	**0.533**	**0.543**	**0547**	**0.510**	**0.516**

Table 3a: Brazil (DA OM)

	2006	2007	2008	2009	2010
Jan	0.3218	0.2292	0.5727	0.2813	0.2111
Feb	0.3462	0.1954	0.6253	0.2531	0.2798
Mar	0.3373	0.1948	0.5794	0.2639	0.2428
Apr	0.2752	0.1965	0.4529	0.2451	0.2379
May	0.3173	0.1606	0.4579	0.4051	0.3405
Jun	0.3058	0.2559	0.518	0.3664	0.4809
Jul	0.3507	0.3096	0.4369	0.2407	0.4347
Aug	0.336	0.324	0.4258	0.1988	0.6848
Sep	0.3834	0.355	0.4102	0.1622	0.7306
Oct	0.3598	0.3774	0.4369	0.1792	0.732
Nov	0.2651	0.4059	0.3343	0.181	0.7341
Dec	0.2802	0.4865	0.4686	0.194	n/a
Average	**0.323**	**0.291**	**0.477**	**0.248**	**0.464**

Table 3b: Brazil (Sul Sudeste Centro Oeste grid)

	OM	Lambda	OM-Simple adjusted
2003	0.9823	0.5312	0.4605
2004	0.9886	0.4937	0.5005
2005	0.9653	0.5275	0.4561
2006	0.8071	0.4185	0.4693

III. SUMMARY

6. The data available is not sufficient to arrive at any clear conclusion. However, the limited data available shows significant variations of the DA OM emission factor over time, compared to other methods (i.e. Simple OM) where the variation of the values is much smaller over time.

7. For Argentina, the value calculated using the simple OM method seems more stable than the value derived from the DA OM.

8. For Brazil, it can be found that the variation for the DA OM value over the same months for different years is sometimes more than 50%, for example, between March 2007 and March 2008, and between September 2009 and September 2010. On the other hand, values derived by the Simple Adjusted OM method, for which data was published for the years 2003 to 2006 (for a particular region which constitutes the majority of electricity consumption in Brazil) seem to fluctuate less.

9. These variations of the DA OM values are the result of the tendency of the fuel mix of the generation at the margin to fluctuate more than those not in the margin. The *ex-post* application of the DA method over one year results in 8760 unique OM emission factors for grid power units in the top of the dispatch order for each hour. In order to come up with a value of an annual OM emission factor, it is required to multiply the hourly emission factors by the amount of electricity that is consumed or displaced by the project activity in the associated hour. All hourly data is then aggregated to annual data and divided by annual electricity consumption or displacement in order to arrive at an average annual emission factor. As the DA method considers the actual displacement of the project activity in each hour, it is considered as the most representative of the electricity at the margin. In case of an *ex-ante* DA OM calculation for any project activity, hourly values of the electricity, which is consumed or displaced in a particular year, would be multiplied by hourly emission factors obtained from a previous year. As the hourly electricity generation of a project activity is not known *ex-ante* and would need to be estimated, the result of *ex-ante* DA OM calculation cannot be considered as adequate.

10. The fluctuation of the DA OM emission factors over time, as observed and analyzed above, suggests that it is less appropriate to use the OM derived by the DA approach for *ex-ante* estimation as opposed to the simple or simple adjusted OM methods, as the DA approach could lead to a situation where similar projects registered at different times can have very different baseline emission factors, while their impact on the grid may be similar. With the Simple OM and Simple Adjusted OM, the fluctuation over time is much less of an issue though still existent.

11. Based on this analysis, the Meth Panel recommends not to revise the tool to allow the use of *ex-ante* dispatch analysis for estimating the operating margin.

- - - - -