

**DRAFT****Annex 11****DRAFT GUIDELINES ON STANDARDIZED APPROACHES FOR DETERMINING
BASELINES FOR MEASURE(S)****(Version 01.0)****I. Background**

1. The clean development mechanism (CDM) Executive Board (hereinafter referred to as the Board), in paragraph 41 of the report of the sixtieth meeting of the Board mandated:

“The Board considered the summary of the public inputs to the call on the draft “Tool for baseline scenario identification and baseline emission calculations” and the recommendations of the Meth Panel based on the practitioner’s workshop on the draft “Tool for baseline scenario identification and baseline emission calculations”. The Board requested the secretariat, in consultation with the Meth Panel, if appropriate, to develop a concept note on a general methodological framework for baseline determination for consideration by the Board at its sixty-fourth meeting.”

2. The concept note with an outline of the key features and elements for the guideline on baseline determination was annotated to the agenda of sixty-fifth meeting of the Board (EB65 annotations to the proposed agenda - Annex 18) and the Board accepted this concept.

II. Objective and scope

3. There is inconsistency in the approaches applied for baseline determination in some of the existing CDM methodologies (refer some examples in appendix II to this document). The use of a standardized approach for baseline determination will help to avoid such inconsistencies in future.

4. The main objective of these guidelines is to ensure consistency of the approaches used in determination of baseline in the different methodologies, by providing standardized approaches to determine the baseline for different baseline scenarios (investment situations) and measure(s). The proposed guidelines elaborate when and under which circumstances baseline based on 48(a), 48(b) or 48(c) should be used.

5. These guidelines will provide standardized approaches for determining baseline for a measure or combination of measures in case the project activity consists of multiple measures. These guidelines will guide the methodology developers, the Methodologies Panel (Meth Panel), the Small Scale Working Group (SSWG) and other relevant stakeholders to determine the approaches to determine and evaluate the baseline during the development and/or assessment of methodologies.

6. The underlying approach takes lessons from the best practices followed for baseline determination in existing CDM methodologies, and the rationale used by the Board in approving different methodologies and issuing guidance.

7. This document provides scope, applicability and definitions of key terms used in the guidelines. There are sections providing approaches and steps to be followed to determine baselines and baseline emissions. The flow charts provides the algorithm to determine baseline, appendix I provides matrix with key criteria for the determination of baseline and appendix II provides examples of the inconsistencies in the approaches followed in some of the existing approved methodologies.

**DRAFT**

8. The document, however, is not exhaustive and may not cover certain (although less likely) situations those may have impact on the approaches to determine the baselines. Therefore, as a general rule, the compliance with these guidelines does not automatically mean that the Board will approve the proposal made in proposed new methodology (PNM) by project participants, if they find a specific situation/s related to PNM that differs from the situations covered by these guidelines and that the approaches provided in PNM in line with these guidelines do not ensure the conservativeness. Similarly, if a project participants justifies that the specific situation/s of its proposal are different from those covered under these guidelines or that there are genuine limitations in following the approaches suggested in these guidelines and that an alternative approach to determine baseline may be conservative enough, they may deviate from these guidelines. The Board will take it into account while considering the PNM.

III. Applicability

9. These guidelines are applicable to non-afforestation and reforestation (non-A/R) sectors.

IV. Definitions

10. For the purpose of these guidelines, the following definitions apply:

- (a) **Measure (for emission reduction activities):** Measure is a broad class of GHG emission reduction activities that possess common features. A project activity can include single or multiple measures. The reason to divide the project activity in multiple measures is that the baseline may change depending upon the measures. Four types of measures are currently covered in the guidelines:
 - (i) Fuel and/or feedstock switch (Example: switch from naphtha to natural gas, or switch from lime stone to gypsum in cement clinker production);
 - (ii) Switch of technology with or without change of energy source (Example: energy efficiency improvements, power generation based on renewable energy);
 - (iii) GHG destruction (Example: landfill gas flaring, incineration of HFC23 gas vented from HCFC22 production unit);
 - (iv) GHG formation avoidance (Example: Use of biomass that would have been left to decay in a solid waste disposal site resulting into formation and emission of methane, for energy generation.
- (b) **Output :** goods or services with comparable quality, properties, and application areas (e.g. clinker, lighting, residential cooking, waste disposal);
- (c) **Project activity:** A non-A/R operation or action that aims to reduce GHG emissions from sources, whether as a whole project or as a part of a project;
- (d) **The investment scenario:** The investment scenario represents the most plausible investment among the alternative investment scenarios available to project participants without CDM. The investment scenario leads to determination of baseline. The investment in CDM project activity involves either initial capital outlay or the incremental expenses caused by project activity (e.g. incremental cost of fuels/feedstocks under a fuel/feedstock switch project activity, requiring no capital outlay). The investment scenario(s) for the measure(s) are determined *ex ante* and should be valid for the crediting period of 21 years or of 10 years. Investment scenario should be determined

**DRAFT**

for the entity that has or would have emitted higher amount of greenhouse gases in absence of project activity. There is a possibility that the entity who implements the project, either through initial capital outlay, or paying to a project implementer (e.g. Energy Service Company (ESCO), supplier constructing project on BOOT basis), may be different than the entity who has or would have emitted higher amount of greenhouse gases in absence of project activity. For example, in case a waste energy recovery project supplying electricity to a new consumer, the investment scenario for electricity should be identified for the new consumer.

- (e) **Baseline:** Baseline is the scenario that most reasonable represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity. The baseline is characterised by three approaches: (i) 48(a)- Existing actual or historical emissions, as applicable, (ii) 48(b)-Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment, (iii) 48(c)-The average emissions of similar project activities undertaken in the previous five years, in similar social, economic, environmental and technological circumstances, and whose performance is among the top 20 per cent of their category. Baseline should be determined for the entity that has or would have emitted higher greenhouse gases in absence of project activity.

V. Steps for determining baseline for a measure or combination of measures

11. The following steps should be applied to determine baseline for a measure:
12. **Step 1: Identify the output:** One project activity can have multiple outputs. For example, cogeneration using biomass has three outputs. Thermal energy for on-site processes, electricity for grid export and potentially waste (biomass residue) disposal.
13. **Step 2: Identify the project activity:** The project activity is a coherent set of inter-related activities, which provides all the outputs identified. The project activity, within the project boundary, includes all the measures resulting in the identified output.
14. **Step 3: Identify number of measures that the project activity encompasses:** One project activity can include more than one measure. For example, the project activity that involves power generation using biomass and supplying to electricity grid includes two measures. First measure is the generation of electricity and supplying to the grid. Second measure is the GHG formation avoidance from the biomass that would have been left to decay in a solid waste disposal site, if applicable.
15. **Step 4: Determine the relationship between measures (if more than one):** The following differentiation of situations can be made based on the interdependencies of measures taken up under the project activity:
- (a) **Situation 1:** The measures are independent (the measures can be implemented separately)
- (i) The investment scenario and the baseline of each measure should be determined separately.

Example: A boiler is retrofitted and in parallel demand side steam saving project is taken up in the plant. These measures are completely independent. The investment scenario for each measure should be identified separately.

**DRAFT**

- (b) **Situation 2:** The measures are mutually dependent (the implementation of any of them needs the implementation of the others)
- (i) The investment scenario should be identified together for all the measures and the baseline identified separately for each measure.

Example: The power plant changes its sub-critical coal-based technology to open cycle natural gas turbine technology. The project activities involve technology switch measure and fuel switch measure, which are completely dependent on each other and cannot take place in isolation¹. The baseline scenario for both these measures should be identified together. It should be noted that this situation is already covered by measure in section 10(a)(ii) above, by ensuring a global definition of measure itself.

- (c) **Situation 3:** The implementation of some measures (e.g. type A) requires the implementation of other measures (e.g. type B), but not vice versa.
- (i) The investment scenario of measure type A determines the investment scenario of measure type B.

Example: The project activity of a grid-based power generation using landfill methane that was vented in absence of project activity involves two measures: methane destruction, and greening of grid by supplying clean fuel power. The measure of power generation requires the destruction of methane, whereas the methane destruction can occur with or without power generation. Therefore, the determination of investment scenario of power generation will also include the fate of landfill methane in absence of power generation.

16. **Step 5: Determine the baseline and baseline emissions:** The following paragraphs describe various approaches to be followed during different situations while determining the baseline for each measure, and the control parameters to be regulated while considering the approaches.

17. *Increase in consumption of output:* The level of output under the project determine the level of output under the baseline. However, in the situation where the situation of suppressed demand exists, the baseline level of service should be determined using the approved guidelines on suppressed demand. The baseline is to be determined for the total amount of output delivered by the project activity. In case of brownfield projects², if the output is increased above the level of maximum capacity of pre-project equipment, the total output of the project activity should be disaggregated into the output up to the level of maximum capacity of pre-project equipment and output exceeding this level. The output up to the level of maximum capacity can be further divided in two parts, first is equal to average output of historical years (e.g. 1, 3 or 5 years), and second is over and above historical average output but equal to the maximum capacity that pre-project equipment can deliver. The baseline should be determined for each output separately. For the project activities of distributed nature (e.g. distribution of compact fluorescent lamps to consumers) where it is expected that the behaviour of the consumers of the output delivered by the project activity will change due to perverse incentives caused by CERs of project activity, an approach to monitor this change is followed by forming a control group of consumers those have similar characteristics as project consumers but are not benefited by the CDM project.

¹ For this example, as the technology and fuel are inter-linked in an energy sector, two measures are combined into one (measure-ii in definition section).

² The brownfield projects are the projects undertaken in the facility that has operational history of at least one year before implementation of project activity.

**DRAFT**

► *Control parameters:* The capacity of pre-project equipment should be determined, taking into account an appropriate equipment load factor. An investment is necessary in order to ensure the increase in output consumption, beyond the maximum capacity of pre-project equipment.

18. *Multiple consumers:* If there are several consumers, the total output of the project activity should be disaggregated into outputs sent to each consumer and the baseline is determined for output sent to each consumer.

► *Control parameters:* Consumers are divided into two categories: (i) specific consumer (existing or new) for which baseline can be determined separately, and (ii) aggregated consumers (existing or new) for which baseline cannot be determined separately.

19. *Technical lifetime of equipment:* As stated earlier, the baseline scenario takes into account the investment for all crediting periods (fixed crediting period of 10 years or renewable crediting period of 21 years). If the technical lifetime of pre-project equipment that is replaced by new equipment ends during the crediting period/s, a new baseline scenario representing futuristic investment (at the end of lifetime of pre-project equipment) and corresponding baseline should be defined *ex-ante*.

► *Control parameters:* The technical lifetime of pre-project equipment/s should be known. This approach does not apply where pre-project equipment would be retrofitted, and not replaced.

20. *Additionality of emission reductions achieved by project activity:* The definition of additionality of ‘project activity’ as per CDM modalities and procedure should be clearly interpreted in terms of additionality of ‘emission reductions achieved by project activity’. For example, one project producing one output can lead to emission reductions that are additional (e.g. sent to consumer A to displace its current service provider which is more carbon intensive) and emission reductions that are not additional (sent to consumer B which is a new consumer and would have received the service with the same or lower carbon intensity in the absence of the project). This interpretation of additionality will lead to the change in additionality of emission reductions due to project activity as a new baseline scenario becomes relevant (as defined *ex-ante*) due to the end of lifetime of baseline equipment.

► *Control parameters:* The additionality of emission reductions can change only in case there are multiple baseline scenarios defined *ex-ante* during all the crediting periods due to the issue of end of lifetime of baseline equipment/s, and these baseline scenarios are different from each other.

21. ***Sub-step 5.1: Identify the baseline for an applicable investment scenario:*** Identify the following four investment scenarios based on options available to the project participants (PPs) to deliver the same output(s) as in case of the project activity.

- (a) *Investment scenario- PPs would invest in another technology/fuel/feedstock in absence of CDM:* This decision of PPs is governed by the fact that regardless of CDM they are facing an imminent investment decision at present in order to supply the desired output. A third party does not have possibility to supply the output. The decision of the choice of technology/ fuel/ feedstock will change in absence of CDM. The examples of such project include, the replacement of pre-project boiler by a more energy efficient boiler, or switch to a cleaner fuel. Such decisions are governed by financial attractiveness and therefore the most attractive course of action will be taken in absence of CDM. If the most attractive course of action is the continuation of current practice, and there is no

**DRAFT**

expansion of capacity resulted due to installation of new equipment, the baseline for historical emissions should be based on average output delivered by pre-project equipment in historical years (e.g. 1, 3 or 5 years). In case of expansion of capacity resulting into increased output consumption, the historical output should be further divided in two categories, first is equal to average of historical years (e.g. 1, 3 or 5 years), and second is over and above historical average but lower than the maximum capacity that pre-project equipment can deliver. The baseline should be determined for each output separately.

► *Control parameters:* The list of project alternatives available to PPs should be realistic, credible and exhaustive. The project alternatives should deliver the same output that is delivered by the project activity. The project alternatives should first be processed through a barrier test in accordance with the tool for demonstration of additionality, and only remaining alternatives should undergo investment comparison analysis.

- (b) *Investment scenario- PPs would not invest in absence of CDM and nobody would invest to deliver the same output as the project activity:* This investment scenario applies to a specific category of projects taken up for GHG destruction. This investment decision is governed by the fact that the PPs have no benefit by investing in the project, therefore they will not invest without CDM. No one other than PPs have control on the source of emissions, to be able to implement the GHG abatement project activity. Example of such project includes the HFC23 destruction in HCFC22 production plant, where the destruction of HFC23 is neither required by law of host country, nor destruction results into any benefit other than CER revenues. The baseline is determined by actual emissions, which is the combination of historical/actual emissions and the factor of continuous improvement in the sector, determined and applied at an appropriate interval.

► *Control parameters:* It needs to be clearly ascertained that PPs have no direct or indirect benefits other than CERs earned by CDM projects, and also that the CDM project activity is not mandatory as per regulations.

- (c) *Investment scenario- PPs would not invest but a third Party would invest in absence of CDM:* This investment decision is governed by the fact that the output is delivered to unspecified consumer or to an open market, therefore it could be supplied by a third party. Example of such projects includes a wind power project supplying renewable energy to the grid. Since it is uncertain what the output of CDM project activity displaces, the baseline can be set at conservative benchmark (e.g. emission factor) either using approved standardised baselines if applicable or benchmark (48 (c)). If the technology of the sector is changing rapidly (e.g. new technologies outweigh the old ones every year due to substantial improvements in performance), the baseline should be adjusted using autonomous improvement of the sector.

► *Control parameters:* The conservativeness of benchmark and quality of data required to determine benchmark should be ensured.

- (d) *Investment scenario- PPs would invest without CDM later in the future:* This investment decision is governed by the fact that the PPs, regardless of CDM, will be facing an imminent investment decision at a foreseeable point in the future. For example, the investment certainly takes place at the end of technical lifetime of equipment that would have been used in the absence of CDM project activity. A third party will not have possibility to supply the output, as this output is required specifically by the PPs. If

**DRAFT**

imminent investment decision to invest in future before the end of entire crediting period is foreseen, the baselines for entire crediting periods is determined *ex-ante* including baseline for investment scenario at the beginning of the crediting period and for future investment scenario. The example of such project is that a boiler is replaced under a CDM project activity having crediting period of 7 years which can be renewed two times, however the technical lifetime of the pre-project boiler ends at 5th year. The baseline for the project activity is historical or actual emissions till the time the technical lifetime of pre-project equipment ends. After end of technical lifetime of pre-project equipment, the baseline is minimum between benchmark (using either approved standardised baseline if applicable or 48(c)) and most attractive course of action.

► *Control parameters:* The ex-ante determination of baseline at the end of lifetime is only possible where exact technical lifetime of pre-project equipment is known.

22. **Sub-step 5.2: Determine the emissions for the identified baseline:** Following paragraphs explain what approaches should be followed for determination of emissions for each identified baseline above.

23. *Emissions for the baseline of most attractive course of action (if other than continuation of current practice):* The baseline emissions should be calculated by formulating the reference plant (or equipment) based on manufacturer's specifications and conservative efficiency and/or emission factor should be used for the reference plant (or equipment). If the lifetime of most attractive baseline plant/equipment is smaller than the crediting period, autonomous improvement factor of the sector should be included at the end of lifetime of baseline plant/equipment.

► *Control parameters:* The specifications of reference plant (or equipment) should be collected from most reputed suppliers and the most conservative efficiency or emission factor should be chosen to calculate baseline emissions. The lifetime of all the alternatives considered to determine the most attractive course of action should be same. The lifetime of most attractive technology should be known.

24. *Emissions for the baseline based on historical or actual data:* Following rationale should be applied to distinguish various approaches based on historical and actual emissions.

- (a) *Average of historical years or historical campaign:* Historical data should be used to calculate the baseline emissions where it is likely that in absence of CDM, the current practice will continue without change in the conditions. For example, the data on average performance of boiler is required for historical years is required if under CDM project activity the boiler is retrofitted to improve efficiency under CDM project, but in absence of CDM project the boiler would have continued its current operation. Where historical data is available the average efficiency (or emission factor) of appropriate number of years, that can represent historical data accurately, should be used to calculate the baseline emissions. For example, in case of boiler the efficiency value of previous three years is normally available. Where, the data for three years is not available it can be collected by running an actual campaign operated under optimal operating conditions and calculating the efficiency/ emission factor based on actual measured values. For example, in case of a Nitric Acid plant the data on N₂O emissions from N₂O waste stream, in absence of secondary/tertiary catalyst that is installed as a part of CDM project activity is not available. As per methodology AM0028 and AM0034, an average value of few baseline campaigns is calculated to be the baseline N₂O emission factor. For some cases, such as landfill gas destruction, the baseline emissions are calculated using actual measurement of the gas emitted in the project year *y*. For all GHG destruction projects

**DRAFT**

baseline emissions should be calculated based on actual emissions using either of above approaches in combination with the factor of continuous improvement in the sector, determined and applied at an appropriate interval.

- (b) *Capacity expansion:* As stated earlier, if there is an increase in consumption of output the baseline is to be determined for the total amount of output delivered by the project activity. The total output of the project activity should be disaggregated into the output up to the level of maximum capacity of pre-project equipment and output exceeding this level. The output up to the level of maximum capacity can be further divided in two parts, first is equal to average output of historical years (e.g. 1, 3 or 5 years), and second is over and above historical average output but equal to the maximum capacity that pre-project equipment can deliver. The baseline emissions for the output equal to average of historical years should be equal to historical performance (e.g. emission factor, efficiency), however the baseline emissions for the output between historical average and maximum capacity of pre-project equipment should be calculated as the minimum between historical performance and the benchmark calculated using approved standardised baselines or 48(c).
- (c) *Control group:* This approach applies to the projects of distributed nature where it is expected that the behaviour of the consumers of the output delivered by the project activity will change due to perverse incentives caused by CERs of project activity, an approach to monitor this change is followed by forming a control group of consumers those have similar characteristics as project consumers but are not benefited by the CDM project. The level of output for the consideration of baseline emissions should be the minimum between the output of project activity and that of control group. Alternatively, the level of output for the consideration of baseline emissions can be minimum value between a default value of output from a recognised source (e.g. in case of water purifier, the consumption of drinking water per capita established by the World Health Organisation) and the output of the project activity.
- (d) *Manufacturer's efficiency values:* For the cases such as chillers, where the efficiency of equipment depends on several factors (e.g. seasonal factors, load etc.) and where the equipment performance is not recorded in historical years displaying impact of each factor, it is possible to use historical efficiency based on the equipment manufacturers' data (e.g. curve) depicting efficiency values based on several combination of input parameters. The manufacturer's efficiency values can be used even if the required historical data is available, bearing in mind that it is more conservative compared to actual performance.
- (e) *Allocation of baseline emissions:* In case where multiple equipment is replaced by fewer equipment and the baseline is based on historical performance, the allocation of baseline emissions among pre-project equipment should be done in order to achieve conservativeness. For example, the output of project equipment can be divided among the pre-project equipment using the priority order based on the descending order of their performance.
- (f) *Use of actual data to determine baseline emissions:* Actual data should be used to calculate the baseline emissions where it is likely that in absence of CDM, the current practice will continue but the baseline emission factor/efficiency is subjected to change due to: (i) change in various conditions such as operating conditions and raw material

**DRAFT**

condition and quality to such a level that the baseline and project conditions become incomparable, (ii) rapid pace of autonomous improvement in the sector there is likely impact on the pre-project technology. The case (i) is possible where the pre-project plant/equipment is retrofitted, and for such case the baseline emission factor should be calculated based on retrievable campaigns, by setting the plant/equipment on the pre-project mode and running the baseline campaign under new conditions (operating conditions, raw material). Example of such case could be an arc furnace retrofitted for improved energy efficiency. This furnace receives a completely new blend of raw material in term of mix of scrap, iron ore and sponge iron, which causes the change in temperature, heat timings and other operating parameters, for which there is no historical experience exist. To calculate accurate baseline emission factor, furnace should be operated without retrofit (as in pre-project scenario) under new conditions and new data on production and energy consumption should be collected. For calculating the baseline emission factor for case (ii) it is necessary to adjust baseline emission factor, which is calculated based on historical data, for the autonomous improvement in the sector.

► *Control parameters:* Based on above, in order to calculate the emission factor based on historical or actual data, following control parameters should be used: (i) whether or not the project affects the baseline conditions, (ii) pace of autonomous improvement in the baseline emission factor (iii) possibility to keep operating conditions comparable to the one during campaign (e.g. heat exchangers and catalysts with decreasing performance), or possibility to conduct baseline campaign under optimal conditions, (iv) possibility to retrieve the baseline condition after implementation of project, (v) whether there is a distributed nature of CDM project activity which requires a control group.

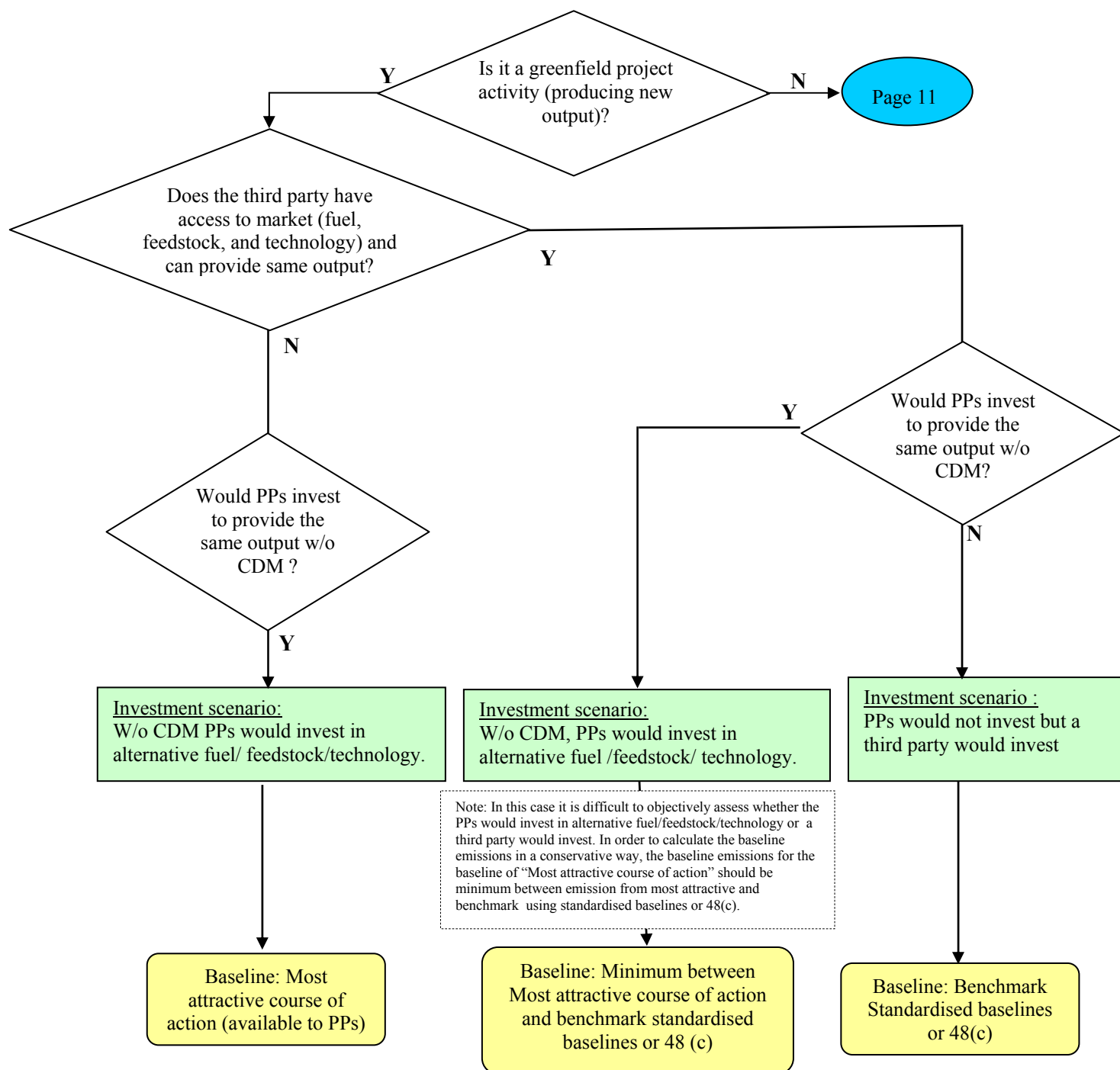
25. *Emissions for the baseline based on benchmark using approved standardised baselines if applicable or using (48(c)):* The conservativeness of benchmark determined using 48(c) should be based on top 20% performing technologies in the same category that the CDM project belongs to. The benchmark is either based on average performance of top 20% least carbon intensive technologies built in 5 years previous to implementation of CDM project activity, or based on the average performance of least carbon intensive technologies contributing to production of 20% of output in the sector.. For the sectors where the technology changes takes place at fast pace, the factor of autonomous improvements in sector should be brought in to adjust the baseline emission factor at an appropriate regular interval, subject to minimum interval of one year. This factor can be determined based on either of the following: (i) historical trend of autonomous improvement in the sector in a specific country and applied in methodology *ex-ante*; (ii) the autonomous improvement determined in project year y and applied *ex-post*; (iii) a fixed value recommended in the methodology or both as an option to each other;

► *Control parameters:* Appropriate level of aggregation should be selected for the benchmark. While using 48 (c) the performance of CDM registered plants should not be included for the calculation of benchmark.



DRAFT

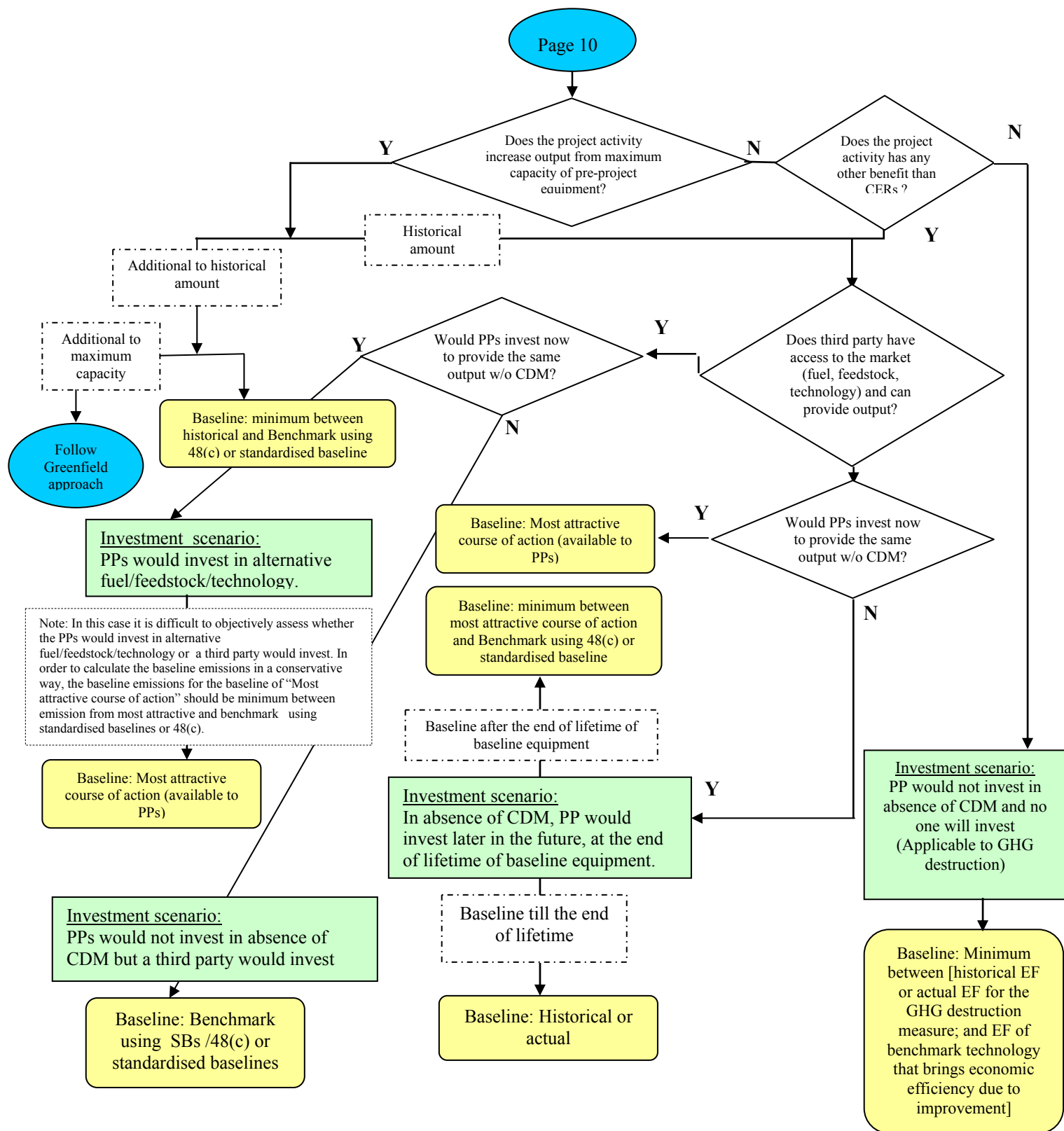
Figure 1: Flow chart to determine baseline for a measure that produces output which is supplied to each specific consumer or aggregated consumer(s)³



³ The flowchart is to be read in conjunction with sub-step 5.1 and 5.2 of this document.



DRAFT





DRAFT

Appendix I: Matrix to determine baseline of a measure⁴

| Cases | Investment scenario and corresponding baseline | | | |
|---------------------------------------|--|--|--|---|
| Investment scenario | Would invest in another technology/fuel /feedstock in absence of CDM <i>(PPs will invest regardless of CDM in existing or new facilities/equipment)</i> | Would not invest and nobody would invest in absence of CDM <i>(No revenues other than CDM, applicable to GHG destruction project activities)</i> | Would not invest but a third Party would invest in absence of CDM <i>(For greenfield facilities and expansion project activities)</i> | Would invest later in the future in absence of CDM <i>(Investment in existing facilities/equipment)</i> |
| Baseline⁵ | Most attractive course of action (technology/fuel /feedstock)/ | Actual emissions | Benchmark using 48(c) or standardised baseline | Historical/actual + minimum between the benchmark technology and most attractive |
| Baseline emissions⁶ | 1) If most attractive course of action is other than continuation of current practice, the baseline emissions should be based on the design performance provided by manufacturer for reference facility/equipment. If the lifetime of most attractive baseline plant/equipment is smaller than the crediting period, autonomous improvement factor of the sector should be included at the end of lifetime of baseline plant/equipment. 2) If most attractive course of action is the continuation of current practice, then either of following applies. (a) Historical emissions based on following applicable | Either of the following options applies ⁷ . The baseline emissions should be determined using following options and are subjected to autonomous improvement of the sector at an appropriate frequency. - Historical emissions based on average of previous years (e.g. 1, 3 or 5 years) before implementation of the project Or - Historical emissions based on Campaign before starting the project Or - Actual emissions based on campaign during crediting period | Benchmark based on top 20% performing facilities/ equipment or the manufacturer's specifications of reference plant/ equipment determined using standardised baseline. | Combination of historical /actual emissions and minimum between emissions of benchmark technology and most attractive technology. |

⁴ This matrix summarizes the flow chart presented earlier (figure 1)⁵ Refer sub-step 5.1 for each type of baseline under different investment scenarios.⁶ Refer sub-step 5.2 for baseline emissions and safeguards to be followed to ensure conservativeness under different circumstances.⁷ Conditions for application are stipulated in relevant paragraphs of sub-step 5.2.

**DRAFT**

| | | | | |
|--|---|--|--|--|
| | <p>options.</p> <ul style="list-style-type: none">- Average of previous years (e.g. 1, 3 or 5 years) before implementation of the project <p>Or</p> <ul style="list-style-type: none">- based on campaign before starting the project <p>(b) Actual emissions based on following applicable options.</p> <ul style="list-style-type: none">- Campaign during crediting period <p>Or</p> <ul style="list-style-type: none">- Retrievable baseline <p>Or</p> <ul style="list-style-type: none">- Measurement during the project | <p>Or</p> <ul style="list-style-type: none">- EF based on measurement during the project | | |
|--|---|--|--|--|

**DRAFT****Appendix II: Examples for inconsistencies in current methodologies**

1. Several commonly used large scale CDM methodologies and consolidated methodologies were evaluated and compared for their determination of the baseline and baseline emissions. The differences in approaches have been justified in several cases, however there is no sufficient rationale provided within the methodology for adopted approach. The following was observed:

(a) Power sector methodologies

| Methodology | Baseline Approach |
|-------------|--------------------|
| ACM0002 | 48(a) and/or 48(b) |
| ACM0012 | 48(a) and/or 48(b) |
| AM0029 | 48(a) and/or 48(b) |
| ACM0013 | 48(a) and 48 (c) |

Salient observations:

- (i) ACM0002, ACM0012 and AM0029 allow the greenfield plants to claim emission reductions due to supply of low/zero carbon electricity to grid. ACM0002 and ACM0012 calculates the baseline based on benchmark i.e. combined margin emission factor of grid, whereas AM0029 requires baseline emission factor to be calculated based on minimum between combined margin emission factor, built margin emission factor and the most attractive course of action. There is no approach provided how one can define the emission factor of the most attractive alternative plant.
- (ii) ACM0013 allows for highly efficient greenfield power plants supplying power to grid to claim emission reduction as compared to a low efficiency baseline plant. The efficiency of baseline plant is required to be determined based on minimum between emission factor of most attractive alternative plant using the same fuel and top 15% performing plants in the host country, using the same fuel. There is no approach provided how one can define the emission factor of the most attractive alternative plant.

(b) Transport sector methodologies

| Methodology | Baseline Approach |
|-------------|--------------------|
| ACM0016 | 48(a) |
| AM0031 | 48(a) |
| AM0090 | 48(a) and/or 48(b) |

Salient observations:

- (i) Although both AM0031 and AM0090 allow the use of default emission factor values, only AM0090 allows applying these to greenfield services, AM0031 is limited to existing services.
- (ii) AM0090 allows using default values for both existing and greenfield services.

**DRAFT**

- (iii) ACM0016 uses a dynamic baseline to consider technological improvement, which the other methodologies do not.

(c) ***Metal production sector methodologies***

| Methodology | Baseline Approach |
|-------------|-------------------|
| AM0030 | 48(a) |
| AM0059 | 48(b) |

Salient observations:

- (i) Both methodologies apply for the cases where production has increased beyond its historical level. Although in AM0030 the emission factor is uniform regardless of such production expansion, in AM0059 a 20% benchmark is used to establish the emission factor of production exceeding the historical level.
- (ii) AM0030 has a “cap” for the specific emission factor, which is an international benchmark value. AM0059 has no such concept, and the baseline emissions up to the historical production are not limited by an industry performance indicator.

(d) ***Waste handling and disposal sector methodologies dealing with GHG destruction***

| Methodology | Approach |
|-------------|--------------------|
| ACM0001 | 48(a) and/or 48(b) |
| ACM0010 | 48(b) |
| ACM0014 | 48(a) and/or 48(b) |

Salient observations:

- (i) ACM0010 allows using published average values as emission factor, whereas the other methodologies do not have this option, and the emission factor is determined through measurement.

(e) ***Waste handling and disposal sector methodologies dealing with GHG formation avoidance***

| Methodology | Approach |
|-------------|--------------------|
| AM0025 | 48(a) and/or 48(b) |
| AM0039 | 48(a) |

Salient observations:

- (i) Although both methodologies apply for existing services, AM0025 bases its baseline emissions only on the measured parameter, regardless of the historical situation. AM0039 uses the historical values for the baseline emissions determination.

2. Other issues identified:

- (a) AM0023 uses a static estimation of the baseline, though the quick pace in which the relevant technology changes merits using a benchmark;

**DRAFT**

- (b) AM0028 and AM0034 uses a static estimation of the baseline, though the quick pace in which the relevant technology changes merits using a benchmark. This issue is currently under consideration by the EB;
- (c) In all methodologies, guidance is lacking how to evaluate the baseline after the end of lifetime of the baseline equipment involved. The crediting is stopped at the end of lifetime, if the end of lifetime reaches before the end of crediting period.

History of the document

| Version | Date | Nature of revision(s) |
|---|-------------|--|
| 01.0 | 2 July 2012 | Initial publication as an annex to the annotated agenda of EB68. |
| Decision Class: Regulatory Document Type: Guideline Business Function: Methodology | | |