CLEAN DEVELOPMENT MECHANISM

**CDM-EB81-AA-A05**

# Revision of guidelines for establishment of sector-specific standardized baselines

Version 01.0



United Nations
Framework Convention on
Climate Change

# COVER NOTE

## 1. Procedural background

1. In response to decision 3/CMP.6, the Executive Board of the clean development mechanism (the Board)requested the secretariat to develop a general methodological framework for the development and assessment of standardized baselines.

2. In this context, the Board, at its sixty-second meeting, adopted the “Guidelines for the establishment of sector specific standardized baselines” (the SB guidelines) (EB 62 report, annex 8). Subsequently, the Board, at its sixty-fifth meeting, revised the SB guidelines to incorporate an appendix defining the vintage of data and the frequency of updated thresholds for baseline and additionality (Xa, Xb, Ya and Yb) (EB 65 report, annex 23). The thresholds, which were approved on an interim basis, establish the default value of 80$^{th}$ percentile for priority sectors (energy for households, energy generation in isolated systems, agriculture) and 90$^{th}$ percentile for other sectors, expressed as the percentage of output of the sector as used in the SB guidelines. At its sixty-fifth meeting, the Board also adopted a detailed work programme (EB 65, annex 22), which envisaged the need for revising the SB guidelines based on lessons learned from their implementation. The work programme contained a plan for the development of country-specific thresholds for baseline and additionality, which can replace (or complement) the default values of thresholds. Subsequently, at its seventy-third meeting, the Board agreed to revise the SB guidelines based on the road-testing of guidelines and lessons learned from their implementation.

3. The Board considered the first draft of the revised SB guidelines at its seventy-fifth meeting and provided specific inputs. The revised draft of the SB guidelines, as contained in appendix 1, is prepared jointly by the secretariat and the Methodologies Panel (Meth Panel), in response to the mandate from the CDM management plan for 2013 and 2014 adopted by the Board. The "guideline" document is categorized and drafted as a "standard" as per the request made by the Board at EB 75.

4. In the context of the plan for the development of country-specific thresholds, the Board considered the draft guidelines for “determination of baseline and additionality thresholds for standardized baselines using the performance-penetration approach” at its sixty-ninth and seventy-third meetings. The Board provided specific inputs to this document.

5. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), at its ninth session, held in Warsaw, Poland, requested the Board to prioritize the development of top-down thresholds for baseline and additionality for the underrepresented countries in the CDM. At its seventy-seventh meeting, the Board approved the workplan of the Board for 2014 (EB 77 report, annex 1) and agreed to the “Further work on standardized baselines including country-specific thresholds on baseline and additionality”. The Board considered a concept note on “further work on standardized baseline regulatory framework including development of top-down thresholds on baseline and additionality for under-represented countries” (annex 11 to EB 79 annotated agenda). At EB 79, the Board requested the secretariat and the Methodologies Panel (Meth Panel): “to jointly prepare an analysis of different options to

define the baseline and additionality thresholds for consideration by the Board at its eighty-first meeting. The analysis should include the option of continuing to use the values in appendix 1 of the SB guidelines (version 02.0), the options outlined in the aforementioned concept note on further work on the standardized baseline regulatory framework and other options where applicable, and assess these options with regard to environmental integrity, attractiveness to CDM projects and comparability across sectors/countries. The analysis should be based on road-testing using existing and future submissions of standardized baselines as well as other sources of information if available."

6. The revised SB guidelines take into account inputs from: the Board; the small-scale working group (SSC WG); the calls for public inputs; relevant experts, practitioners, and institutions; various workshops/meetings organized with Designated National Authorities (DNAs), project participants, Designated Operational Entities (DOEs); road-testing of the SB guidelines from various bottom-up SB submissions received to date; and, lessons learned from the secretariat's experience of implementing the SBs.

7. This document contains three appendices: appendix 1 covers the revised draft SB guidelines named as the standard for the development of standardized baselines (hereinafter referred to as "SB standard" ); appendix 2 (Information note: Lessons learned from road testing of guidelines for establishment of sector-specific standardized baselines) covers the road testing of existing approved version of SB guideline and the new draft SB standard based on SB submissions made as on date; and, appendix 3 (Concept note: Analysis of options for determination of baseline thresholds for standardized baselines) presents the analysis of and recommendation for defining the options for baseline and additionality thresholds.

## 2. Purpose

8. The objectives of the revision of the SB guidelines (Appendix 1) (renamed as standard for the development of standardized baselines (SB standard)), jointly prepared by the secretariat and the Meth Panel, are to:

(a) Improve clarity through more examples, elaborations and editorial corrections;

(b) Expand the scope of the guidelines to other approaches for the establishment of SBs;

(c) Make significant changes in methane abatement SBs and elaborate the approach on sectoral emission factor;

(d) Cover new definitions and examples;

(e) Ensure linkages of the guidelines to various documents under the SB regulatory framework;

(f) Consolidate key considerations for the development of SBs.

9. The purpose of the information note included in appendix 2, jointly prepared by the secretariat and the Meth Panel, is to inform the Board on the lessons learned through road-testing of the SB guidelines based on the standardized baseline (SB) submissions that led to the revision of the revised SB guidelines (renamed as standard for the development of standardized baselines (SB standard)) as included in appendix 1 to this

document. Since the work on the analysis of the power sector in the context of the SB standard is in progress (please refer to the section on issues and proposed solutions), the road-testing of the power sector is not included, even though evaluation is in progress for two power sector SB submissions which have used the SB guidelines. The results of the road-testing were used to prepare the draft SB standard.

10. The purpose of the concept note (appendix 3), which has been jointly prepared by the secretariat and the Meth Panel, is to present the analysis of different options for defining the baseline and additionality thresholds. The outcome of the analysis was used in preparing the SB standard (appendix 1).

## 3. Key issues and proposed solutions

(a) **Issues and proposed solutions for the SB standard:** The following key issues are identified and solutions are proposed in the SB standard which is included in appendix 1 to this document:

(i) **Convert the guidelines into standard:** At its seventy-fifth meeting, the Board requested the secretariat to classify and rewrite the document as standard instead of guidelines;

(ii) **Approaches for developing a standardized baseline:** It is clarified in the draft SB standard that there are three different approaches to developing a standardized baseline: (1) an approach based on approved CDM methodologies; (2) an approach based on an approved CDM methodological tool; and (3) the approach covered in the SB standard. The rationale for third approach is further clarified in that it accounts for performance, penetration and cost/barrier. The road-testing results based on limited bottom-up submissions and interactions with industry experts show that the current approach is comprehensive, robust and flexible enough to develop SBs under most of the sectoral circumstances;

(iii) **Sector-specific vis-à-vis measure-specific approach:** The SB standard is drafted to include the step-wise algorithm and requirements to develop a sectoral emission factor that encompasses technology switch, fuel switch and feedstock switch. The DNA can develop measure-specific standardized baselines when the conditions provided in the documents can be met by the sectoral facilities;

(iv) **Change in baseline and additionality thresholds:** Based on the analysis, as presented in the concept note included in appendix 3, it is recommended that the two approaches in the SB standard that involve different values of baseline and additionality thresholds be used. Approach A, as presented in the SB standard, includes the baseline threshold of 90$^{th}$ percentile. There is no necessity to use cost/barrier for the inclusion of a fuel/feedstock/technology in the positive list, that is cleaner than the fuel/feedstock/technology of the facility on the baseline threshold. Approach B relaxes the threshold from existing the 80$^{th}$ /90$^{th}$ percentile to a 70$^{th}$ percentile for the threshold, maintaining the existing requirement of cost/barrier to demonstrate additionality. Further stringency is included in this approach, which requires cost/barrier to be used for shifting the baseline to a cleaner facility than the facility on 70$^{th}$ percentile, if the

technology/fuel/feedstock of the cleaner facility does not meet the criterion of additionality;

(v) **Expanded additionality criteria:** In addition to the demonstration of additionality based on cost/barrier criteria, the draft revision includes automatic additionality for projects that qualify according to: objective conditions for deeming additionality as defined in approved CDM methodologies; additionality criteria of microscale project activities; and additionality criteria of small-scale project activities;

(vi) **Measures on methane abatement:** The measure 3 (methane destruction) and measure 4 (methane avoidance) of the existing SB guidelines are substantially revised under the draft SB standard. The new measures on methane abatement are termed as: methane abatement from existing closed landfills; methane abatement for fresh waste treatment;

(vii) **Positive list:** It is clarified that the positive list can include the technologies/fuels/feedstock which are not implemented in the country;

(viii) **Design vs. actual data:** The draft revision explicitly allows the use of actual data as well as design data for the development of SBs;

(ix) **Key considerations in the development of standardized baselines:** A separate section is added to elaborate the key considerations required for developing SBs, which include: level of aggregation; static or dynamic standardized baselines; ex-post application of standardized baselines; scope of positive lists; application of standardized baselines to project activities that can also use approved methodologies or tools; multiple outputs; consideration of facilities with registered CDM projects for the development of SBs; application of standardized baselines to project activities using multiple measures;

(i) **Applicability of the SB standard to the power sector:** The Meth Panel, at its sixty-fifth meeting, recommended that the Board limits the applicability of the SB standard to sectors other than the power sector, as the work on analysing the implications of applying this standard to power sector is still undergoing. This analysis also includes the implications of applying the approved "tool to calculate emission factor of an electricity system" (grid tool).The secretariat, however, has proposed an alternative option that the current applicability of SB guideline should be maintained in the revised document. In the secretariat's opinion, since the existing approved version applies to the power sector and that the approach presented in the SB standard results in a much more conservative grid emission factor than that using the grid tool, the SB standard should be applicable for the power sector. It should be noted that two SB submissions have already been received for the power sector which use the existing approved SB guidelines and there is a possibility that other DNAs might be working on new SB submissions for the power sector using the existing approved SB guidelines. The Board may consider this issue again when the joint analysis of the secretariat and the Meth Panel on the power sector is completed and submitted for the Board's consideration;

(b) **Issues and proposed solutions for the Information note on lessons learned from road testing of guidelines for establishment of sector-specific standardized baselines**: The following key issues are identified and solutions are proposed in the information note, which is included in appendix 2 of this document:

(i) The SB guidelines approved by the Board at its sixty-fifth meeting has so far led to the submission of twenty-six SBs. The submitted SBs using the SB guidelines include one in the charcoal sector, one in the cement clinker sector, one in the rice mill sector, two in the power sector and eight in the waste sector (Methane destruction). Of these, two SBs have been approved, namely, ASB0002 for Charcoal production in Uganda and ASB0004 for the Rice mill sector in Cambodia;

(ii) Eleven SBs were also submitted by various DNAs for an emission factor of the power sector (grid) using the “tool for emission factor of electricity system”, of which four have been approved;

(iii) In addition, several other SBs are in progress and will be submitted by various DNAs in the near future;

(iv) While assessing and evaluating these submissions, and feedback from stakeholders and other practitioners, several lessons were learned by the secretariat, the Meth Panel and the SSC WG, which are incorporated in the draft SB standard (appendix 1);

(c) **Issues and proposed solutions for the concept note on** the **analysis of options for determination of baseline thresholds for standardized baselines:** The following key issues are identified and solutions are proposed in the concept note, which is included in appendix 3 of this document:

(i) Based on the analysis of five options, the secretariat and the Meth Panel have recommended two options on thresholds for baselines and additionality to the Board;

(ii) Both the recommended options have been incorporated in the revised SB standard. Various aspects of the recommended options are highlighted in the recommendation section of the concept note.

## 4. Impacts

11. The revision of the SB guidelines (or development of the draft SB standard) will contribute to improved clarity, expanded scope and flexibility for user, while ensuring balance between attractiveness and environmental integrity of SBs for CDM projects. This will further facilitate the development of SBs and their application in CDM projects.

12. Since the revision takes into account lessons learned from the implementation of the SB guidelines, road testing and outcome of analysis on various options to define baseline and additionality thresholds, the SB standard will reflect reality on the ground.

## 5. Subsequent work and timelines

13. The work on the revision of the SB guidelines is completed except the elements of including approaches for the power sector. The secretariat and the Meth Panel are analysing the implications of applying a newly proposed approach of ‘weighted average emission factor’ for the SB standard and the existing grid tool for determination of the power sector. The analysis may be used to revise the SB standard again to include the new power sector approach and/or to revise the grid tool.

14. This work is expected to take two to three meetings of the Meth Panel.

## 6. Recommendations to the Board

15. The secretariat recommends that the Board consider the information, analysis and recommendation presented in the information note and the concept note presented in appendices 2 and 3.

16. The Board may wish to consider two options proposed by Meth Panel and the secretariat on the application of the SB standard for the power sector. The Board may decide to either exclude the power sector from the applicability of the SB standard to the power sector, or continue the applicability of the SB standard to the power sector.

17. Based on the above the secretariat and Meth Panel recommends that the Board adopts the new SB standard presented in appendix 1.

## 7. References

18. Relevant provisions from the following documents should be applied when the SB standard is used by SB developers:

    (a) Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines;

    (b) Procedure for development, revision, clarification and update of standardized baselines;

    (c) Standard for determining coverage of data and validity of standardized baselines;

    (d) Sampling and surveys for CDM project activities and programmes of activities.

**TABLE OF CONTENTS** **Page**

| | | |
|---|---|---|
| **APPENDIX 1.** | **DRAFT STANDARD: DEVELOPMENT OF STANDARDIZED BASELINES** | **9** |
| **APPENDIX 2.** | **INFORMATION NOTE: LESSONS LEARNED FROM ROAD TESTING OF GUIDELINES FOR ESTABLISHMENT OF SECTOR-SPECIFIC STANDARDIZED BASELINES** | **31** |
| **APPENDIX 3.** | **CONCEPT NOTE: ANALYSIS OF OPTIONS FOR DETERMINATION OF BASELINE THRESHOLDS FOR STANDARDIZED BASELINES** | **41** |

# Appendix 1. Draft Standard: Development of standardized baselines[1]

## 1. Introduction

1. The use of standardized baselines can potentially reduce transaction costs, enhance transparency, objectivity and predictability, facilitate access to the clean development mechanism (CDM), particularly with regard to underrepresented project types and regions, and scale up the abatement of greenhouse gas (GHG) emissions, while ensuring environmental integrity. At the sixth meeting of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) in Cancun, Mexico, Parties adopted decision 3/CMP.6 on the implementation of standardized baselines under the CDM.

2. Parties at CMP 6 also decided that Parties and project participants, as well as international industry organizations or admitted observer organizations through the host country's designated national authority (DNA), may submit proposals for standardized baselines applicable to new or existing methodologies, for consideration by the CDM Executive Board (hereinafter referred to as the Board).

3. Also at CMP 6, Parties requested the Board to develop standardized baselines, as appropriate, in consultation with relevant DNAs, prioritizing methodologies that are applicable to the least developed countries (LDCs), small island developing States (SIDS), Parties with 10 or fewer registered CDM project activities as at 31 December 2010 and underrepresented project activity types or regions, inter alia, for energy generation in isolate systems, transport and agriculture.



4. In response to the request from CMP 6, the Board, at its sixty-second meeting (EB 62), adopted the "Guidelines for the establishment of sector specific standardized baselines" (the SB guidelines) (EB 62 report, annex 8). Subsequently, the Board, at EB 65, further revised the guidelines (EB 65 report, annex 23).

5. The SB guidelines have been revised in response to the mandate from the CDM management plan for 2013 and 2014 adopted by the Board. The "guideline" document is categorized and drafted as a "standard" as per the request made by the Board at EB 75.

[1] This SB standard proposes substantive revision of existing SB guideline, which has impact on its language, flow, contents and requirements of entire document. Therefore it is decided not to present the revised contents in highlighted form to enhance the readability of the document.

# 2. Scope, applicability, and entry into force

## 2.1. Scope and applicability

6. The document includes requirements and guidance for three approaches to developing standardized baselines (standardization of the baseline scenario and/or baseline emission factor and/or additionality):

(a) **Approach 1:** A standardized baseline may be developed using a methodological approach in the approved CDM methodologies,[2] in particular the approaches for baseline scenario identification, additionality demonstration and baseline emissions;

(b) **Approach 2:** A standardized baseline emission factor may be developed using a methodological approach in an approved CDM methodological tool;[3]

(c) **Approach 3:** A standardized baseline may be developed based on an approach covering three dimensions: performance, penetration and cost/barrier. The performance is defined in terms of emission factor, carbon intensity or energy intensity, whereas the penetration is determined by the contribution to the total national/regional production of the output. In one of the sub-approaches of this approach (approach A), the performance and penetration are used to identify the baseline technology/fuel/feedstock, demonstrate additionality and then to determine the baseline emission factor. Another sub-approach (approach B) requires that in order to determine baseline and demonstrate additionality, the cost/barriers of facilities are analysed in addition to determination of their performance and penetration. Under this sub-approach the technologies/fuels/feedstock which are commercially less attractive or have barriers for implementation are identified, and additionality is standardized using this analysis. This document further elaborates how to develop standardized baselines (SBs) by using approach 3 in later sections.



7. The requirements and guidance are to be taken into account by SB developers, in particular the host country DNAs (hereinafter DNAs represent all SB developers). The requirements and guidance may also be informative for project participants (PPs) in developing CDM projects using approved SBs. These requirements and guidance are applicable for the development of SBs using approach 3 and may be applicable for approach 1 or 2, especially if relevant requirements and guidance are not provided in the approved methodologies or tools.

---

[2] For example, AM0070 “Manufacturing of energy efficient domestic refrigerators” can be used to develop a standardized baseline, e.g. the baseline scenario and the baseline emission factor for a particular refrigerator class of a country. If a suitable approved methodology is not available, a new methodology or a revision of an approved methodology may be submitted in accordance with the “Procedure for development, revision and clarification of baseline methodologies and methodological tools”.

[3] For example, the “Tool to calculate the emission factor of an electricity system” can be used to determine an emission factor for the grid of a country or region. This emission factor can be used to calculate baseline emissions (and project emissions/leakage emissions) of CDM projects applying a CDM methodology that refers to this tool.

8. DNAs, PPs and other stakeholders may propose new approaches, revisions to or deviations from the requirements of this standard, including the values of the baseline threshold, as part of the initial submission of a standardized baseline for approval by the Board.[4]

9. Approach 3 is applicable to sources of emissions of carbon dioxide ($CO_2$)[5] and to the waste management sector for emissions of methane ($CH_4$) and not applicable to nitrous oxide ($N_2O$), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride ($SF_6$).

10. [Approach 3 is not applicable to the standardized baselines developed for the power sector] *Note for the Board: As mentioned in the cover note to this document, the Board may decide to either exclude the power sector from the applicability of the SB standard to the power sector or continue the applicability of the SB standard to the power sector.*

### 2.2. Entry into force

11. The document will enter into force upon its adoption by EB81 on 26 November 2014.

## 3. Normative references

12. Relevant provisions from the recent versions of the following documents should be applied when this standard is implemented, which are all available at <http://cdm.unfccc.int/methodologies/standard_base/index.html>:

(a) "Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines": DNAs should ensure that the data quality for the development of SBs is in accordance with the data quality objectives and documentation provisions as well as the stepwise guidance specified in the guidelines;

(b) "Procedure for development, revision, clarification and update of standardized baselines": DNAs shall submit new/revised/updated SBs in accordance with the requirements specified in this procedure, which can also be used to submit clarifications for approved SBs;

(c) "Standard for determining coverage of data and validity of standardized baselines": DNAs shall comply with the data coverage and currentness requirements when developing SBs and should update approved SBs in a timely manner in accordance with the requirements specified in this standard;

(d) "Sampling and surveys for CDM project activities and programme of activities".



[4] At EB 76, the Board requested the secretariat to revise the "Procedure for development, revision, clarification and update of standardized baselines" with a view to including a procedure to request deviations. Once this request is addressed in the revised procedure, proposed deviations from this standard should be processed as per the procedure.

[5] For the afforestation and reforestation sector, please refer to "Establishment of standardized baselines for afforestation and reforestation project activities under the CDM".

# 4. Definitions

13. In addition to the definitions in the “Glossary of CDM terms” (CDM-EB07-A04-GLOS), the following definitions apply, especially to approach 3. These definitions may apply to standardized baseline development using approaches 1 and 2 only if the approved tools and methodologies do not include relevant definitions:

(a) **Output** - goods or services that are delivered/provided to external customers, with comparable quality, properties, and application areas (e.g. clinker, street lighting, residential cooking, milled rice, solid waste collection and disposal, wastewater treatment, etc.);

(b) **Facility** - a set of equipment and associated process to provide the output for which the SB is to be developed. If one plant produces two outputs in two separate processes with separate feedstock and energy inputs and both outputs are for consumption outside the facility, these two processes of the plant are considered to be two separate facilities; for example, one steel production plant would be divided into a cold-rolled steel facility and a hot-rolled steel facility. Additional guidance is provided for facilities with multiple outputs in section 5;

(c) **Sector** - a segment of a national or regional economy, comprising facilities within the defined level of aggregation, that provides the output for which the SB is to be developed (e.g. all the power generation facilities connected to the national or regional grid, all the facilities to produce charcoal for consumption in households and facilities of small/medium-sized enterprises in the country or region, all the small/medium-sized rice mill facilities in a country). The sector can provide a service also. The waste or wastewater management sector provides a service for the collection, treatment and disposal or recycling of solid waste or wastewater, either as a public service (e.g. municipal solid waste or sewage utility or entity), as a service provided to individual customers by an informal/formal sector entity or individuals, or as an internal service within a private entity (e.g. an industry);

(d) **Measure** - a broad class of GHG emission reduction activities possessing common features. Four types of measure are currently covered in approach 3:

(i) Fuel switch;

(ii) Feedstock switch;

(iii) Technology switch;

(iv) Methane abatement (including methane destruction and avoidance).

# 5. Guidance on key considerations for the development of standardized baselines

14. The following guidance is provided on the key considerations that shall be taken into account while developing SBs using approach 3 and may be applicable to approach 1 or 2, especially if relevant requirements and guidance are not provided in the approved methodologies or tools. DNAs shall explain in the submissions whether these issues are applicable and, if so, justify how these issues are addressed, taking into account the guidance contained in paragraphs 15 to 22 below.

15. **Level of aggregation**: Selecting an appropriate level of aggregation is important to ensure that the SB is representative of the applicable facilities and measures. The DNAs shall propose the level of aggregation, based on the following guidance:

(a) By default, the level of aggregation comprises the facilities producing the same output in one country. It may be expanded to a group of countries under similar circumstances with regard to the output.[6] Similarly, the standardized baseline can be restricted to a region of a country;

(b) The default group of facilities should be disaggregated if a significantly dissimilar performance exists among groups of the facilities in the country because of differences in criteria such as production scale (or installed capacity) or age of the facilities.[7] In this case, the DNA may disaggregate the facilities according to the criteria, and then propose a standardized baseline for each group of similar facilities or for one prioritized group if resources are limited;

(c) The selection of the final level of aggregation may be an iterative process as illustrated in Figure 1 and explained in paragraph 33;

(d) Disaggregation shall not result in standardized baselines with overlapping applicability (e.g. an SB for all the power generation facilities and another SB for the coal-fired power generation facilities).

16. **Static or dynamic standardized baselines:** A standardized baseline may be static or dynamic in a predetermined manner. A static standardized baseline has the same baseline emission factor during the crediting period of a project applying the SB. A dynamic SB has a procedure to vary baseline emission factors[8] during the crediting period of a project applying the SB and its variations are predetermined for a CDM project activity according to the procedure contained in the SB. For SBs in production and manufacturing industries, the DNA shall propose and justify the criteria[9] for determining whether a static SB or a dynamic SB is more appropriate. If the DNA assesses that the GHG emitting technology of a sector is evolving at a fast pace, and/or the output of the sector is increasing at a high rate, it shall be required to include a procedure for dynamic SBs.



17. **Ex post application of standardized baselines:** The requirement to develop a dynamic SB may be satisfied by developing and updating a static SB and applying the latest version ex post to a project activity registered under the SB, if it is not possible to establish future projections of the baseline of a measure or a sector. For example, for the fuel switch measure, if the fuel prices are volatile and it is difficult to forecast future fuel prices that determine the most attractive (i.e. baseline) fuel during the crediting period, the DNAs should develop a static SB, and a registered project using this SB shall apply the emission factor of the latest version of the SB during its crediting period(s).

---

6 Refer to the approved standardized baseline ASB0001 for which the level of aggregation comprises power generation facilities from a group of countries.

7 A DNA may propose other criteria for disaggregation which may demonstrate dissimilar performance.

8 Such as an autonomous improvement factor included in approved methodologies AM0070 and ACM0013.

9 Such as evolution of technologies, sectoral growth, and trend of changes in the baseline emission factors between the updates of the standardized baselines, etc.

18. **Scope of positive lists:** The development of an SB using approach 3 shall result in a country-specific or region-specific positive list of technologies, fuels and/or feedstock, whereby all technologies/fuels/feedstocks on the positive list are additional. Approach 1 or 2 may also result in such a positive list. By applying a positive list, further demonstration of additionality is not required when seeking registration of a project. The development and application of positive lists should take into account the following guidance:

    (a) The positive lists should not be limited to technologies/fuels/feedstock available and used in the country/region, and may include other technologies/fuels/feedstock not yet available or used in the country/region that meet all the criteria for positive lists (e.g. performance, and barrier or cost[10]);

    (b) For facilities involving one piece of equipment, such as a 1MW wind turbine, the identification of technologies may be relatively straightforward. For facilities involving multiple pieces of equipment and integrated processes, the differentiation of technologies may be based on the technical features of the key equipment of the facilities, their performance and their levelized costs, so that the ranges of performance and costs of one technology do not overlap significantly with those of another technology, thus facilitating the comparison of performance and costs where applicable.

19. **Application of a standardized baseline to project activities that can also use approved methodologies or tools:** The application of a standardized baseline within any host country is at the discretion of the DNA of that host country, including the determination of whether project activities covered by the standardized baseline may use approved methodologies or tools instead of the standardized baseline. In a case where the approval of the standardized baseline could jeopardize environmental integrity, including as a result of the applicability determined by the DNA, the Board could reject the standardized baseline and engage with the DNA to address the risk to environmental integrity.[11]



20. **Multiple outputs:** The production and manufacturing sectors, as well as the waste and wastewater management sector, may have multiple outputs. Each standardized baseline is developed to be applicable to one output, and the emissions and performance data are collected for that one output. If multiple outputs (including main product, co-product and by-product) are produced simultaneously with some common feedstock and/or energy inputs at the same facility, it may not be possible to allocate the emissions to each of the multiple outputs and to develop standardized baselines for those outputs. Taking into account the circumstances of the country and the production process and equipment of the facility producing multiple outputs, an approach of apportioning or aggregation may be proposed (e.g. the approach outlined in PAS2050) and proper justification for conservativeness shall be provided. The following examples may be considered in this regard:

    (a) Emissions may be apportioned between sugar production and ethanol production in the sugar sector. The DNA may propose to allocate one part of the feedstock

[10] Refer to section 6.1.6 as an example on how performance, cost and barriers are used to determine a positive list.

[11] Paragraph 24, EB 78 meeting report.

and energy inputs and their emissions to the sugar facility as a facility covered under the sugar sector SB and another part to the ethanol production facility as a facility covered under the ethanol sector SB. If the sugar mill exports electricity based on bagasse or biogas, grid electricity may also be a co-product. In this case, the part of the facility's emissions due to the generation of electricity that is supplied to the grid should be allocated to the facility and considered in the context of the grid electricity SB;

(b) One standardized baseline may be developed only for one main output identified in a sector. The DNA may propose a conservative approach to convert the production of other co-products or by-products to the production of the main product, and allocate all the feedstock and energy inputs and their emissions to this facility for the SB of the main output. This option may be applicable to the example case of biodiesel production facilities with glycerine as a by-product.

21. **Consideration of facilities with registered CDM projects for the development of SBs:** For the development of the SBs, all facilities with registered CDM projects shall be included in the cohort of facilities by default. If the DNA wishes to exclude a facility with a registered CDM project, it should be demonstrated that, for the measure for which the SB is being developed, the cost of fuel/feedstock/technology used in the CDM project is higher than the maximum cost of the fuels/feedstocks/technologies that contribute to at least 30 per cent of the output of the sector. For the cost comparison of technologies, both capital cost and operation expenditure should be included.

22. **Application of standardized baselines to project activities using multiple measures**: The projects may implement multiple measures, which may be covered by (a) multiple SBs or (b) an SB and a methodology. The guidance for the application of an SB to such projects is provided in the context of the following example. Consider a project activity that involves animal manure treatment and biogas-based power generation. In such a case, the waste sector SB may only conclude that the measure of anaerobic digestion of animal manure is additional and one of the following options shall be applied for determining the baseline and additionality of the energy component:



(a) Refer to an existing SB developed for the power sector if available;

(b) If no such SB is available, develop a new SB in the power sector; or

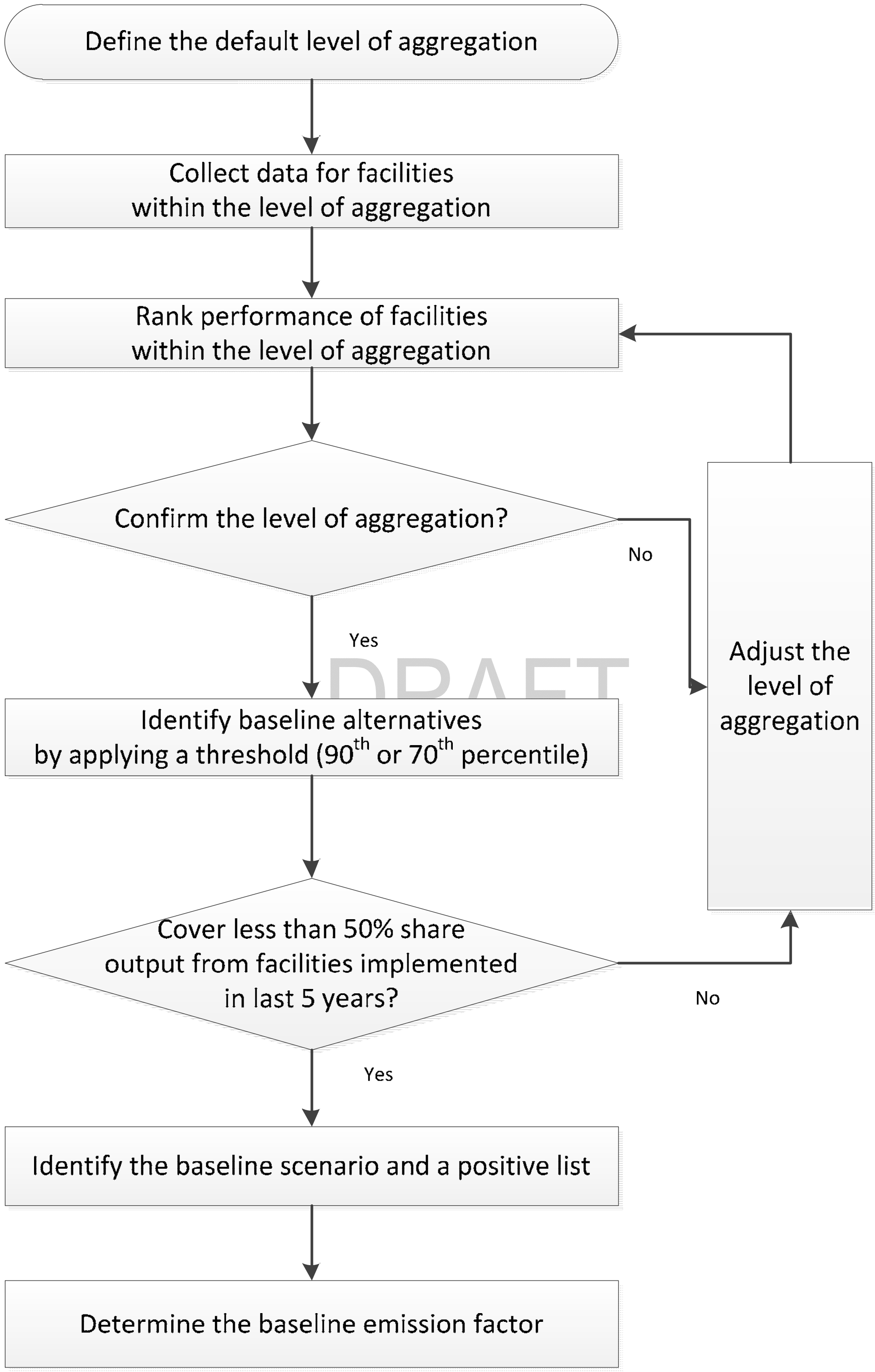
(c) Use the applicable CDM methodologies for the emission reduction (and/or additionality) due to displacing more carbon-intensive power generation with biogas-based power generation.

# 6. Steps for developing standardized baselines under approach 3

23. This section provides step-wise guidance to developing SBs following approach 3. The steps are illustrated in figure 1. The section consists of five subsections: (1) section 6.1 provides general requirements for developing sectoral SBs; (2) section 6.2 provides requirements for developing sectoral SBs for an aggregated sector where potential for disaggregation exists; (3) section 6.3 explains how an SB may be developed for a specific measure (fuel switch, feedstock switch or technology switch); and (4) section 6.3 provides requirements for the development of an SB for methane abatement from existing closed landfills and from treatment of fresh waste. The section 7 covers the

approach of determining an emission factor for a sector by combining measure-specific SBs. Examples of the development of SBs are contained in the attachment to this appendix.

**Figure 1. Steps for developing a standardized baseline using approach 3**



## 6.1. Development of a sectoral standardized baseline

24. A sectoral SB is developed based on the overall design or empirical GHG performance of the facilities of the sector and is applicable to project activities implementing a technology and/or fuel and/or feedstock from the positive list(s). The sectoral SB is deemed representative of a facility to be implemented in the absence of the CDM.

### 6.1.1. Define the default level of aggregation

25. The default level of aggregation shall be established according to the guidance given in section 5.

### 6.1.2. Collect the data from the sector

26. The following performance and market penetration information shall be collected for each facility implemented within the 25 years prior to the year(s) of data for the development of the standardized baseline. The collection of information shall cover either all facilities in the sector or a sample of the facilities as determined by the standard "Sampling and surveys for CDM project activities and programme of activities", according to the defined level of aggregation:

    (a) Activity data, including the actual output (O) production and the actual consumptions of fuels, electricity and feedstock by types/sources;

    (b) Parameters that describe the properties or characteristics of fuels and feedstocks, such as net calorific values, fuel/electricity/feedstock emission factors;

    (c) As an alternative to (a), empirical data on energy and feedstock consumption, design-specific energy consumption (e.g. GJ/t output, GWh/t output) and/or design-specific feedstock consumption (e.g. t feedstock/t output);

    (d) General information on the facilities such as name, location, year of establishment/upgrading/expansion, design production capacity and description of equipment.



27. The following information is required for additionality demonstration, for some facilities of the sector (as described in section 6.1.6):

    (a) Capital costs and operational expenditures; or

    (b) Barriers to implementation or retrofit of facilities with specific technologies/fuels/feedstocks, etc.

28. The DNA may assess whether the technology/fuel/feedstock of each facility is available to be implemented by a CDM project activity.[12] If the DNA can justify that the technology/fuel/feedstock of some facilities are no longer available in the country or region and therefore cease to be a potential baseline, such facilities may be excluded from the development of the SB.

[12] For example, the DNA may assess whether there are still some manufacturers producing old technologies or whether the government has banned certain technologies/fuels/feedstock for the particular sector.

### 6.1.3. Rank the performance of the facilities

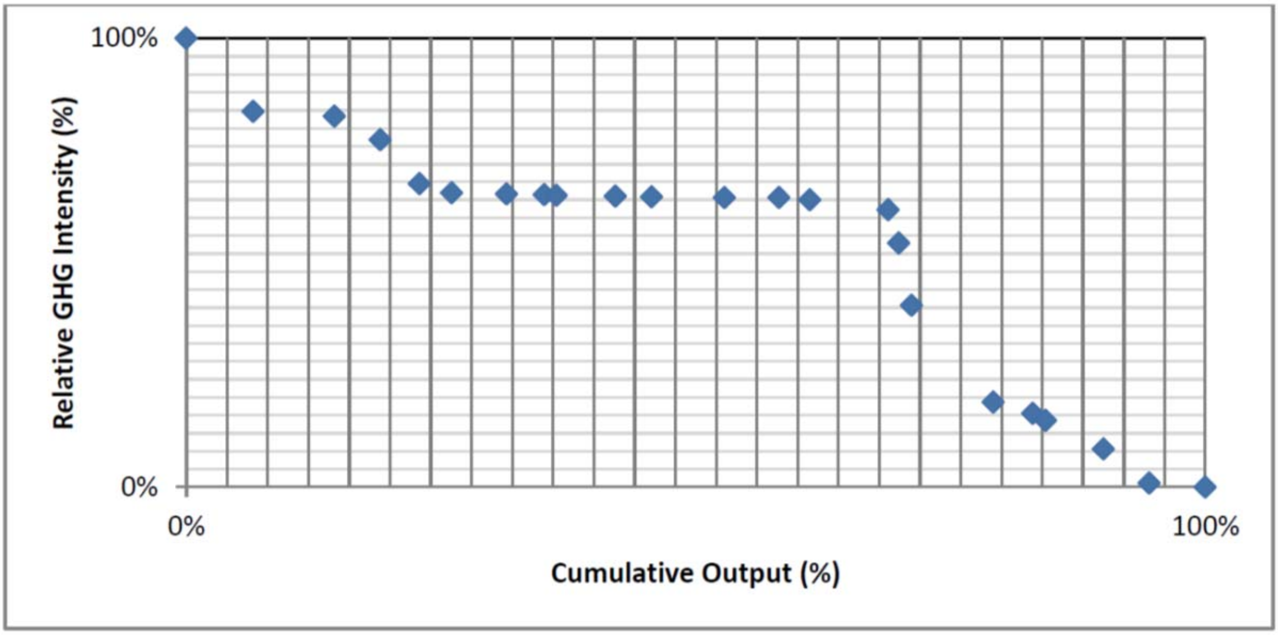
29. The cumulative output of the facilities shall be ranked in descending order of their GHG intensity ($tCO_2e/tOutput$).

30. The ranking may be illustrated by a bar chart (refer to the examples contained in the attachment to this appendix) or a performance-penetration chart. To plot the performance-penetration chart, the data are converted from absolute terms to relative terms:

(a) For performance (Y axis), calculate the relative GHG intensity of each facility (the difference in GHG intensity of each facility and that of least GHG intensive facility) against the total GHG intensity range (the difference in GHG- intensity between most and least GHG-intensive facilities). Plot the ratio as percentile (%) on y-axis;

(b) For penetration (X axis), calculate the relative contribution (%) of each facility to the total production output and plot these on a cumulative scale on the X-axis.

**Figure 2. An example of a performance-penetration chart**




### 6.1.4. Confirm the level of aggregation

31. The level of aggregation shall be adjusted or confirmed to be appropriate according to the guidance given in section 5:

(a) If the level of aggregation needs to be redefined, the previous step (ranking the performance) should be repeated with the facilities only within each disaggregated sector;

(b) If the level of aggregation is confirmed to be appropriate, proceed to the following subsections: identification of baseline scenario, demonstration of additionality

and determination of baseline emission factor. If the sector is disaggregated from the default level, the following steps should be followed respectively for each disaggregated sector.

#### 6.1.5. Identify alternative baseline scenarios and reconfirm level of aggregation

32. The facilities that have the same or better GHG performance than the facility at the baseline threshold are alternative baseline scenarios. If a baseline threshold of 90$^{th}$ percentile is selected, Approach A (the simplified approach) in Section 6.1.6 may be applied to identify the baseline scenario and demonstrate additionality; if a baseline threshold of 70$^{th}$ percentile is selected, Approach B in Section 6.1.6 shall be applied.

33. In addition, the DNA shall assess whether the facilities that have the same or better GHG performance than the baseline threshold facility cover 50 per cent or more of output generated by the facilities implemented in the most recent five years prior to the date of collection of data on the SB by the DNA. If so, then the sector should be disaggregated by age, i.e. a disaggregated sector for facilities implemented more than five years ago and another for those implemented less than five years ago; otherwise, adjustment to the level of aggregation due to facility age is not necessary.

#### 6.1.6. Identify the baseline scenario and demonstrate additionality

34. Two approaches are available to identify the baseline scenario and demonstrate additionality. If a baseline threshold of 90th percentile is selected, the simplified Approach A is applicable; otherwise, Approach B shall be applied.



35. In both approaches, the positive list shall be developed taking into account:

    (a) National or subnational enforced laws and regulations mandating or incentivizing the use of certain technologies, fuels and/or feedstock;

    (b) The Board’s guidance on the consideration of national and/or sectoral policies and circumstances in identifying the baseline scenario.[13]

##### 6.1.6.1. Approach A: Applying baseline threshold of 90$^{th}$ percentile

36. In Approach A, the baseline scenario is the baseline alternative at the baseline threshold of 90$^{th}$ percentile and the positive list of technologies/fuels/feedstocks may include any which is available, which may or may not be used in the country or region currently, and which has better GHG performance (i.e. less GHG-intensive fuel/feedstock and more energy-efficient technology) than that of the technology/fuel/feedstock of the facility at the baseline threshold of 90$^{th}$ percentile.

[13] EB 22, annex 3, and any other forthcoming guidance from the Board on this subject.

#### 6.1.6.2. Approach B: Applying baseline threshold of 70th percentile

37. In Approach B, all the remaining procedures in Section 6.1.6 apply. The positive list of technologies/fuels/feedstocks may include any which is available, which may or may not be used in the country or region currently, which has better GHG performance (i.e. less GHG-intensive fuel/feedstock and more energy efficient technology) than that of the technology/fuel/feedstock of the facility at the baseline threshold of 70th percentile and fulfils one of the following conditions:

(a) It is not financially attractive according to an investment comparison analysis (see section 6.1.6.2.1 on investment comparison analysis);

(b) It faces barrier(s) according to a barrier analysis (see section 6.1.6.2.2 on barrier analysis);

(c) It is automatically additional, according to approved CDM methodologies, or by demonstrating that it satisfies the objective conditions for deeming additionality as defined in approved CDM methodologies; or

(d) It is automatically additional according to the latest approved “Guidelines on the demonstration of additionality of microscale project activities” or the latest approved “Guidelines on the demonstration of additionality of small-scale project activities”.

38. The development of an SB shall result in at least one positive list, which may be a positive list of fuels, a positive list of feedstocks, or a positive list of technologies.



39. Consider all the alternative baseline scenarios identified in line with section 6.1.5. Remove from the list those that have implemented a fuel from the positive list of fuels, a feedstock from the positive list of feedstocks, or a technology from the positive list of technologies. Among the remaining alternatives, the least GHG-intensive alternative is identified as the baseline scenario. If the DNA can demonstrate that this least GHG-intensive alternative is not available for the majority of facilities within the sector and region of the SB, then this least GHG-intensive alternative is not the baseline scenario and the next least GHG-intensive alternative scenario (among the group of alternative scenarios that have not implemented a fuel from the positive list of fuels, a feedstock from the positive list of feedstocks, or a technology from the positive list of technologies) should be the baseline scenario.

#### 6.1.6.2.1. Investment comparison analysis

40. To demonstrate that a fuel/feedstock/technology is not financially attractive in the sector, the cost of the fuel/feedstock/technology shall be higher than the maximum cost of any group of fuels/feedstocks/technologies representing at least 30 per cent of the observed output of the entire sector. The group may represent the most financially attractive among several groups in the sector.

41. The financial analysis shall be based on parameters that are standard in the sector, but not necessarily linked to the costs incurred at an actual facility.

#### 6.1.6.2.2. Barrier analysis

42. A barrier analysis may be used to demonstrate that some realistic and credible barriers may prevent a fuel/feedstock/technology from being implemented in the country/region and that the CDM alleviates the barriers, taking into account the "Guidelines for objective demonstration and assessment of barriers" and guidance given for barrier analysis in the "Combined tool to identify the baseline scenario and demonstrate additionality".

43. While applying the barrier analysis, the DNA shall provide transparent and documented evidence, and offer conservative interpretations of this evidence, as to how it demonstrates the existence and significance of the identified barriers and whether alternative baseline scenarios are prevented by these barriers.

### 6.1.7. Calculation of baseline emissions

44. The GHG intensity or emission factor ($tCO_2$/t output) of the baseline scenario shall be used to calculate the baseline emissions. The baseline emissions shall be determined by project participants for each project activity, based on the output of the project facility, unless specified otherwise in the methodology that is used in conjunction with the proposed standardized baseline.

45. If a project participant whose technologies/fuels/feedstock is/are already listed in the positive list wishes to claim emission reductions using standardized baselines for a CDM project activity, the project participant is required to invest in switching from its current technology/fuel/feedstock to another technology/fuel/feedstock listed in the positive list, and its baseline emissions shall be based on the more conservative value between the standardized baseline and its historical performance used to derive the standardized baseline based on data from the three years preceding implementation of the CDM project activity. The DNA may propose an algorithm in the submitted standardized baseline for calculation of baseline emissions for such project participants.



## 6.2. Development of a measure-specific standardized baseline

46. An SB may be developed for a target measure (fuel switch, feedstock switch, or technology switch). Depending on the target measure,[14] the SB will be based on the GHG performance of the fuel (e.g. $tCO_2$/GJ), feedstock (e.g. $tCO_2$/tFeedstock) or the energy efficiency of technology (e.g. GJ/tOutput) of the facilities of the sector and is applicable to project activities implementing a fuel switch, feedstock switch or technology switch in the sector.

47. To demonstrate that a sector is eligible for a measure-specific SB, the DNA shall demonstrate that all of the following conditions can be fulfilled:

   (a) The target measure (e.g. fuel switch) does not require the implementation of any other measure (e.g. technology switch);

   (b) The data are available to distinguish the separate impacts of technology, fuel and feedstock on the performance of a facility;

[14] The target measure should be clearly defined. For example, a technology switch requires the change of key equipment/technology that governs the technical specification of a facility and determines the GHG performance of the facility. For example, a new storage tank or pipeline in a cement kiln should not be regarded as technology switch.

(c) All facilities in the sector can use all available fuels/feedstocks;

(d) For the technology switch measure, while ranking the performance of the technologies in the facilities, the order of ranking of the facilities in terms of their GHG performance does not change when they are all ranked using each of the reference fuels/feedstock available in the sector. This condition for the technology switch measure applies mutatis mutandis to the fuel switch and the feedstock switch measures.

48. The measure-specific SB should be developed according to the step-wise guidance provided for the sectoral SB in section 6.1, taking into account the following requirements.

(a) To rank the performance, the GHG performance of the facilities shall be represented, not by overall performance, but by a parameter relevant for the measure, e.g. the GHG performance in $tCO_2$/GJ of the fuels used at the facility;

(b) To demonstrate that an alternative baseline scenario is additional, the positive list shall be developed for the relevant measure, for example a positive list of fuels for a fuel switch measure;

(c) To calculate the baseline emissions of a fuel switch measure, the project participants for each project activity shall multiply the following three parameters, unless otherwise specified in the methodology that is used in conjunction with the proposed standardized baseline:

(i) The emission factor ($tCO_2$/GJ) of the baseline fuel;

(ii) The energy efficiency (GJ/tOuput) of the technology at the project facility, for which a fuel switch measure is implemented. If the energy efficiency of the technology varies with the fuel, the energy efficiency corresponding to the baseline fuel shall be used;

(iii) The output produced by the project activity.

The same procedure applies to a technology switch measure or a feedstock switch measure.



## 6.3. Development of a standardized baseline for methane abatement

49. This section specifies the requirements for the development of an SB for methane abatement from waste treatment. Two situations of methane abatement from waste treatment are distinguished in sections 6.3.1 and 6.3.2, which facilitates SB development for these applications.

### 6.3.1. Methane abatement from existing closed landfills

50. This section is specifically applicable to the destruction (via flaring and/or energy generation) of methane in the landfill gas (LFG) recovered from existing closed landfills.[15]

[15] The standardized baseline developed for closed landfills cannot be applied to the project activities involving aeration of closed landfills.

51. The level of aggregation shall be defined, inter alia, based on the mandated level of methane destruction in the local/national regulations.

52. The information that shall be collected includes the mandated level of methane destruction in the local/national regulations, as well as information on LFG destruction in existing closed landfills on account of voluntary initiatives collected from individual landfill owners or through any other credible means, if applicable.

53. The baseline scenario is the methane emissions from the existing closed landfills for which the SB is to be developed.

54. The technology is additional if it achieves a higher level of methane destruction than that which is mandated in the local/national regulations

55. Baseline emissions are calculated by subtracting the mandated destruction level of LFG in the regulations (if applicable) and the methane that would have been oxidized in the upper oxidation layer of the landfill[16] from the landfill gas that is recovered and sent to the flare or engine.

### 6.3.2. Methane abatement for fresh waste treatment

56. In contrast with the waste already deposited in the existing landfill as specified in section 6.3.1 above, this section is applicable to the development of an SB for project activities involving the treatment of fresh waste, thus rendering the consideration of different treatment options (i.e. alternative baseline scenarios) very important. The types of waste include, but are not limited to, municipal solid waste (MSW), animal manure and industrial wastes. Wastewater from domestic, rural and industrial sources is also covered in this section.



57. The following guidance on the level of aggregation shall be taken into account for this measure in addition to the guidance in Section 5. The level of aggregation shall be defined, inter alia, based on the type of waste, its characteristics and other conditions which may significantly affect the methane generation in the baseline. For example, the solid waste level of aggregation could be based on: (i) its origin (domestic, industrial, co-mingled etc.); or (ii) the size of a plant (e.g. the population served by the system). For wastewater, the level of aggregation could be based on, for example: (i) source of wastewater (e.g. starch production, pulp and paper production); (ii) the required level of methane destruction in the regulations and/or the required level of effluent quality after treatment (e.g. effluent chemical oxygen demand has to be less than 100mg/L); or (iii) size classification of urban settlements (e.g. small, medium, large and megacities for domestic wastewater).

58. The following consideration should be taken into account for suppressed demand. If waste treatment qualifies for the scenario of suppressed demand (e.g. discharge of untreated wastewater to waterways), one of the following two options shall be followed when identifying the alternative baseline scenario:

(a) Identify the hypothetical technology that will be used to address suppressed demand according to the "Guidelines on the consideration of suppressed

[16] As per provisions in the methodological tool "Emissions from solid waste disposal sites", a default value of 10 per cent shall be applied.

demand in CDM methodologies"[17], and use the MCF of the identified hypothetical technology for the purpose of ranking; or

(b) Use the hypothetical technology in the relevant methodologies, if provided (for example the hypothetical baseline technology as a septic system in ACM0014).

59. If the share of the waste processed under the suppressed demand scenario is less than 5 per cent of the total waste, DNAs may choose to exclude such a share of waste under suppressed demand while developing the standardized baselines.

#### 6.3.2.1. Fresh solid waste treatment

60. Data shall be collected on the share of different technologies deployed for the treatment of the type of fresh solid waste (e.g. MSW) for which the SB is developed in the country/region. The following options are applicable for the determination of the baseline scenario.

(a) If equal to or more than 90 per cent of the solid waste is disposed in landfills without LFG recovery for flaring/utilization, the baseline scenario shall be considered as uncategorized landfills with an MCF of 0.6;

(b) If the share of solid waste disposed at landfills without LFG recovery for flaring/utilization exceeds 90 per cent only after taking into account the treatment of waste that qualifies under suppressed demand (e.g. only 70 per cent of the solid waste goes to deep landfill and 25 per cent of the waste is treated by a treatment method that qualifies for suppressed demand), then the baseline scenario shall be considered as landfill with an MCF derived based on the weighted average MCF, i.e. an MCF of 0.6 for uncategorized landfills treating 70 per cent waste and an MCF of 0.4 for the treatment method under suppressed demand treating 25 per cent waste.



61. If the project activity does not involve methane recovery from fresh solid waste, baseline emissions can be determined by following the methodological tool "Emissions from solid waste disposal sites".

62. If the project activity involves methane recovery from the fresh solid waste (e.g. MSW deposited in open cells of an existing landfill), baseline emissions are calculated by subtracting the mandated/voluntary destruction level of LFG in the regulations (if applicable) and the methane that would have been oxidized in the upper oxidation layer of the landfill from the landfill gas that is recovered and sent to the flare or engine.

63. The positive list comprises other treatment technologies which fulfil the requirement for additionality specified in section 6.1.6 above.

[17] Version 2 of the guideline can be found at <https://cdm.unfccc.int/Reference/Guidclarif/meth/meth_guid41.pdf>.

#### 6.3.2.2. Wastewater and animal manure treatment

64. For wastewater and animal manure treatment, the procedure for SB development in section 6.1 above is also applicable, with the following specific guidance:

(a) The performance for different technologies for wastewater and animal manure treatment is defined by their overall GHG performance/intensity, i.e. $tCO_2$/tonne pollutant treated. GHG emissions from the treatment facilities are determined by following the methodological approaches specified in AMS-III.H (for wastewater treatment) and AMS-III.D (for animal manure treatment). If methane is fully or partially recovered for flaring or utilization, the destructed amount of methane thereof shall be subtracted while deriving the GHG performance;

(b) The following information shall be collected for each facility in the sector. The SB developer may propose to collect the following information by using sampling techniques covered by the standard “Sampling and surveys for CDM project activities and programme of activities”, if that is the only practical or cost-effective means to obtain it:

(i) Activity data, primarily the quantity (volume or mass) of pollutant treated in the wastewater or animal manure, i.e. chemical oxygen demand for wastewater and volatile solids for animal manure;

(ii) Performance data, including the MCF of the key treatment technologies/units ($MCF_u$) and their respective actual treatment efficiencies. If a flare is used for flaring methane, the destruction efficiency of the flare is collected in order to quantify the methane destructed while determining the overall GHG performance of the facility. If an actual value is not available, design performance data can be submitted;

(iii) Data on energy consumption if it accounts for significant GHG emissions due to the nature of the technology, for example activated sludge technology for wastewater treatment;

(iv) General information on the facilities, for example name, location.



##### 6.3.2.2.1. Baseline scenario identification, additionality demonstration and calculation of baseline emissions

65. The ranking of wastewater/manure treatment facilities should be done in accordance with section 6.1.3 based on the descending order of carbon intensity ($tCO_2$/tonne pollutant treated) of each facility. The confirmation of the level of aggregation should be done in accordance with subsection 6.1.4 while also taking into account the specific guidance provided in section 6.3.2. The baseline scenario identification and additionality demonstration should be done in accordance with sections 6.1.5 and 6.1.6.

66. Baseline emissions are determined as the minimum between the actual amount of methane captured in the project and the calculated methane emissions by applying the emission factor of the baseline treatment facility identified.

67. If a project activity is not recovering biogas (e.g. aerobic treatment), the baseline emissions are determined by multiplying the emission factor identified by the pollutant treated in the project facility.

# 7. Emission factor for a sector by combining measure-specific standardized baselines

68. When multiple measures which are independent of each other are simultaneously applied in a sector, it may be necessary for the DNA to derive a baseline emission factor that integrates the combined effect of all the measures applied in the sector.

69. The DNA may decide to develop an emission factor of the sector by combining the measure-specific SBs (such as an SB for technology switch, an SB for fuel switch, etc.). For this, the DNA shall initially develop the measure-specific SBs that include measure-specific baseline carbon intensity or specific energy consumption or emission factor, and a positive list of fuels/feedstocks/technologies or regulations for the level of methane destruction.

70. The requirements outlined in this document for the development of measure-specific SBs shall be followed. While combining measure-specific SBs, the positive list can be merged. For example, if three SBs which are developed for measures of technology switch, fuel switch and feedstock switch in the sector are combined, the combined positive list shall include technologies, fuels and feedstocks of the positive list of independent SBs. However, the DNA shall propose, for the Board's approval, an approach for combining the baseline of the three SBs. For example, an approach could be proposed on how to combine the carbon intensity of a baseline fuel with the carbon intensity of a baseline feedstock and the specific energy consumption of a baseline technology in order to develop a sectoral emission factor.

# Attachment. Two examples for development of standardized baselines using approach 3

## 1. Example for development of a measure-specific standardized baseline

1. In this example, a standardized baseline (SB) is to be developed for the technology switch measure for the residential interior lighting sector. The output of interior lighting for residential buildings can be measured in lumen-hours.

### 1.1. Define the default level of aggregation

2. The default level of aggregation includes all the interior lighting installations of residential buildings of country A.

### 1.2. Collect the data from the sector

3. The following data are collected from each of a sample of 200 interior lighting installations (referred to as lamps) in country A:

    (a) One year of activity data: annual usage hours;

    (b) Information on whether the lamp consumes the electricity from the grid or an off-grid generator;

    (c) The design-specific energy consumption (i.e. the reciprocal of the luminous efficacy) in watts per lumen and the lamp power in watts, as the actual electricity consumption of the individual lamps is not monitored;

    (d) The type of lamp, address and year of installation.

4. To demonstrate that the sector is not fast-moving in country A and that therefore a dynamic standardized baseline is not applicable, an analysis may be performed on the data collected from the sample, or general sales information for the different types of lamps in the past five years.

5. As the positive list may be developed based on the “Guidelines on the demonstration of additionality of small-scale project activities”, cost and barrier information is not needed in this case.

6. If further disaggregation is to be proposed, information related to the possible criteria for disaggregation (such as socioeconomic status of the residents) also needs to be collected and may need to be considered in determining the sampling plan. In this example, no further disaggregation is expected.

7. As all residential buildings in country A are connected to the national grid, it is considered that the conditions to develop a measure-specific SB are fulfilled and the sector is eligible to develop an SB for the technology switch measure:

    (a) A technology switch from incandescent lamps to light-emitting diodes (LEDs) does not require a switch of the electricity source;

(b) Design-specific energy consumption of the lamps allows distinguishing the impacts of the technology from the impact of energy source ( electricity) on the performance of the lamps;

(c) All the lamps can use the electricity provided by the national grid;

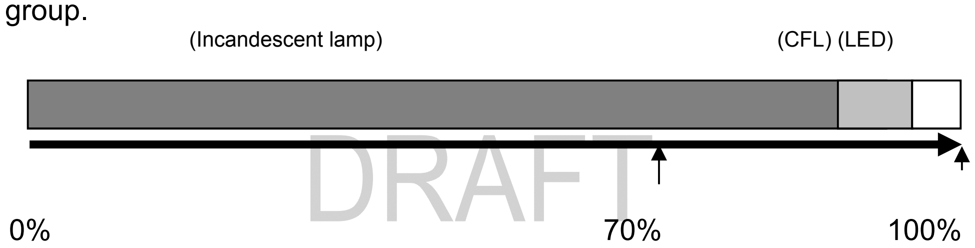
(d) The ranking of the energy efficiency of the lamps does not depend on the source of the electricity.

### 1.3. Rank the performance of the lamps

8. In this example, all the lamps are connected to the same national grid. Therefore, the ranking in $tCO_2$/lumen-hour can be substituted by the ranking in watts per lumen.

9. For each lamp, the output of each lamp (lumen-hours/year) is calculated as the lamp power (watts) x luminous efficacy (lumens/watt) x annual usage hours (hour/year).

10. The 200 lamps are ranked in a bar chart according to their design-specific energy consumption (watts per lumen) and the bar length of each lamp is represented by its output. To simplify the bar chart, the incandescent lamps, the compact fluorescent lamps (CFLs) and the LEDs are grouped together and represented by the total output from each group.





### 1.4. Confirm the level of aggregation

11. The difference in GHG performance is mostly attributed to the difference in technologies and is not found to be correlated with other factors, such as installation year. Therefore, the default level of aggregation is confirmed.

12. In addition, improvement of performance or increased output from CFLs or LEDs among the newer lamps in comparison with older lamps was not observed from the data. This confirms that a static SB is appropriate in this case.

### 1.5. Identify alternative scenarios and reconfirm level of aggregation

13. The baseline threshold is set at the $70^{th}$ percentile for this priority sector, i.e. energy for households, and the alternative baseline scenarios may include all the lamps which are more efficient than the lamp at the $70^{th}$ percentile, i.e. all the CFLs and LEDs.

14. Because incandescent lamps typically have a lifetime of 1000 hours, almost all the incandescent lamps in operation have been installed in the past five years. Therefore, the CFLs and LEDs do not cover more than 50 per cent of the total output from the lamps implemented in the past five years, and the level of aggregation is reconfirmed.

### 1.6. Identify the baseline scenario and demonstrate additionality

15. CFLs and LEDs are more efficient than the lamp at the 70th percentile and they are considered automatically additional according to the “Guidelines on the demonstration of additionality of small-scale project activities”, and therefore the positive list may consist of CFLs and LEDs.

### 1.7. Calculation of baseline emissions

16. The baseline emissions of a project lamp shall be calculated by multiplying the design-specific energy consumption (watts per lumen) of the lamp at the 70th percentile, the annual usage hours of the project lamp, the grid emission factor, the project lamp power (watts) and the luminous efficacy of the project lamp (lumens/watt).

## 2. Example for the development of a sectoral standardized baseline

17. In this example, an SB is to be developed for the cement clinker producing sector in country B.

### 2.1. Define the default level of aggregation

18. The default level of aggregation includes all the clinker producing facilities of country B.

### 2.2. Collect the data from the sector

19. The following data are collected from each of the 20 clinker facilities in country B:

(a) Three years of activity data: the actual clinker production and the actual consumption of fuels and feedstocks;

(b) Net calorific values and emission factors of fuels from IPCC, emission factors of feedstocks;

(c) The name, location, year of establishment/upgrading, production capacity and description of equipment (e.g. rotary kilns).



20. In addition, cost information of the fuels, feedstocks and technologies used in the sector is needed.

### 2.3. Rank the performance of the facilities

21. For each facility, the three-year total emissions are calculated from the emission factors and consumption of the fuels and feedstocks. Then all the facilities are ranked in average $tCO_2$/tClinker from the three years.

### 2.4. Adjust the level of aggregation

22. It is observed that the facilities built in the past five years installed vertical shaft kilns while older facilities installed the more efficient rotary kilns. The difference in GHG performance between the two groups of facilities can be mostly attributed to the difference in age or installation year. Therefore, the sector is disaggregated into the nine facilities built in the past five years and the 11 older facilities, and the SB will be developed based on the newer facilities only.

23. The performances of the nine newer facilities are ranked by $tCO_2$/tClinker.

24. In addition, the newer facilities are more carbon-intensive than the older facilities. This confirms that a static SB is more conservative in this case.

### 2.5. Identify alternative baseline scenarios and reconfirm level of aggregation

25. The baseline threshold is set at the 90$^{th}$ percentile for this sector to apply the simplified Approach A, and Facility 8 at the baseline threshold uses pet coke as the fuel, 95%lime+5%clay as the feedstock, and a vertical shaft kiln. There is a Facility 9 above the baseline threshold which uses heavy fuel oil as the fuel, lime as the feedstock and a vertical shaft kiln. These two configurations from Facility 8 and Facility 9 are identified as baseline alternatives.

26. As the sector is already disaggregated by age and the proposed SB is developed for the facilities built in the past five years, the level of aggregation is reconfirmed.

### 2.6. Identify the baseline scenario and demonstrate additionality

27. The baseline alternative represented by Facility 8 at the 90$^{th}$ percentile is identified as the baseline scenario.

28. Heavy fuel oils and biomass are less carbon-intensive than the pet coke used at Facility 8, and both are included in the positive list of fuels.

29. All rotary kiln technologies are less carbon-intensive than the vertical shaft kiln used at the facility at the baseline threshold, and therefore all rotary kiln technologies are included in the positive list of technologies.



30. No positive list of feedstocks is developed in this case.

### 2.7. Calculation of baseline emissions

31. The baseline emissions of a project clinker facility shall be calculated by multiplying the emission factor ($tCO_2$/tClinker) of Facility 8 (baseline scenario) and the annual clinker production of the project clinker facility.

- - - - -

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 03.0 | 10 November 2014 | Published as an annex within annex 05 to the annotated agenda of EB 81.<br>This revision will reclassify the document from a Guideline to a Standard. It also incorporates the changes based on lessons from the implementation of version 02.0 of the "*Guidelines for the establishment of sector-specific standardized baselines*" and consultation with experts, practitioners and stakeholders. The revision aims to:<br>• Improve clarity through more examples, elaborations and editorial corrections; |

| *Version* | *Date* | *Description* |
| --- | --- | --- |
| | | • Expand the scope of the document to other approaches for the establishment of SBs;<br>• Make significant changes in methane abatement SBs and elaborate the approach on sectoral emission factor;<br>• Cover new definitions and examples;<br>• Ensure linkages of the document to various documents under the SB regulatory framework;<br>• Consolidate key considerations for the development of SBs. |
| 02.0 | 25 November 2011 | EB65, Annex 23<br>Revision to incorporate an appendix defining the vintage of data and the frequency of update, Xa, Xb, Ya and Yb. |
| 01.0 | 15 July 2011 | EB62, Annex 8<br>Initial adoption. |

Decision Class: Regulatory
Document Type: Guideline
Business Function: Methodology
Keywords: standardized baselines

# Appendix 2. Information note: Lessons learned from road testing of guidelines for establishment of sector-specific standardized baselines

## 1. Introduction

1. The approved management plan and the workplan of the Executive Board of the clean development mechanism (the Board) for 2014 requires that when revising the guidelines for establishment of sector-specific standardized baselines (SB guidelines), lessons learned from the use of these guidelines should be implemented in the revision and a report on road testing of these guidelines should be submitted for the Board's consideration.

## 2. Lessons learned from road testing and corresponding revision in SB guideline

### 2.1. Lessons learned through evaluation and assessment of SB proposals

2. The SB guidelines approved by the Board at its sixty-fifth meeting has so far led to submission of twenty-six standardized baselines (SBs). The submitted SBs using SB guidelines include one in charcoal sector, one in clinker sector, one in rice mill sector, two in power sector and eight in waste sector (Methane destruction). Out of these two SBs are approved, which include ASB0002 for Charcoal production in Uganda and ASB0004 for Rice mill sector in Cambodia.



3. Apart from submission of SBs using SB guideline, there are eleven SBs submitted by various designated national authorities (DNAs) for emission factor of power sector (grid) using the "tool for emission factor of electricity system", out of which four are approved.

4. While assessing and evaluating these submissions, and feedback from stakeholders other practitioners, several lessons were learned by secretariat, Methodologies Panel (Meth Panel) and Small-scale Working Group (SSC WG), which were incorporated in the revised SB guidelines (or draft SB standard included in appendix 1).

5. The sectors for the data collections were selected based on the examples provided by the Board at its sixty-eighth meeting, i.e. the cement sector and cook stove sector.

6. Following is the analysis of lessons learned while assessing each SB submission, particularly those which used approved version of SB guideline.

### 2.2. Charcoal Sector SB submission (PSB0001)

7. This SB was developed using SB guideline and was the first submission evaluated by secretariat, Meth Panel and SSC WG. The lessons learned were as follows.

8. Although most of the technologies in the positive list of this SB are the technologies employed in the country, it was realized that all potential technologies according to DNA

can also be included in the positive list, provided they meet the criteria for additionality as per SB guideline.

9. Another lesson learned was that the standardized baseline need not standardize entire baseline emission section, but a partial standardization can also be done using SB guideline, which was implemented in this approved SB.

10. There was new methodology proposed by DNA to be used in conjunction with standardized baseline. This methodology was approved even as a stand-alone methodology, that can be used for developing projects only based on this methodology. However, the lesson learned was that the DNAs need not be required to submit a stand-alone methodology, and it is good enough if DNA submits a methodology that can be used only with SB for estimation of emission reductions of the projects using SB.

## 2.3. Rice Mill sector SB submission (PSB0004)

11. This standardized baseline which was developed using the SB guideline and approved by the Board as ASB0004 helped to learn several lessons, given as follows.

12. This SB applied the sampling standard referred to in the Guidelines for quality assurance and quality control of data used in the establishment of standardized baselines (QA/QC guideline) and helped to clarify how the stratified random sampling can be applied for data collection of around 22000 rice mills of Cambodia.

13. This SB implemented measure 2 of SB guideline (version 02.0) under which a technology switch is associated with a fuel switch and therefore it was the first SB that achieved full standardization of baseline of the sector by developing a sectoral emission factor. This led to revision of some key elements of SB guideline, including change of flow of text, which now emphasises more on integrated measures of technology switch and fuel switch.



14. The criteria for level of aggregation were effectively developed by DNA with due justification and without detrimental impact on environmental integrity. This provided good elements for revision of this aspect in SB guideline.

15. The proposed SB initially recognized all existing diesel engines as the same technology and the average emission factor of all the diesel engines was proposed as the baseline emission factor. However, the performance of these existing diesel engines is observed to vary significantly. To address the complex issue of defining the appropriate aggregation of technologies, the revised SB guidelines intend to improve the process by ranking the performance of individual facilities instead of that of the individual technologies.

16. During assessment of this SB it was realized that all the potential clean development mechanism (CDM) projects in rice mills of Cambodia qualify for micro-scale additionality criteria. However micro-scale additionality was not mentioned in the SB guidelines, which resulted in seeking a deviation from SB guideline from the Board in the approval process. The criteria of additionality using micro-scale/ small-scale project guideline and objective criteria of approved methodologies are incorporated in revised SB guideline to cover such cases.

17. It was found that there is practical difficulty to collect data of older vintages from less organised small sectors and those from least developing countries (LDCs), and for such

sector one-year data can be good enough to meet the purpose of the new SB. Therefore, for development of new SB in LDCs or in sectors with low GHG emitting facilities (within small-scale thresholds) one year data is mandated in approved standard for determining coverage of data and validity of standardized baselines. The SB guidelines, which requires three-year data for all sectors and countries is revised to refer to the new standard.

## 2.4. Cement clinker sector SB submission (PSB0002)

18. This PSB, developed based on SB guidelines, is still under evaluation. The experience of this SB led to several lessons learned as follows.

19. The clinker sector is a complex sector in terms of its linkages of fuels and feedstock with performance of technologies. Based on interactions with experts and practitioners, it was assessed that since efficiency of kiln is linked with fuel it uses and to some extent feedstock it processes, it is more accurate to develop the sectoral emission factor for this sector. The experience gained from this SB helped to develop the SB standard (appendix 1), in particular its elements on sectoral emission factor and positive list of fuels, feedstock and technologies in the context of sectoral SB. The attachment-1 to this document specifically elaborates the exercise that was conducted to develop sectoral EF.

20. This SB also helped to gain experience on evaluation of sectoral barriers that can be used for demonstration of additionality and development of positive list. The SB proposes to adopt the level of aggregation based on facilities which have been implemented in previous five years and have visibly dissimilar performance as compared to older facilities. The understanding of level of aggregation improved with this SB that reflects country-specific situation and it helped to improve the SB guideline in this context.



21. The submission, based on its country-specific situation, also led to development of guidance in SB guideline that helps to exclude those technologies/ fuels/feedstock/ facilities from the baseline which are not available or do not have potential for implementation in future, if the SB is applicable to Greenfield plants.

22. Based on Board's mandate a top-down methodology to be used only with this SB is developed and launched for public call. This is the first methodology that will be used only with an SB, if adopted by the Board.

## 2.5. Waste Sector Standardized Baselines

23. There are eight submission received for methane destruction in waste sector. The original submissions referred to SB guideline. The submissions are under evaluation. Following are the lessons learned so far.

24. Depending upon the need of DNA, whether they wish to also cover power/heat generation using Methane or not, the SB will be developed based on either SB guideline or approved methodology ACM0001. The methodology allows the use of the default emission factor of 0.4 for off-grid projects, as many of these countries may not have official grids, or may have large potential for off-grid CDM projects.

25. This experience helped to revise SB guideline to bring the benefits to off-grid projects.

## 2.6. Lessons learned from interactions with external experts, practitioners and Panel/WG experts, standard-setting bodies

26. *Conditions for inter-linkages of measures:* The existing SB guidelines define a part of measure-2 for the technology switch that is inherently characterised to be linked with change of energy source e.g. power sector technologies. Whereas measure-1 or part of measure-2 can only be implemented where technology is not inherently linked with fuel or feedstock. It was recognized based on interactions with experts this requirement cannot be defined objectively because technologies in almost all the sectors have impact on performance because of the fuel or feedstock they use. The use of various fuels/feedstock may change their position in the ranking in terms of specific energy consumption of sectoral technologies (as required by SB guidelines for technology switch measure) depending on the fuel/feedstock they use. For example it was understood that the same rotary kilns for clinker production may have different place in ranking of specific energy consumption of sectoral technologies if used with coal and natural gas. SB guidelines are revised to take this aspect into account.

27. *Level of aggregation:* It was learned that the level of aggregation cannot be completely left on the DNA's choice but some guidance should be provided for them to work it out. A specific requirement based on the situation of investment in previous five years is also included in the revised SB guidelines.

28. *Measure-4 revision:* It was realized that in existing approved SB guidelines difference between methane destruction and methane avoidance is not very clearly established and there is a possibility of overlap between the project activities aiming to implement these two measures independently. An issue was identified that there is a lack of consistency of approaches between measure-1/measure-2 and measure-4. These issues have been addressed by revising the methane abatement section completely.



29. *Combination of measures:* Although it was allowed to combine measure using SB guidelines, specific guidance was missing in the document. This guidance has been brought in the revised document.

30. *Definition*: Several aspects of clarity were identified in the definitions of key terms (e.g. output, sector). Existing definitions are revised and new definitions are added to improve the clarity of document.

31. *Multiple products/outputs*: In existing guideline there is no guidance provided on how to deal with development of SBs for sectors producing multiple products, which can be a practical possibility for many sectors. Guidance is provided to improve the guidelines in this aspect.

## 2.7. Recommendations to the Board

32. The secretariat and Meth Panel recommend that the Board may take note of the information presented in this document and its implementation in the SB standard.

# Attachment. Road testing based on PSB0002 on cement clinker sector

1. The development of a sectoral emission factor (EF) and positive list for the clinker sector of Ethiopia (proposed standardized baseline PSB0002) based on data is presented in a step-wise manner below, as an example. The approach B of SB standard (as per appendix-1) is applied for the development of this emission factor.

2. Step-1: Estimation of the sectoral baseline emission factor:

   (a) *Ex-ante* determination of the baseline emission factor is based on the data presented or calculated for each clinker facility as below:

      (i) average clinker production (actual data) - tons/year;

      (ii) fuels (actual data) and feedstock (actual/estimated data) used - tons/year;

      (iii) specific technology efficiency (calculated) – $tCO_2$/t-clinker;

   (b) In case of Ethiopia, the fuels used in the clinker facilities were a combination of Heavy fuel oil (HFO), Coal and/or Pet Coke. Based on the share of fuels used in the clinker production for each facility the sector emission factor was calculated, which approach is illustrated in the table below:

**Table 1. Fuel (actual)**



| Facility j | HFO | | Coal | | Pet Coke | | Total Fuels Emissions | Tons Clinker Produced |
|---|---|---|---|---|---|---|---|---|
| | % share1,HFO on energy basis | tCO2HFO | % share1,coal on energy basis | tCO2Coal | % share1, pet-coke on energy basis | tCO2pet-coke | A1 = tCO2(HFO+Coal+Pet-coke) | A2 = t-Clinkerfacility,1 |
| Facility 1 | | | | | | | | |
| Abyssinya | 0 | 0 | 0 | 0 | 100 | 22,562.56 | 22,562.56 | 38,805.67 |

**Table 2. Feedstock (estimated)**

| Defaults based on % $share_{j,fuel}$ | In the estimation of feedstock (no data on actual values available), theoretical values are used as below:<br>1.3 ton limestone/t-Clinker in case of coal used;<br>1.4 ton limestone/t-Clinker in case of petcoke used; and<br>1.8 ton limestone/t-Clinker in case of HFO.<br>The weighted average is calculated based on fuel share in each facility, and this value is used along with the actual limestone consumption. | | | | | |
|---|---|---|---|---|---|---|
| **Facility *j*** | **Limestone**<br>(*Default* 95% share) | | | **Clay**<br>(*Default* 5% share) | **Other****<br>(*Default* 0% share) | **Total Feedstock Emissions** |
| | B<br><br>wt.avg | C<br><br>(t-clinker$_{facility,1}$) | **D** = B * C<br><br>t-Limestone++ | **E = D** * 0.05<br><br>(t-clay/t- | | **F = D** * EF limestone |

| | | | (t-CaCO3) | Clinker) | | (tCO2-feedstock) |
|---|---|---|---|---|---|---|
| Facility 1 | | | | | | |
| *Abyssinya* | 1.4 | 38,805.67 | 54,327.93 | 2,716.40 | | 21,513.87 |

++ estimated based on weighted average of fuel share per facility

**Note: Other (non-carbonate additives) shall be different in baseline and project

**Table 3. Sectoral emission factor**

| Facility j | Col A - FUELS | | Col B - FEEDSTOCK | | Col C – TECHNOLOGY | |
|---|---|---|---|---|---|---|
| | A1<br>Total Fuels Related Emissions<br><br>(tCO2-total fuels) | (A1/A2)<br>Fuel Carbon Intensity<br><br>(tCO2-fuels/t-clinkerfacility,j) | F<br>Total Feedstock Related Emissions<br><br>(tCO2-feedstock) | (F/A2)<br>Feedstock Carbon Intensity<br><br>(tCO2-feedstock/t-clinkerfacility,j) | (A1 + F)<br>Total emissions from Clinker production (Fuels & Feedstock)<br><br>(tCO2) | Col C-2<br>= (A1 + F)/A2<br>Specific emission from Clinker production<br><br>(tCO2/t-Clinkerfacility,j) |
| Facility 1 | | | | | | |
| Abyssinya | 22,562.56 | 0.58 | 21,513.87 | 0.55 | 44,076.43 | 1.136 |

(c) Above approach performed for all facilities, the values of Col C-2, i.e. the combined emission factor per facility is arranged in descending order of their carbon intensity. The facility that lies on the 70 per cent is the baseline emission factor for this sector. Table below identifies the facility "National Cement Rennovation Project" as the facility that falls on 70 Per cent. Therefore the baseline emission factor for the proposed standardized baseline for Ethiopia is 1.079 $tCO_2$/t-clinker.



| Facility | Clinker output | **Col C-2** Specific emissions from clinker production (tCO2/t-clinker) | cumulative production | % cumulative production |
|---|---|---|---|---|
| East Cement | 19434.700 | 1.301 | 19434.700 | 4.10 |
| Pioneer cement | 26720.885 | 1.273 | 46155.585 | 9.74 |
| Huang Shang Cement plc | 95000.000 | 1.180 | 141155.585 | 29.80 |
| Debresina Business Industries plc I phase | 20176.667 | 1.175 | 161332.252 | 34.06 |
| Abyssinya Cement plc I phase ans II phase | 38805.667 | 1.136 | 200137.918 | 42.26 |
| CH Clinker | 14700.000 | 1.128 | 214837.918 | 45.36 |
| Jema Cement plc I phase and II phase | 99000.000 | 1.083 | 313837.918 | 66.26 |
| National Cement Rennovation Project | 112538.6667 | 1.079 | 426376.585 | 90.02 |
| Derba Dashen Cement | 47257.333 | 1.073 | 473633.918 | 100 |

3. Step-2: Determination of positive list:

(a) Whence approved, any project activity that applies this standardized baseline should have emissions less than the baseline emission factor, i.e. 1.079 $tCO_2$/t-clinker;

(b) Project activities can implement either one measure or combination of measures in a project activity. For example only fuel switch or feedstock switch or combination by selecting fuel/feedstock/technology from the positive list:

(i) *Positive list for fuels*:

a. In the determination of positive list of fuels the fuels are ranked in terms of their cost attractiveness and the fuels which meet following conditions are included in positive list which meet both the conditions stated below:

i. Fuels that have a cost higher than those fuels which contributes to at least 30 per cent of the sector; and

ii. Fuels with a lower emission factor than the emission factor of the fuel of baseline facility;

b. For the PSB0002 the positive list for the fuels is defined by the ‘fuel or combination of fuels whose emission factor is less than 92.62 $tCO_2$/TJ and cost is more than 28 USD/TJ’ (based on lowest cost of any combination producing 30% output);



c. 92.62 $tCO_2$/TJ is the emission factor of the fuels used at the facility which is at 70 per cent threshold i.e. the National Cement Rennovation Project (that uses 27 per cent HFO and 73 per cent coal with emission factors of 77.4 and 98.3 $tCO_2$/TJ respectively) (*see Table-1 below*);

d. Lowest cost of fuel in the combination is 28 USD/TJ (*see Table-3 below*);

e. Possible example of positive list is: (a) HFO, (b) HFO with Coal in combinations, which meets the above requirements, (c) other alternate fuels.

**Table 4. Associated fuel costs (assumed)**

| Fuel | Cost of fuels (USD/TJ) | NCV GJ/t fuel | EF (tCO2/TJ) |
|---|---|---|---|
| HFO | 60 | 40.19 | 77.4 |
| Coal | 30 | 25.8 | 98.3 |
| Pet coke | 28 | 32.5 | 97.5 |

**Table 5. Fuels costs per facility based on weighted averages of fuels used**

| Facility, *j* | Facility | Clinker output (t-clinker) | Contribution in production (%) | Fuel costs (tCO2/TJ) |
|---|---|---|---|---|
| 1 | East Cement | 19434.700 | 4.10 | 60 |
| 2 | Pioneer cement | 26720.885 | 5.64 | 28 |
| 3 | Huang Shang Cement plc | 95000.000 | 20.06 | 28 |
| 4 | Debresina Business Industries plc I phase | 20176.667 | 4.26 | 28 |
| 5 | Abyssinya Cement plc I phase and II phase | 38805.667 | 8.19 | 28 |
| 6 | CH Clinker | 14700.000 | 3.10 | 28.77 |
| 7 | Jema Cement plc I phase and II phase | 99000.000 | 20.90 | 28 |
| 8 | National Cement Rennovation Project | 112538.667 | 23.76 | 38.16 |
| 9 | Derba Dashen Cement | 47257.333 | 9.98 | 28 |

**Table 6. Sample combinations producing the 30 per cent output in baseline and cost**

| **Plant nos. (constituting 30% of baseline segment)** | **Total production (%)** | **weighted average Cost of fuel** |
|---|---|---|
| 1,2,3,4 | 34.063 | 31.85 |
| 1,3,4,5 | 36.614 | 31.59 |
| 1,3,4.6 | 31.525 | 32.2 |
| 3,4 | 40.960 | 28 |
| Other combinations | | |



(ii) *Positive list for feed stock:*

a. Similar procedure as above (for positive list of fuels);

b. Feedstock or combination of feedstocks whose emission factor is **less than 0.376 $tCO_2$/Ton of feedstock** and cost is more than **xx USD/T feedstock;**

(iii) *Positive list of the technology:*

a. Similar procedure as above (for positive list of fuels);

b. Requires cost of technology per facility, which will be calculated based on capital cost divided by the production capacity and design life;

c. Based on sample data weighted average cost (lowest) of technologies that contribute towards 30 per cent production are Facilities 5 and 8.

**Table 7. Average cost of vertical shaft kiln (facility# 5 with a contribution of 8.19 per cent =)**

| | |
|---|---|
| Capital cost (assumed) | USD 30,000 |
| Design life (assumed) | 10 years |
| Production capacity (assumed) | 30,000 t-clinker/year |
| **Cost of Technology** | **0.1 USD/t-clinker** |

**Table 8. Average cost of two stage preheater (facility# 8 with a contribution of 23.76%)**

| | |
|---|---|
| Capital cost (assumed) | USD 1,000,000 |
| Design life (assumed) | 30 years |
| Production capacity (assumed) | 1,000,000 t-clinker |
| **Cost of Technology** | **0.033 USD/t-clinker** |

(c) Thus weighted average cost can be achieved through product of cost of production per ton of clinker and percentage share of contribution in terms of production;

(d) This is estimated as following based on the results of table 7 and 8:

Weighted average cost of technologies contributing to 30 per cent production of clinker

= 0.033*0.2376 + 0.1*0.0819

= 0.016 USD/t of clinker



(e) The positive list will contain the technologies which is having specific energy consumption **less than 5.54 GJ/ton of clinker and cost more than 0.016 USD/t-clinker**, as demonstrated above.

\- - - - -

### Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 01.0 | 10 November 2014 | Initial publication as an annex to the annotated agenda of EB81. |

Decision Class: Regulatory
Document Type: Information note
Business Function: Methodology
Keywords: data collection and analysis, standardized baselines

# Appendix 3. Concept note: Analysis of options for determination of baseline thresholds for standardized baselines

## 1. Procedural background

1. The Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) at its ninth session in Warsaw, Poland, requested the Board to prioritize the development of top-down thresholds for baseline and additionality for the underrepresented countries in the clean development mechanism CDM. The CDM Executive Board (the Board) at its seventy-seventh meeting approved the workplan of the Board for 2014 (EB 77 report, annex 1) and agreed to the “Further work on standardized baselines including country-specific thresholds on baseline and additionality”.

2. At its seventy-ninth meeting, the Board considered the concept note on further work on standardized baseline regulatory framework including development of top-down thresholds on baseline and additionality for under-represented countries (annex 11 to EB 79 annotated agenda). The Board requested the secretariat and the Meth Panel to jointly prepare an analysis of different options to define the baseline and additionality thresholds, expressed as the percentage of output of the sector as used in the "Guidelines for the establishment of sector-specific standardized baselines" (SB guidelines), for consideration by the Board at its eighty-first meeting. The analysis should include the option of continuing to use the values in appendix 1 of the SB guidelines (version 02.0), the options outlined in the aforementioned concept note on further work on standardized baseline regulatory framework and other options where applicable, and assess these options with regard to environmental integrity, attractiveness to CDM projects and comparability across sectors/countries. It was requested that the analysis should be based on road-testing using existing and future submissions of standardized baselines as well as other sources of information if available.



## 2. Purpose

3. The purpose of this concept note, jointly prepared by the secretariat and Methodologies Panel (Meth Panel), is to present the analysis of different options for defining the baseline and additionality threshold. The outcome of this analysis was used in preparing the SB standard (appendix 1).

## 4. Key issues, analysis and proposed solutions

3. As per the request from EB 79, the key issues were to define the options containing approaches to determine baseline and additionality thresholds. The scope for analysis is as following.

## 4.1. Scope of the analysis

4. This section covers an analysis of different options for defining the baseline and additionality thresholds[18], expressed as the percentage of output of the sector as used in the "Guidelines for the establishment of sector-specific standardized baselines" (SB guidelines). All the approaches are tested following the ranking of facilities in the sector against their output and based on descending order of their carbon intensity, as per the approach of revised SB guideline (named as "standard for the development of standardized baselines" or "SB standard"). The tested approaches are as following:

(a) **Approach 1:** Default values agreed by the Board, i.e. 80% for priority sectors and 90% for the remaining sectors[19];

(b) **Approach 2:** Default value of 90%, without further check of cost or barrier for additionality;

(c) **Approach 3:** Default value of 70%, requiring further check of cost or barrier for additionality;

(d) **Approach 4:** The approach based on the performance-penetration curve (see Fig 1 as illustration), i.e. box approach[20][21], in particular the following two approaches are tested:

(i) **Approach 4.1:** Threshold derived based on the baseline segment comprised of 50% production but no greater than 20% variation in performance (50%x20%);

(ii) **Approach 4.2:** Threshold derived based on the baseline segment comprised of 30% production but no greater than 20% variation in performance (30%x20%).



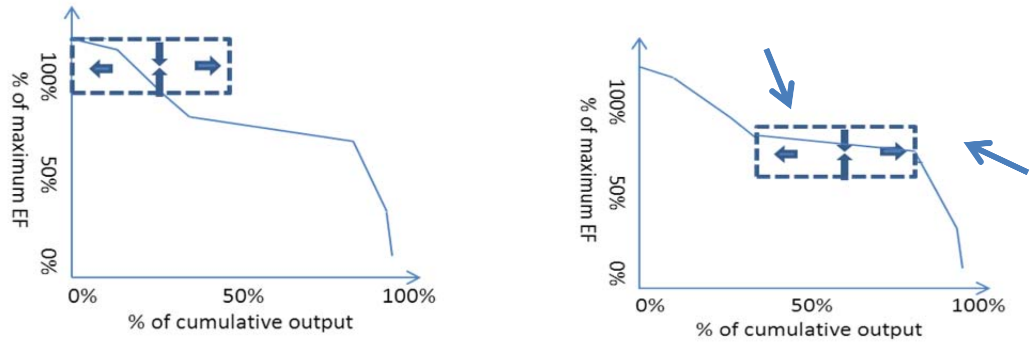
[18] This threshold is basically a screening threshold for baseline, or negative list of technologies (non-additional). Actual baseline scenario and positive list is further determined following investment or barrier analysis included in draft revised SB standard.

[19] Appendix 1 of the SB guidelines (version 02.0).

[20] The rationale for this approach can be further found in the document which was first presented as Annex 11 to the annotated agenda of EB 69, available at following link. <http://cdm.unfccc.int/filestorage/d/x/8OBU7VTPG6R2A5L4MFEND09SXKJQHY.pdf/eb69_propan11.pdf?t=eUl8bmQxZGZqfDBvTz7I6RrQoLYrQ7ECQp8q>.

[21] In case multiple segments are found to fit the box, the most conservative (right most on the curve) is chosen.

**Figure 3. Performance-penetration curve with illustrative segment boxes**




(iii) Although the "box approach" is available in the guideline document which was presented to EB 69 (annex 11, EB 69 annotations), the rationale for approaches 4.1 and 4.2 is summarized below for readers' benefit. The rationale takes into account the important aspects need to be understood in the consideration of the "box approach":

a. The key objective of the performance-penetration approach is to find a threshold which can clearly establish the negative list to exclude technologies for further consideration in developing a positive list. In other words, the purpose is to separate the technologies which have the potential to be additional from those ones which are definitely not additional (negative list). Once the initial screening of negative list is completed by applying this approach and a screening threshold is in place. However, the conclusive baseline scenario and additionality demonstration is achieved by the subsequent financial analysis or barrier analysis, following SB standard;



b. The fitting of box on the curve demonstrates that the technologies/facilities in the curve regarded as similar technologies as one hand they belong to a narrow range (20%) of performance (Y-axis), and on the other hand also penetrate enough (50% or 30% for approaches 4.1 and 4.2 respectively) in the sector to prove their availability in delivering the same service. Therefore, it may be reasonable (with a good confidence) to assume that these technologies are popular among the sector and would represent the technology in the absence of CDM. A conservative performance (top 20%) of those technologies covered in the box is selected as first screening threshold to determine the negative list of technologies;

c. Baseline emission is the function of performance of all the facilities/ technologies in the negative list (non-additional technologies). The inclusion of only those facilities/technologies should be done which are not more than 25 years old and which are available. In spite of

these qualifying criteria for inclusion, still an aspect which is important for consideration is that there is a need to remove some portion of these technologies which are highly inefficient and which are likely to distort the curve of performance-penetration. By a rule of thumb, all those most inefficient/carbon intensive facilities/technologies can be removed which do not contribute more than 5% output to the sector, in order to smoothen the performance-penetration curve;

d. Therefore, the current dimensions of the box are proposed based on the aspects above. In addition, a proposal can be considered that contains the cross checks to demonstrate the credibility of baseline segment identified by the box: (i) The levelized cost of more than 50% of facilities/technologies in the box is in the lowest range of all the technologies/facilities; (ii) More than 75% of the facilities implemented in last 10 years have the GHG emission performance range covered by box. However, this is only possible when the data on year of implementation of each facility is available;

(e) **Approach 5:** Leave it up to designated operational entities (DNAs) to suggest the procedures and values of country-specific thresholds.

5. The following table presents a summary of various approaches for which analysis was conducted.



**Table 1. Summary of different approaches used in the analysis**

| | **Approach 1** | **Approach 2** | **Approach 3** | **Approach 4.1** | **Approach 4.2** | **Approach 5** |
|---|---|---|---|---|---|---|
| **Baseline threshold**[22] | Default values: 80%/90% | 90% | 70% | Box approach | Box approach | Leave to DNA to propose |
| **Additionality** | Cost or barrier | No additional other check needed | Cost or barrier | 50 % output coverage, and 20% performance range | 30 % output coverage, and 20% performance range | |

6. The aspects of environmental integrity and attractiveness to project developers is analysed for each approach since the testing results are obtained for each approach using the data of different sectors from existing submissions of standardized baselines as well as other sources of information, e.g. data from CDM projects in the pipeline and data from some research papers.

7. Nevertheless, data availability still poses a major constraint to perform the full comparative analysis. With this in view, cement sector, clinker sector, power sector, rice mill sector and charcoal sector are selected for analysis.

[22] For approaches 1, 3 and 4 the baseline threshold represents a screening threshold, beyond which all the facilities are available as baseline alternatives. The approach of SB standard is followed to determine baseline scenario based on investment and/or barrier analysis.

## 4.2. Analysis

8. This section covers the analysis of implications of different approaches listed in table 1 based on the data of different SB submissions and other information (e.g. secondary data or similar data from registered CDM projects), where available. Where required, the name of country is not mentioned to protect the confidentiality of data source.

### 4.2.1. Clinker production in Ethiopia

9. Data from bottom-up submitted standardized baseline of Ethiopia Clinker production sector (PSB0002) are used[23]. Emissions of each production facility include that from fuel consumption as well as from feedstock consumption (i.e. calcination process emissions). Results from applying different approaches are shown in Table 2 below.

10. It can be seen that baseline emissions resulted from Approach 1, 2 and 3 are the same, which corresponds to the cleanest facility in the sector. It is due to the reason that the last/cleanest facility accounts for about 36% production of the sector. Approach 4.1 turns to be non-applicable, because no segment could fit the 50%x20% criteria. Whereas, threshold can be derived in Approached 4.2 with reduced production coverage, leading to the highest emission factor among these approaches.

11. For the purpose of comparison, one non-registered (Greenfield) CDM project located in Ethiopia "Project 7632: Clinker Optimization in cement types production at Derba MIDROC cement Plant"[24] applying ACM0005 was found in the CDM pipeline, indicating an emission factor (EF) of 0.84 $tCO_2$/t Clinker for this particular plant[25]. It was found that this project is less carbon intensive than the cleanest plant in the sector used for SB development. The main reasons seem to be that the proposed SB is based on aggregation of smaller private plants to which investment barriers do not apply and which have data vintage between 2009 to 2011, whereas, the project 7632 is a Greenfield plant which was not even commissioned until end of validation in 2013 (therefore not included in the cohort of plants for SB development) and utilize a very superior kiln technology.



**Table 2. Result of clinker sector with different approaches applied in the analysis**

| **Approach** | **Approach 1** | **Approach 2** | **Approach 3** | **Approach 4.1** | **Approach 4.2** | **ACM0005 project 7632** |
|---|---|---|---|---|---|---|
| | Default values: 90% | 90% | 70% | Box approach (50%x 20%) | Box approach (30%x20%) | |
| **Baseline (tCO2/t clinker)** | 0.952 (the cleanest facility) | 0.952 | 0.952 | No box identifiable | 1.049 (57.6% threshold) | 0.84 |

[23] <https://cdm.unfccc.int/methodologies/standard_base/new/sb8_index.html>.

[24] <http://cdm.unfccc.int/Projects/DB/CarbonCheck_Cert1349705724.42/view>.

[25] It seems that this project was rejected by the Board for other reasons than the baseline emission calculation. Thus, its baseline emission factor is still used here to inform the analysis.

| | | | | | | |
|---|---|---|---|---|---|---|
| **Additionality** | cost or barrier check | No additional check needed | cost or barrier check | cost or barrier check | cost or barrier check | |

### 4.2.2. Cement production in country X[26]

12. Data from cement production (PPC or blended cement[27]) in country X were collected for conducting the analysis. It should be noted that these emission data only cover fuel consumption, but not calcination process emissions.

13. Results from different approaches are included the Table 3 below. Due to the lack of cost data, additionality check in some of the approaches could not be performed.

14. Furthermore, data from the CDM projects of country X randomly selected from the CDM pipeline applying ACM0005 are used to understand the implication of the above results. Since ACM0005 accounts both emissions from energy consumption and calcination, the emissions from the energy consumption only are used in this comparison.

15. Since cement does not belong to priority sector, approach 1 and approach 2 are essentially same in determining the baseline emission factor[28]. A similar emission factor is also produced by Approach 4.2, since Approach 4.2 leads to threshold close to 90%, i.e. 93.6%. The highest resultant emission factor comes from approach 4.1, with gives a threshold of 63%.

16. The comparative analysis with ACM0005 projects showed that results from Approach 1, 2 and 4.2 are close (although more conservative) to the emission factor from ACM0005 projects in the CDM pipeline. EF from approach 3 is relatively higher. Lastly, it should be noted that the benchmark in ACM0005 are based on the market where blended cement is supplied to whereas benchmark for SB guideline is based on the data of blended cement facilities in the entire country.



17. Lastly, although baseline from approach 3 is on the higher side, it should be noted that this value is without applying cost/barrier to determine baseline. It is very much possible that the baseline will be more conservative, if the facilities cleaner that the one on this threshold do not implement fuel/feedstock/technology from the positive list.

[26] The country X is one of the developing countries.

[27] One possible uncertainty associated with this study was that the exact blending ratio in the blended cement is not known for all the cement plants.

[28] It should be noted that approach 1 provides a screening threshold of negative list whereas approach 2 provides baseline threshold. The difference may exist if following approach 1 the baseline scenario shifts to a cleaner technology based on cost/barrier analysis. This cannot be known as cost/barrier data is not available.

**Table 3. Result of different approaches used in the analysis**

| Approach | Approach 1 | Approach 2 | Approach 3 | Approach 4.1 | Approach 4.2 | ACM0005 project |
|---|---|---|---|---|---|---|
| | **Default values: 80%/90%** | **90%** | **70%** | **Box approach (50%x 20%)** | **Box approach (30%x20%)** | |
| **Baseline ($tCO_2t$/t cement)** | 0.2796 | 0.2796 | 0.3044 | 0.3186 (63%) | 0.2706 (93.6%) | 0.2848[29] |
| **Additionality** | cost or barrier check | No additional check needed | Most plants are additional by applying 3% penetration check | cost or barrier check | cost or barrier check | Registered project |

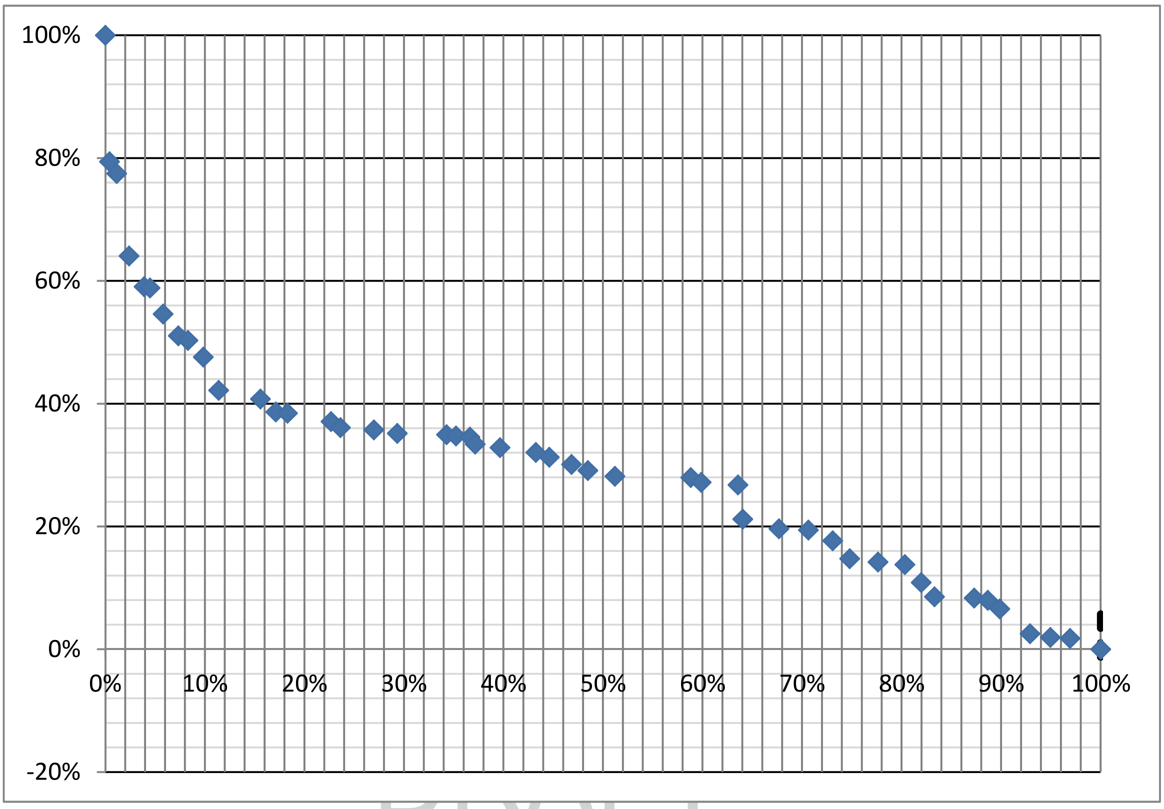
**Table 4. Emission factor of ACM0005 projects in the CDM pipeline**

| ACM0005 projects in the pipeline | EF ($tCO_2$/t cement) |
|---|---|
| Project 1 | 0.2990 |
| Project 2 | 0.2828 |
| Project 3 | 0.2777 |
| Project 4 | 0.2523 |
| Project 5 | 0.3907 |
| Project 6 | 0.2862 |
| Project 7 | 0.2444 |
| Project 8 | 0.2812 |
| Project 9 | 0.2493 |



[29] Derived by taking the average of data in Table 4.

**Figure 4. Performance-penetration chart for cement sector in country X**




### 4.2.3. Rice mill sector of Cambodia

18. Data from the approved ASB0004 is used to test the different approaches. Since the rice mills are disaggregated based on their capacity (small/medium and semi-large), the results for each group are included in the tables below. In ASB0004 the approach 1 is used with threshold of 80%, as the sector belongs to priority sector.

19. Additionality is not an issue for the sector under study, because all rice mills had benefited from the eligibility under micro scale additionality.

20. For small/medium size rice mills baseline emission factor resulted from approach 2 corresponds to the cleanest facility which seems to be overly stringent. Approach 3 will lead to an increase of 6~7% compared with approach 1. For the “box approach” included in approaches 4.1 and 4.2, box with both dimensions are identifiable. Baseline emission factors obtained from 4.1 and 4.2 are the same, but are the highest compared which all other approaches. This is because, although Approach 4 is working, its application leads to a very small threshold (about 48%). In order to address such a situation, a proposal has been made before to specify a minimum acceptable threshold when this approach was discussed in EB 69, i.e. 70%.

21. For semi-large rice mills similar results as that for small/medium size rice mills are observed, except that the curve does not allow to fit the box following approach 4.1(50%x20%). Another observation is that approach 4.2 with reduced penetration coverage is of higher applicability compared to approach 4.1, but the resulted threshold is more conservative (0.0304 tCO2t/t rice for semi-large plants).

22. Results from the testing of all approaches are presented in tables 5.

**Table 5. Result of different approaches used for small capacity rice mills (<=1000ton/year)**

| **Approach** | **Approach 1 used in ASB0004** | **Approach 2** | **Approach 3** | **Approach 4.1** | **Approach 4.2** |
|---|---|---|---|---|---|
| | **Default values: 80%** | **90%** | **70%** | **Box approach (50%x 20%)** | **Box approach (30%x20%)** |
| **Baseline (tCO2t/t rice)** | 0.0506 | 0.03376 (the cleanest facility) | 0.05401 | 0.0648 (48.56% threshold) | 0.0648 (48.56% threshold ) |
| **Additionality** | Automatically additional due to micro capacity (<5MW) | | | | |

**Figure 5. Performance-penetration chart for small ricemill sector in Cambodia**

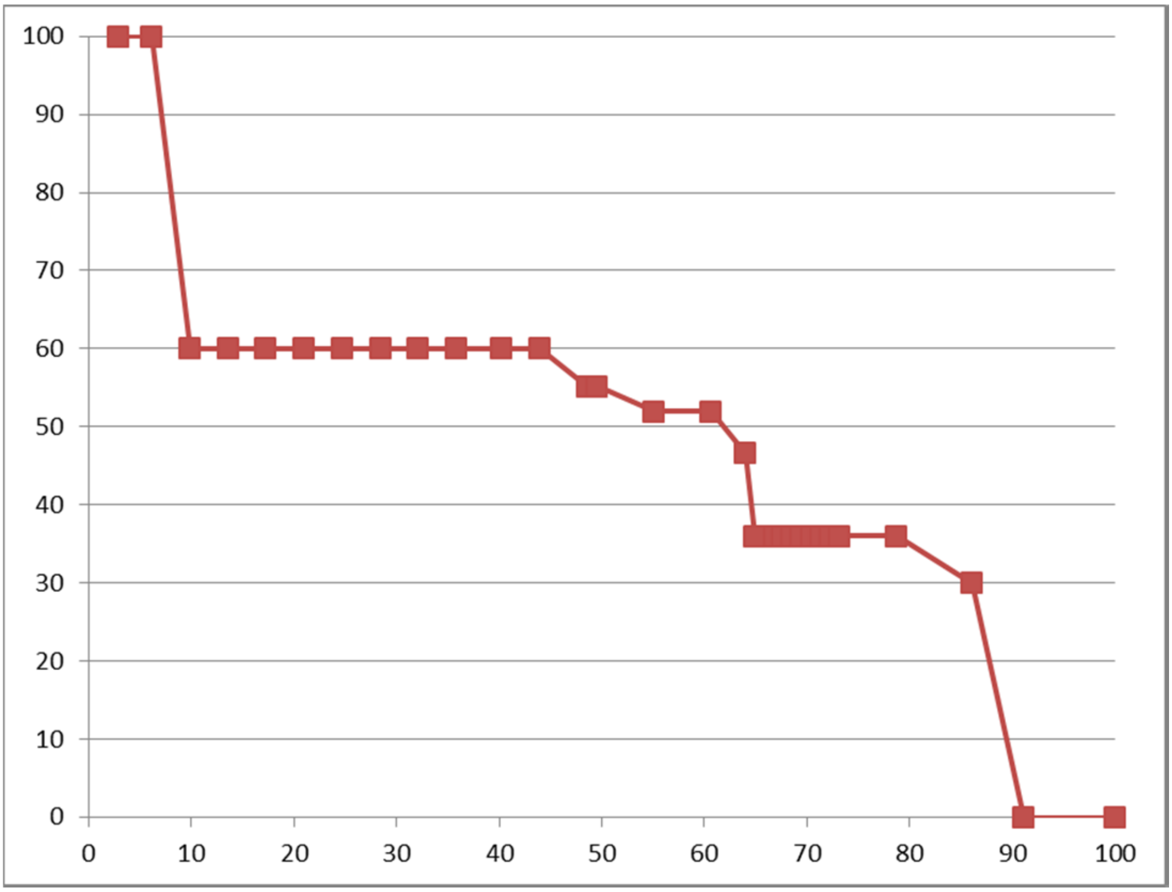
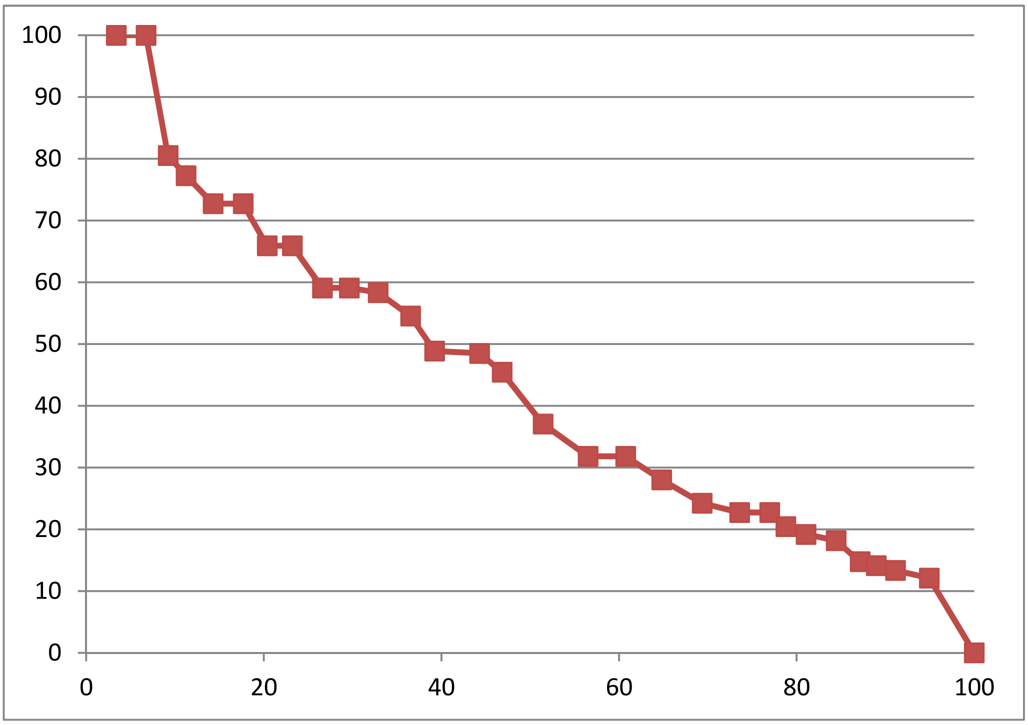



**Table 6. Result of different approaches used for semi-large size rice mills (<=3000 ton/year)**

| **Approach** | **Approach 1, used in ASB0004** | **Approach 2** | **Approach 3** | **Approach 4.1** | **Approach 4.2** |
|---|---|---|---|---|---|
| | **Default values: 80%** | **90%** | **70%** | **Box approach (50%x 20%)** | **Box approach (30%x20%)** |
| **Baseline (tCO2t/t rice)** | 0.0330 | 0.0288(the second cleanest facility) | 0.0351 | Box non-identifiable | 0.0304 ( 84.44% threshold ) |
| **Additionality** | Automatically additional due to micro capacity (<5MW) | | | | |

**Figure 6. Performance-penetration chart for semi-large ricemill sector in Cambodia**






23. It should be noted that the baseline EF values from ASB0004 have been considered to be very conservative by the Cambodia DNA. In such a context, data from 2 CDM projects and 1 research study carried out by Economic Institute of Cambodia (EIC) are presented below in table 6.

**Table 7. Baseline emission factor from other sources**

| **Source** | **CDM0363-Angkor Rice Mill in Cambodia** | **CDM3446-Rice Mills in Philippines** | **EIC research: survey of 162 Cambodia rice mills** |
|---|---|---|---|
| **Condition/ Assumption** | 2MW, 30 ton/hr<br>7920 hr/yr (operation)<br>GEF=0.9 kgCO2/kWh | 2MW, 22 ton/hr,<br>90%=capacity factor<br>8760 hr/yr (operation)<br>GEF=0.474 tCO2/MWh | 7.1.1. Average 18.72 (l diesel /t-rice)<br>1 ton/hr Density of diesel;<br>3.2 kg CO2/kg of diesel |
| | Large | Large | A mix of small and semi-large |
| **Project year** | 2006 | 2010 | 2009 |
| **EF (t-CO2/t-rice)** | 0.06 | 0.0431 | 0.0506 |

24. From the data above, it can be noted that for large mills, the baseline EF from two registered CDM projects and that from survey of 162 mills (by using weighted average) is much higher than the baseline EF approved in ASB0004 (Approach 1). It actually appeared to be comparable with the EF for small size mills in ASB0004, which are less

efficient as compared to large mills. In addition, both CDM projects include emission reductions from methane avoidance, which contributed significantly to the economic viability of the projects.

25. Result from Approach 3 is a bit closer to the emission factor from project in the same country and survey from the 162 rice mills in the sector. But this is without using further filter of cost/barrier to determine the final baseline value.

26. When a sampling method is used and many small-size facilities exist, the collected sample is more likely to over-represent large-size facilities (or underrepresent small-size facilities due to difficult data collection from small-size facilities). In fact, the ASB0004 included 46% small-size mills while the small-size mills represented more than 99% of the number of rice mills in Cambodia. Considering the general assumption that large facilities perform more efficiency due to the effect of scale of production, the outcomes based on the sample with the underrepresent small-size mills may generate conservative outcomes. Therefore sampling based studies in such situation may be considered to apply less stringent thresholds.

# 5. Impacts

27. The feedback received from various stakeholders suggest that the default values of 80/90 percentile of baseline and additionality threshold included in SB guideline (version 02.0) may not represent the country-specific circumstances and mostly they are very conservative, particularly in view that a separate cost/barrier criteria is required to be applied to demonstrate additionality. The option/s to define baseline and additionality threshold selected from the analysis will help to make SB standard that can achieve good balance between environmental integrity and attractiveness for the CDM projects.



# 6. Subsequent work and timelines

28. The options selected from this analysis are included in SB standard, presented as appendix 1 to this document. In future, the approaches included in this analysis can be further tested, as mentioned in the conclusion and recommendations section of this document.

# 7. Conclusion

29. The following conclusions are drawn from the analysis and results obtained above:

(a) Pursuant to the analysis it was agreed that Approach 1, Approach 4 and Approach 5 as presented in this paper are either too conservative or not mature enough or appropriate to be considered for establishing the threshold. The reasons for arriving at the above conclusions are as follows:

(i) For the Approach 1 (default 80/90 percentile plus cost/barrier analysis), it appears that the resultant baseline emission factor is too conservative in most cases based on the testing included in this paper. In addition, cost or barrier analysis is still required in order to demonstrate additionality. Keeping in mind that the approach has fundamental spirit of baseline based on 48(C), it is considered that this approach may be too stringent and resource-intensive for SB development. This will reduce the attractiveness

of developing standardized baseline due to high resources required for development against the limited benefits of its use by CDM projects. Therefore it is agreed to recommend to the Board to withdraw this approach from the existing approved SB guideline;

(ii) It was observed that although the Approach 4 (box approach) has potential, its road testing requires more data to achieve sound results. Based on limited available data presently, the conclusion cannot be drawn to allow the development of country-specific thresholds following this approach;

(iii) Further, using approach 5 (DNA's submitted approach) that it would be impossible to evaluate the approaches submitted by DNA without having minimum evaluation criteria agreed by the Board.

# 8. Recommendations to the Board

30. Based on the above conclusion, the secretariat and the Meth Panel recommended that the Board agrees to include approaches 2 and 3 in SB standard and allows the flexibility to DNA to use either of the two approaches. Based on this recommendation, both the approaches are included in the revised draft SB standard (appendix 1) for the Board's consideration. The approaches are explained as follows:

(a) Simplified approach (approach 2 in the paper that is referred as approach A in SB standard (appendix 1)): To set the threshold at 90% of the output for all sectors and no further procedure is needed for determination of baseline scenario and demonstration of additionality; or



(b) Threshold with barrier/cost assessment (approach 3 in the paper that is referred as approach B in SB standard (appendix 1)): To set the threshold at 70% of the output for all sectors, and further determination of baseline scenario and demonstration of additionality shall be carried out by applying investment/ barrier analysis as specified in the revised draft SB standard. However, the Board may wish to note that a further analysis that is required to determine the positive list and baseline after determining the threshold could not be done due to the unavailability of data on cost and barrier. Further work may need to be carried out in future on this approach to evaluate the practicality of its application and identify any possible challenges e.g. the unavailability of data.

31. Both the approaches, approach 2 and approach 3 above, provide the baseline emission factor and positive list of technologies.

32. Approach 2 in the paper is equivalent to the Baseline Approach 48(c) of modalities and Procedures, i.e. it is equivalent to setting baseline as average of 20% most efficient options among plants build in last five years. Further, it is simplified approach as it does not involve the collection of data for cost and barrier analysis, however may provide a relatively stringent baseline as compared to approach 3. Therefore, in order to provide flexibility for the cases where information on cost and barrier is available, approach 3 is recommended. This approach, however, may provide relatively less stringent baseline and therefore higher emission reductions. Both the approaches ensure environmental integrity, which is clear from the analysis done in this document.

- - - - -

## Document information

| *Version* | *Date* | *Description* |
|---|---|---|
| 01.0 | 10 November 2014 | Initial publication as an annex to the annotated agenda of EB81. |

Decision Class: Regulatory
Document Type: Information note
Business Function: Methodology
Keywords: data collection and analysis, threshold criteria, standardized baselines