Information Note on ACM0013

I.   Background

1.   A comment received through the CDM approved methodology website's commenting system on methodology ACM0013 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" suggested that the baseline emissions may be overestimated as a result of underestimating the impact of technology improvement and vintage of data used in the estimation of the baseline emissions benchmark. The suggestion is based on the following quotation from the 2005 IEA report, "Reducing Greenhouse Gas Emissions. The Potential of Coal": "under ideal conditions, modern coal-fired power plants are capable of achieving efficiency levels of more than 40% on a higher heating value basis. This is about a 30% improvement on plants built in the 1950s and 1960s". Therefore, the increase in efficiency during 50 years since 1960 was about 10% which corresponds to an average annual efficiency improvement of about 0.2%.

2.   According to Option 2 (equation 5) of the methodology, the baseline emission factor should be calculated based on data collected from the top 15% performer plants. It is likely that these plants started their commercial operation at least five years before the start of commercial operation of the CDM project, as illustrated by the example below:

- Start of commercial operation of the CDM project: 2012;

- Validation completed / request for registration 2010;

- Start of validation 2010;

- Reference year 2008;

- Decision on the technology employed by the CDM project : 2009;

- Five-year period for which data is available: 2004 - 2008;

- Start of commercial operation of plants used for the benchmark: 2004 - 2007.

3.   It is probable that the decision on the technology employed by the top 15% performer plants was undertaken during the period 2001 - 2004 hence, at least five years before the decision on the technology employed in the CDM project. Consequently, it is expectable that the overall increase in efficiency of fossil fuel fired power plants during that time is at least 1%. This may affect the conservativeness of the estimation of baseline emissions because the majority of the CDM registered projects (and projects in the validation pipeline) apply the baseline emission factor calculated using Option 2.

II.   Analysis

4.   The Meth Panel reviewed the methodology and noted that:

- (a)   The methodology requires to use the lower emission factor between the following two options:

   - (i)   Option 1: the emission factor of the most likely technology determined in the baseline selection procedure through investment analysis; and

   - (ii)   Option 2: the average emission factor of the top 15% plants monitored during the reference year.

(b) The methodology includes Option 2 as a conservative provision by setting the baseline emission factor on the basis of the average of the top 15% performers, however, the methodology does not account for technology improvement over time;

(c) Further work is needed to improve the baseline selection procedure for Option 1, especially with respect to the selection of the energy efficiency of the baseline plant;

(d) The requirements included in the methodology for the data vintage used in selecting the top 15% plants should be revised, in order to account for the fact that the benchmark is established using data from plants built 5-10 years before the proposed CDM project activity;

(e) A statistical approach to evaluate the effects of technology improvement, as proposed in the comment, is reasonable but also data-intensive, and therefore a default factor for the annual efficiency improvement is required. The Meth Panel further noted that external expertise may be needed to collect data needed to propose such a default factor.

5. The Meth Panel reviewed the PDDs of the four registered projects and all projects under validation, and noted the following:

(a) Although the amount of annual emission reductions is in the order of millions of tons of CO_2, it is relatively small difference between two very large numbers which are in the order of hundred millions of tons (i.e. the baseline and project emissions). This raises the concern of a low signal-to-noise ratio;

(b) For the majority of the projects the signal-to-noise ratio is lower than 10%, and in some cases, even lower than 5%. Therefore, small inaccuracies in the baseline emission estimation could result in significant differences in the estimate of the emission reductions. In the worst case the implementation of a project that claims emission reductions, in fact, might have caused an emissions increase;

(c) For the projects applying Option 2 that are under validation, under review or registered , an analysis of potential over-estimation of emission reductions, as presented in the annex, was conducted. The analysis showed that the emission reductions would be overestimated by about 25% on average for these projects if technology improvement is taken into account and the baseline efficiency increases by 1% (e.g. from 38% to 39%) over the period between the finalization of the design of the project plant and that of the top 15% performer plants used to determined the baseline emissions benchmark;

(d) The baseline efficiency values determined by project proponents through the baseline selection procedure (Option 1) are rather low, while it could be expected that they should be comparable (or even higher) than the values derived from the top 15% plants (Option 2);

(e) The PDDs of the registered project activities do not provide the efficiencies of the individual plants to be considered for the identification of the 15% top performers and therefore it is not possible to assess the degree of conservativeness of this provision;

6.   Given that the average capacity of the registered projects and those in the validation pipeline are in the range of 2000-3000 MW, resulting in a large amount of emission reductions per project activity, extra caution should be given to ensure that the baseline emissions are estimated in a transparent and conservative manner. The annual emissions reduction for all coal-fired projects (registered and under validation) applying Option 2 of this methodology is estimated to be 34 million tCO_2 per year.

III.   Conclusion

7.   The above consideration justifies the conclusion that continued use of methodology ACM0013 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" may lead to significant over-estimation of emission reductions.

8.   The Meth Panel recommends the following stepwise approach:

   (a)   Put the methodology on hold with immediate effect, while initiating a revision of the methodology;

   (b)   Revise Option 1, to improve the procedure for the identification of the baseline scenario;

   (c)   Revise Option 2, to include the consideration of technology improvement and a more suitable definition of the data vintage. External consultancy is required.

9.   Considering that time will be required to finalize the external consultancy for the default values for the annual technological improvement rate, to revise the procedure to identify the most likely baseline scenario and to revise the definition of data vintage, the Meth Panel expects that the revision could be completed at the fifty-second Meth Panel meeting.

Annex

Annex: Expected Overestimation of Annual Emission Reductions, Assuming an Increase in Baseline Efficiency from 38% to 39% (Option 2)

Project Activity ID	Status	Capacity (MW)	Annual Emissions[1] (tCO$_2$/yr)		Annual Emission Reductions (tCO$_2$/yr)			
			Baseline Emissions	Project Emissions	ER from PDD	(BE-PE)/BE	ER Overestimation[2]	ER overestimation / ER from PDD
2716	registered	1320	8,376,931	6,537,414	1,839,517	22%	217,800	12%
3225	registered	1320	8,376,931	7,183,914	1,193,017	14%	217,800	18%
3690	registered	3690	27,001,725	24,755,849	2,245,876	8%	702,045	31%
4533	review	3690	24,199,573	22,964,875	1,234,698	5%	629,189	51%
4629	review	3960	25,833,209	23,693,284	2,139,925	8%	671,663	31%
	validation	3000	8,077,118	7,614,591	462,527	6%	210,005	45%
	validation	2000	8,246,896	7,614,591	632,305	8%	214,419	34%
	validation	3000	8,077,118	7,614,591	462,527	6%	210,005	45%
	validation	1320	8,573,661	6,967,806	1,605,855	19%	222,915	14%
	validation	2000	8,056,620	7,542,757	513,863	6%	209,472	41%
	validation	1000	5,288,109	4,986,443	301,666	6%	137,491	46%
	validation	1320	9,085,062	8,619,716	465,346	5%	236,212	51%
	validation	2000	4,498,158	4,157,654	340,504	8%	116,952	34%
	validation	1320	8,555,164	6,480,468	2,074,696	24%	222,434	11%
	validation	1980	11,870,290	10,761,885	1,108,405	9%	308,628	28%
	validation	1980	12,853,201	10,525,291	2,327,910	18%	334,183	14%
	validation	1320	4,899,455	4,600,883	298,572	6%	127,386	43%
	validation	1370	9,025,192	7,922,828	1,102,364	12%	234,655	21%
	validation	1400	13,585,049	11,945,306	1,639,743	12%	353,211	22%
	validation	1980	9,605,591	8,011,362	1,594,229	17%	249,745	16%
	validation	1320	8,922,325	7,857,320	1,065,005	12%	231,980	22%

	validation	1320	7,876,517	7,614,208	262,309	3%	204,789	78%
	validation	1320	8,386,009	7,863,944	522,065	6%	218,036	42%
	validation	2000	8,516,448	8,427,061	89,387	1%	221,428	248%
	validation	1320	8,386,009	7,863,944	522,065	6%	218,036	42%
	validation	660	4,000,872	3,785,687	215,185	5%	104,023	48%
	validation	4000	26,007,389	21,858,718	4,148,671	16%	676,192	16%
	validation	1320	9,020,078	7,928,371	1,091,707	12%	234,522	21%
	validation	1980	13,530,117	11,892,557	1,637,560	12%	351,783	21%
	validation	1320	9,020,078	7,928,371	1,091,707	12%	234,522	21%
Total		**57,530**	**327,750,893**	**293,521,689**	**34,229,204**	**10%**	**8,521,523**	**25%**

Notes:

1. As presented in PDDs downloaded on 3 June, 2011

2. Potential overestimation of emission reductions was calculated to illustrate the likely impact of the issues analyzed in the information note. As the baseline emission factors of Option 2 are published by government agencies and the underlying baseline efficiencies are not clearly identified in the PDDs, the calculations are based on the assumptions of a baseline efficiency of 38% and a 1% potential improvement in the efficiency. A 38% efficiency is within the range of Option 2 baseline efficiencies used by the PDDs and this assumption will not significantly affect the estimates of the ER overestimation.

3. All the power plants listed in the table are coal-fired and their baseline emissions are based on Option 2. The following projects are not included:

- one rejected project.

- one registered project and seven projects under validation, the baseline emissions of which are based on Option 1.

- two natural-gas-fired power plants and one fuel-oil-based power plant, all of which are under validation.

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History of the document

Version	Date	Nature of revision
01	EB 62, Annex # 15 July 2011	To be considered at EB 62.
Decision Class: Operational **Document Type**: Information note **Business Function**: Methodology		