Information note

Background information on the proposed revision of ACM0013

I Introduction

1. At its sixty-seventh meeting, the Executive Board (hereinafter referred to as the Board) of the clean development mechanism (CDM) considered the revision of the methodology ACM0013 "Consolidated baseline and monitoring methodology for new grid connected fossil fuel fired power plants using a less GHG intensive technology" and inputs received from the call for public inputs on the draft revised methodology. The Board also took note of an information note prepared by the Meth Panel (the panel), which summarizes the issues identified in methodology ACM0013. The Board requested the panel to prepare a new revision to the methodology and a more detailed information note, for consideration by the Board at its sixty-eighth meeting, taking into account:

(a) The comments received from the call for the public inputs;

(b) The comments by the Board members during the consideration of the methodology.

2. This note is prepared in response to this request. The note summarizes the issues identified in the information note prepared by the panel at its fifty-third meeting and describes how these issues are addressed in the proposed draft revision of ACM0013. Furthermore, the note explains the revisions that were incorporated in the methodology to improve its objectivity and clarity.

3. The note also explains how the public inputs and comments by the Board members at the Board's sixty-seventh meeting, were considered while preparing the new draft revised methodology.

4. The methodology uses two approaches/options to determine baseline emissions: approach/option 1 identifies which power plant would most likely be constructed in the baseline scenario and determines the emission factor of this specific power plant. Under approach/option 2 the baseline emission factor is determined as an emissions benchmark based on a peer group of recently constructed power plants. As a conservative approach, the project participants shall use the lower baseline emission factor between the two approaches/options.

5. The draft revised methodology continues to use these two approaches/options to determine baseline emissions. However, the approaches/options have been refined to address the issues that were identified. The sections below describe the proposed changes to these approaches.

II. Identification of the baseline scenario

6. According to the latest approved version of ACM0013, the project participants shall identify the economically most attractive baseline scenario alternative by comparing the economic attractiveness of different power plants that could be constructed as an alternative investment to the project activity. The information note prepared by the panel at its fifty-third meeting recommended to further clarify which revenues should be considered in the investment analysis and noted that many PDDs do not provide information on key assumptions and parameters underlying the calculations. During the preparation of the revised draft of ACM0013, the panel recognized the difficulty to ensure conservativeness in the

selection of the input parameters used in the investment analysis, including, inter alia, the project load factor and the fuel price.

7. A standardized approach to determine the baseline scenario was introduced to address the inconsistencies in the application of the current approach and to determine the baseline scenario in a more objective manner. Considering the relatively small difference between the significant amount of investment under the baseline scenario and the project scenario, and taking into account that the conclusion of the baseline scenario is very sensitive to the assumptions used in estimating the values of the input parameters, the panel agreed that a standardized approach would overcome the subjective nature of the baseline selection through an investment analysis and would help to reliably identify the power generation technology that would be implemented in the absence of the CDM.

8. This standardized approach draws upon the "Guidelines for the establishment of sector specific standardized baselines" and takes into account the market penetration of technologies. First, all planned power plants using the same fuel category and of similar load and size are identified. These plants should have received within the past five years the required government permit to start construction, but should not have started commercial operation. Among these plants, the market share of each power generation technology (as defined in the draft revised methodology revision) is determined. These technologies are sorted by their efficiency. The technology at the 80th percentile is identified as the baseline technology.

9. The group of planned power plants used to identify the baseline technology excludes power plants registered as CDM project activities but includes power plants requesting registration as CDM project activities or under validation. Several comments were received on this requirement: on the one hand it is suggested to include the registered CDM plants, on the other hand it is suggested to exclude the projects requesting registration or under validation. The panel considers that the group of power plants should include the projects that are under validation, but not yet registered because no pre-assumption should be made regarding the result of the validation process of these projects. The panel also considers that registered projects may be excluded as they may only have been implemented as a result of the CDM and, hence, including them may not reflect what types of technologies would be used in the absence of the CDM.

III. Demonstration of additionality

10. The general approach for additionality demonstration remains the same and compares the financial attractiveness of the baseline technology and the project technology. The draft revised methodology clarifies the requirements on accounting for revenues and subsidies/fiscal incentives/tax benefits in the calculation of the levelized cost of electricity production. Most of the data used to calculate the levelized costs and the information used to determine the efficiency of the baseline technology shall be substantiated by the required feasibility studies. Additional guidance is provided for the projection of the fuel price and safeguard measures are included to ensure that the load factor of the project plant is not underestimated to understate the financial viability of the project technology. Furthermore, the revised methodology requires that the sensitivity analysis should consistently support the conclusion that the alternative scenario with the baseline technology is economically more attractive than the project activity.

11. Considering that both the project and the baseline technology require a large capital investment and that there is inherent uncertainty with regard to the economic attractiveness of the alternatives and the impact of the CDM on the selection among the alternatives, the methodology requires to substantiate that the decision to implement the project technology is

incentivized by the CDM revenues . To demonstrate additionality, the revised methodology requires that the levelized costs of electricity production for the proposed project activity, taking into account its annual revenue from CERs, are lower than the levelized costs of electricity production for the alternative scenario with the baseline technology. The methodology further prescribes how to determine the CER price used in the comparison of levelized costs.

12. Because the alternatives considered for baseline identification and additionality demonstration no longer include renewable power, nuclear power or energy sources using other fossil fuels, an applicability condition was modified to require that at least 50% of the installed *capacity* of the *recently* built power plants use the same fossil fuel category as the project activity. The cohort for this applicability condition is limited to power plants commissioned in the most recent five years to ensure that the baseline fossil fuel is used predominantly in the newly built power plants. This applicability conditions aims to provide a safeguard that plants using the same fossil fuel category are the most likely baseline scenario. In the proposed revision, more recently built power plants are used, because recent developments may better reflect what is the most likely baseline fuel category than an assessment based on the entire stock of power plants. The capacity of the power plants is used instead of the power generation, as such data is usually more readily available. In addition, the power generation may fluctuate in some countries significantly from year to year, e.g. due to weather conditions or changes in fuel prices.

IV. Approach/Option 1

13. Under Approach/Option 1 of the latest approved version of ACM0013, the baseline emission factor is calculated based on the efficiency of the baseline power plant and the CO_2 emission factor of the relevant fuel type.

14. The following issues were identified for approach/Option 1in the information note prepared by the panel at its fifty-third meeting:

- Lack of a consistent approach and lack of justification of assumptions in deriving the baseline efficiency under Approach/Option 1 of the methodology;
- Lack of project-specific considerations. The actual efficiency of a power plant will depend not only on the category, quality of fuel used and technology employed but also on design and operating conditions. The following project site specific conditions/properties have an impact in the actual efficiency of a coal power plant, inter alia: (i) coal properties; (ii) cooling technology (water or air) and the ambient conditions; and (iii) application of air pollution control equipment. These factors at the project site should be taken into account when estimating the efficiency of the identified baseline technology and fuel. Most PDDs do not consider these site-specific factors but derive the baseline efficiency based on other plants that may face different site-specific conditions;
- Use of data from existing plants. In many cases, data from existing plants is used to determine the baseline efficiency of the new power plant that would be constructed in the baseline. A data vintage of at least five years is observed for projects to be commissioned in 2012 or later. The use of data from existing plants is not appropriate because power plants constructed in the past tend to have a lower efficiency than new power plants. This results in a systematic under-estimation of the baseline efficiency.

15. The draft revised methodology makes it explicit that data on the efficiency of existing plants shall not be used for determining the baseline efficiency and requires that feasibility

studies are conducted for the baseline technology and the project technology. The studies are required to specify key design and operating parameters, the operational efficiency of the technologies, all costs, and the fuel type used. The studies shall be based on the specific characteristics of the site where the project plant is established. These studies were required because in the previous application of the methodology in many cases the baseline emission factor was not derived based on the consideration of the specific site where the baseline power plant would be constructed but based on generic assumptions. In practice, the baseline emission factor will largely depend on the specific situation of the site. For example, the available cooling or the ambient conditions as well as the coal type available at that site can influence the overall efficiency of the power plant.

16. The panel considers that it is reasonable to require feasibility studies for both the baseline and the project technology. The proposed project activity can only be deemed additional if both the baseline technology and the project technology were seriously considered as two alternatives for investment decisions and that the baseline technology would be implemented in the absence of the CDM. Consequently, if the project participants seriously considered to implement the baseline technology, they would in any case have conducted feasibility studies for both technologies to inform their investment decision. In addition, the draft revised methodology allows the use of preliminary feasibility studies, or studies conducted for the FEL-2 stage or other equivalent project planning stage, if the studies contain the information as required by the methodology for the feasibility studies.

17. In many PDDs, it was found that the efficiency identified for the baseline technology through Approach 1 is lower than the efficiency determined through Approach 2, while the panel expected that in most cases the efficiency from Approach 1 should be higher considering that it is based on the design efficiency of a new plant. Therefore, the draft revised methodology provides a minimum baseline efficiency for different coal-fired power generation technologies.

18. These values are not default values to use optionally instead of Approach/Option 1 or Approach/Option 2. They are minimum values for the plant efficiency to be used in Approach 1, in order to provide an additional safeguard for the determination of the baseline efficiency according to Approach/Option 1. The panel considers that the values should not be too conservative and therefore used the average of the top 50% performing plants to determine the values.

19. The values are based on a survey of the measured efficiencies of Chinese plants in 2009, as reported by the China Electricity Council in 2010. The data used is the only comprehensive set of data which is publicly available for one of the countries where CDM projects are implemented and which is based on measured efficiencies and not derived from secondary data. Furthermore, the draft revised methodology invites the project proponents to submit a revision request to amend the table with conservative minimum efficiency values for other countries and other technologies with appropriate substantiation.

V. Approach/Option 2

20. In Approach/Option 2, the baseline emission factor is determined as an emissions benchmark based on a peer group of recently constructed power plants. The peer group consists of recently constructed power plants using the same fossil fuel category, with a comparable size as the project, and operated in the same load category. Based on the rank of the operational efficiencies of the plants in the peer group, the top 15% performer plants shall be identified. The average emission factor of these plants is then determined as the baseline emission factor under Approach/Option 2.

21. The following issues were identified for Approach/Option 2 in the information note prepared by the panel at its fifty-third meeting:

- The data and assumptions used to calculate the baseline efficiency, which the methodology requires to be documented in the PDD, are not documented in many cases, and where they are documented, there are data inconsistencies for the same plants;
- The plants in the peer group are found to be constructed and commissioned on average seven years before the project plant, while various sources demonstrated an improvement in the efficiency of newly constructed power plants from 1.3% points over 10 years up to 3% points over four years.

22. The proposed revision of ACM0013 makes it explicit that all underlying data, the data sources and all calculations applied in Approach/Option 2 shall be transparently documented in the CDM-PDD, in a manner that the reader can re-produce the calculations.

23. A procedure is incorporated to estimate the annual efficiency improvement of newly constructed power plants that would likely have occurred due to technical development in the time between the investment decisions made for the peer plants and the investment decision made for the proposed project activity. The procedure requires the identification of the plants using the same fuel category and of similar load and size which started commercial operation in the recent ten years. If no data is available to implement the procedure, a default improvement rate is provided. In addition, the emission factor from Approach/Option 2 is required to be recalculated with newly available data at the first renewal of the crediting period.

24. According to the procedure to estimate the trend of the efficiency over time, a linear or exponential curve is fit to the data set of the similar plants from the recent ten years, using the method of least squares. In addition, the statistical significance of the trend is evaluated with the student test:

- If the trend is statistically significant at a significance level of 5%, the mathematical function of the trend curve shall be used to calculate the efficiency improvement in the time between the commissioning of the peer plants and the commissioning of the proposed project activity. If the curve results in a reduction in the efficiency with time, the efficiency is conservatively assumed to be constant with time. The probability of concluding on a trend while the plant efficiency does not depend on the start date of commercial operation of the plants is thus equal to or less than 5%;
- If the trend is not significant at a significance level of 5%, the hypothesis that the efficiency of the newly constructed power plant during the last ten years does not depend on plant age, is rejected. However, the probability of concluding from this statistical test that there is no such trend while there is actually a significant trend, is not quantifiable with statistical tests and could be potentially quite large. Therefore, the average global trend in efficiency improvement, observed over the past 50 years, as identified by a study of the IEA, is used in such cases.

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History of the document

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