

 <p style="text-align: center;"><b>CDM: Proposed new methodology expert form</b> (version 04) (To be used by methodology experts providing desk review for a proposed new methodology)</p>	
Name of expert responsible for completing and submitting this form	A. Ricardo J. Esparta
Related F-CDM-NM document ID number	NM0125
<p><i>Note to those completing this form, as applicable: Please provide recommendations on the proposed new baseline and monitoring methodologies based on an assessment of CDM-NMB and CDM-NMM and of their application in sections A to E of the draft CDM-PDD, desk reviews and public input. Please ensure that the form is entirely filled and that arguments and expert judgements are substantiated.</i></p>	
<b>A. Evaluation of the proposed new methodologies by desk reviewers:</b>	
<b>I. Evaluation of the proposed new baseline methodology:</b>	
<p>Title of new baseline methodology:</p> <p>Baseline methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system.</p>	
<p>i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):</p> <p>According to proposed new <b>Baseline methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system</b> (hereafter referred to simply as "NMB0125"):</p> <p><i>"The methodology is applicable to grid-connected renewable power generation project activities in a centrally dispatched hydrothermal electricity system, where there is an official source that provides a reference expansion plan, under the following conditions:</i></p> <ul style="list-style-type: none"> <li><i>i) Applies to electricity additions and retrofits from</i> <ul style="list-style-type: none"> <li><i>• Hydro power plants;</i></li> <li><i>• Wind sources;</i></li> <li><i>• Geothermal sources;</i></li> <li><i>• Solar sources;</i></li> <li><i>• Wave and tidal sources.</i></li> </ul> </li> <li><i>ii) This methodology is not applicable to project activities that involve switching from fossil fuels to renewable energy at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site.</i></li> <li><i>iii) The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.</i></li> </ul> <p>The baseline methodology shall be used in conjunction with the proposed monitoring methodology "Monitoring methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system," that is submitted with the present baseline methodology."</p>	
<p>ii. Strengths and weaknesses of the methodology:</p>	

**Strengths:**

1. Mainly based on official sources.
2. Consideration of a wide range of hydrothermal electricity system variables.

**Weaknesses:**

1. Complexity
  2. Dependence on governmental expansion plans (politically subjective variables)
  3. Dependence on uncertain/subjective variables, for example, opportunity price of water resources, methane emissions due to biomass decomposition in flooded areas, among others.
  4. Dependence on “black-box” dispatch models.
  5. Resource-intensive calculations.
- iii. Any changes needed to improve the methodology:
- a. Minor changes: *none*.
  - b. Major changes: *Solve points 1 to 5 of the weaknesses in item A.I.ii.*

**II. Evaluation of the proposed new monitoring methodology:**

Title of new monitoring methodology:

*Monitoring methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system.*

- i. Conditions under which this methodology is applicable to other potential projects (e.g. project type, region, data availability):

*According to proposed new Monitoring methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system (hereafter referred to simply as “NMM0125”):*

*“The methodology is applicable to grid-connected renewable power generation project activities in a hydrothermal electricity system under the following conditions:*

- i) Applies to electricity additions and retrofits from*
  - Hydro power plants*
  - Wind sources;*
  - Geothermal sources;*
  - Solar sources;*
  - Wave and tidal sources.*
- ii) The geographic and system boundaries for the relevant electricity grid can be clearly identified and information on the characteristics of the grid is available.”*

- ii. Strengths and weaknesses of the methodology:

**Strengths:**

1. Mainly based on official sources.

**Weaknesses:**

1. Key dependence on third-parties subjective information.
2. Dependence on governmental expansion plans (politically subjective variables)
3. Dependence on uncertain/subjective variables, for example, opportunity price of water resources, methane emissions due to biomass decomposition in flooded areas, among others.
4. Dependence on “black-box” dispatch models.

5. Resource-intensive monitoring & verification.

- iii. Any changes needed to improve the methodology:
  - a. Minor changes: none.
  - b. Major changes: Solve points 1 to 5 of the weaknesses in item A.II.ii.

**B. Details of the evaluation of the proposed new methodology by the desk reviewer:**

**I. Proposed new baseline methodology (*specify title here*):**

Baseline methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system.

**(1) Short description of the methodology, including an assessment of which approach from paragraph 48 of the CDM modalities and procedures was used:**

*a) Describe the methodology:*

According to NMB0125:

*“Baseline emissions are calculated in a two-step procedure. First, the quantity of thermal electricity generation that is displaced by the project activity is determined with the help of a dispatch model<sup>1</sup>. In the second step, emission reductions from avoided thermal power plants are calculated, applying emission factors of each power plant to the quantity of electricity generated by those plants. With the help of the dispatch model, it is possible to determine the amount of electricity replaced by the project activity and thus the saved GHG emissions.*

*A two-step approach is proposed to demonstrate additionality: a barrier analysis (step 1), complemented with a common practice analysis, and a financial analysis (step 2).”*

*b) State the approach selected:*

Existing actual or historical emissions, as applicable.

*c) Indicate (in summary form) why the approach selected is the most appropriate. Please provide your expert judgement on the appropriateness of the selected approach to the project category:*

From the three general baseline approaches it is the more appropriate as the methodology considers existing actual emissions from power plants connected to the grid as well as power plants considered in official expansion plans.

<sup>1</sup> Reviewer's note: The dispatch model is not assumed to be part of the methodology. According to NMB0125, “if available, the dispatch model should preferably be the model used by the dispatch center that manages the electricity system ... Otherwise, project participants shall justify why they decide to [develop and] use other model.”

**(2) Basis for determining the baseline scenario:**

a) *State whether the documentation explains how the baseline scenario is to be chosen and identified:*

Yes.

b) *State the basic underlying rationale for algorithms/formulae used (e.g. marginal vs. average basis) (see also section 4 below):*

According to NMB0125:

*"The baseline is determined by running the simulation model [dispatch model] at the end of every year during the crediting period in two cases:*

- 1. Without including the proposed project activity into the system dispatch, under the expected expansion plan available at the time the project activity starts, i.e. including power plants considered in the expansion plan with the date they are likely to enter into operation, as foreseen in this plan for every year;*
- 2. With the proposed project activity including the addition of new capacity that really occurs, i.e. new power plants and retrofits in the system are included using the date they have entered into operation every year."*

c) *State whether the documentation explains how, through the use of the methodology, it can be demonstrated that a project activity is additional and therefore not the baseline scenario. If so, what are the tools provided by the project participants?*

A two-step approach is proposed to demonstrate additionality: a barrier analysis (step 1), complemented with a common practice analysis, and a financial analysis (step 2).

d) *State whether the basis for determining the baseline scenario and for assessing additionality is appropriate and adequate*

Due to the high complexity of dispatch models for hydrothermal interconnected power systems and their dependence on subjective information it is doubtful that the basis for determining the baseline scenario is appropriate. The basis for assessing additionality is adequate.

**(3) Assessment of the description of the proposed methodology and its applicability**

a) *State whether the methodology has been described in an adequate manner:*

No. The most relevant tool for the proposed baseline methodology is the dispatch model used. As the dispatch model is not part of the methodology it is not described.

b) *State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and submitted along with CDM-NMB):*

It can be appropriate depending on the dispatch model.

c) *State whether the application of the methodology could result in a baseline scenario that reasonably represents the anthropogenic emissions by sources of greenhouse gases that would occur in the absence of the proposed project activity.*

It can be appropriate depending on the dispatch model.

*Please explain:*

It is assumed that very well designed dispatch models for the hydrothermal interconnected power system ("an already sound computer program") as well as reliable official expansion plans are available. As the dispatch model is not part of the methodology it is not described and, therefore, no definitive conclusion can be drawn.

**(4) Assessment of algorithms/formulae and type of data needed:**

*a) State whether the description of the methodology includes algorithms and generic formulae that can be applied to other potential project activities (if not, the proposed new methodology will be considered as a project-specific methodology):*

Yes, as long as publicly and verifiable data to input simulation models that reasonably describe the system as well as reliable official expansion plans are available.

*b) Explain the spatial scope of data used to determine the baseline and whether the scope is appropriate:*

According to NMB0125:

*“Most necessary data must be provided by the manager of the wholesale electricity market or the government department in charge of dispatch decisions ... Other data are provided by national or regional centres taken as official sources, which in turn collect data from involved companies ...”*

Again, the scope can be appropriate, if publicly and verifiable data to input simulation models that reasonably describe the system as well as reliable official expansion plans are available.

*c) Explain the vintage of data used (in relation to the duration of the project crediting period) and whether the vintage of data is appropriate, indicating the period covered by the data:*

For the determination of the baseline operating margin the baseline scenario shall consider the latest expansion plan published, but not beyond the last two years. The additions considered in the considered expansion plan will be fixed and used for running the dispatch model every year, during the period covered by the expansion plan. It can be appropriate depending on the reliability of the considered expansion plans. In the methodology it is stated that simulated and actual data shall be compared during monitoring in order to decide whether they remain realistic. Nevertheless no procedure is given for the case the variables turn out to be unrealistic.

**(5) Definition of the project boundary related to the baseline methodology:**

a) State how the project boundary is defined in terms of:

i) Gases and sources

According to NMB0125:

*“Project participants shall account only the following emission sources for the project activity:*

- *For geothermal project activities, fugitive emissions of methane and carbon dioxide from non-condensable gases contained in geothermal steam and carbon dioxide emissions from combustion of fossil fuels required to operate the geothermal power plant.*
- *For hydroelectric power plants, methane emissions generated as a consequence of organic matter decomposition in flooded areas by the project.*

*For the baseline determination, project participants shall only account CO<sub>2</sub> emissions from electricity generation in fossil fuel fired power that is displaced due to the project activity.”*

Regarding baseline determination it is also stated later in the document that *“fuel emission factors ... for carbon dioxide, methane and nitrous oxide, and specific consumptions of thermal power plants ... are needed to estimate GHG emission factors.”*

ii) Physical delineation

According to NMB0125:

*“The spatial extent of the project boundary includes the project site and all power plants connected physically to the electricity system that the CDM project power plant is connected to.”*

It is essentially the same spatial scope of ACM0002.

b) Indicate whether this project boundary is appropriate:

Yes.

**(6) Key assumptions/parameters (including emission factors and activity levels) and data sources:**

a) List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:

Key assumptions are the availability of:

- A dispatch model that reasonably describes the hydrothermal interconnected power system operation;
- Publicly, verifiable and indisputable input data for simulation model;
- Reliable official expansion plans.

b) State whether the key assumptions are arrived at in a transparent manner:

Yes.

c) Give your expert judgement on whether the assumptions/parameters are adequate:

No.

Although, as stated in NMB0125, *“running simulation models to forecast power plant dispatch is a standard procedure most generators usually perform,”* commonly:

- Different models for the same scenario have different results. It is not uncommon that the

results are significantly diverse.

- A significant number of variables necessary to run hydrothermal power system simulation models are subjective and/or confidential.
- Government plans are usually susceptible to political interests and uncertainties.

d) *Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):*

According to NMB0125:

*"Most necessary data must be provided by the manager of the wholesale electricity market or the government department in charge of dispatch decisions ... Other data are provided by national or regional centers taken as official sources, which in turn collect data from involved companies ... Usually, all generators have access to this information, which is an important part of their usual practice, since they need to know how to be prepared for delivering and selling electricity to the system. If this were not the case, the methodology would be too hard to apply."*

e) *Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:*

No. See item c above.

f) *State possible data gaps:*

No significant data gap was identified.

#### **(7) Assessment of uncertainties:**

a) *State whether the methodology includes an assessment of uncertainties regarding:*

i) *The basis for determining the baseline scenario:*

The most relevant tool for the proposed baseline methodology is the dispatch model used. As the dispatch model is not part of the methodology it is not described.

ii) *Algorithms/formulae:*

No systematic assessment of algorithms/formulae uncertainties is included.

iii) *Key assumptions:*

To deal with most of the uncertainties it is proposed to run the dispatch model yearly.

iv) *Data:*

Dispatch model input data uncertainties are mentioned but no systematic assessment is included.

b) *State whether the uncertainties presented are reasonable:*

The presentation of the uncertainties is reasonable.

#### **(8) Leakage:**

a) *State how the baseline methodology addresses any potential leakage due to the project activity.*

According to NMB0125, *"no leakage is perceived to occur under this approach."*

b) *Indicate whether the treatment for leakage is appropriate and adequate:*

Yes. Nevertheless, depending on the size of the project possible leakage due to power plant construction should be estimated.

#### **(9) Transparency and "conservativeness":**

a) *Indicate whether the baseline methodology was developed in a transparent way:*



The most relevant tool for the proposed baseline methodology is the dispatch model used. As the availability of a dispatch model that reasonably describes the hydrothermal interconnected power system operation a dispatch model is assumed, the model itself is not described. If the assumption is considered reasonable, the methodology was developed in a transparent way.

*b) State whether the baseline methodology is conservative:*

Without the description of the dispatch model and an assessment of the official expansion plans it is impossible to say.

**(10) Potential strengths and weaknesses of the proposed baseline methodology (please explain):**

Potential strength is the detailed consideration of a wide range of hydrothermal electricity system variables in a dispatch simulation model. The potential strength can turn out to be the greatest weakness if publicly, verifiable and indisputable input data for simulation model is not available.

**(11) Other considerations, such as a description of how national and/or sectoral policies and circumstances have been taken into account (please explain):**

The methodology has a key dependence on official expansion plans, which by their turn theoretically take into account national and/or sectoral policies.

**(12) Applicability of the proposed methodology across project types and regions (please indicate):**

The methodology is applicable to grid-connected renewable power generation project activities in a centrally dispatched hydrothermal electricity system, where there is an official source that provides a reliable reference expansion plan, a dispatch model that reasonably describes the hydrothermal interconnected power system operation is available and, verifiable and indisputable input data for simulation model are public.

**(13) Any other comments:**

*a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:*

Various documents on approved and proposed methodologies available on the UNFCCC CDM website have been used.

*b) Indicate any further comments:*

Please revise the language of the text, as some passages are not completely clear, both grammatically and regarding the content.

Expectation of an extremely high accuracy will unequivocally lead the process to an unfeasible time consuming procedure. In the example proposal, inserting more variables to a methodology does not make it necessarily more accurate. Actually, for the kind of complex scenario analyzed, inserting more variables will likely increase the uncertainty. Also, the kind of expert capacity needed to thoroughly audit the methodology make it almost impossible to validate and verify.

**II. Proposed new monitoring methodology (specify title here): >> Monitoring methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system**

*In respect of the proposed new monitoring methodology, evaluate each section of CDM-NMM to the draft CDM-PDD. Please provide your comments section by section:*

**(1) Brief description of new methodology:**



*Describe new methodology:*

According to the proposed new *Monitoring methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system* (hereafter referred to simply as “NMM0125”):

*“The Monitoring Plan is based on recording mainly electricity generation of the proposed power plant and the electricity generation of all thermal plants serving the interconnected national system and running the simulation model every year. Data should be collected on a monthly basis for the duration of the project lifetime and crediting period. Since most generation projects last longer than the maximum crediting period permitted under CDM, the later value of 21 years will also determine the monitoring period.”*

**(2) Key assumptions/parameters:**

a) *List the implicit and explicit key assumptions. Identify those, if any, which are problematic and explain:*

A key assumption is the availability of publicly, verifiable and indisputable input data for simulation model.

b) *State whether the key assumptions are arrived at in a transparent manner:*

Yes.

c) *Give your expert judgement on whether the assumptions/parameters are adequate:*

Without a detailed description of the dispatch model it is impossible to say.

**(3) Data sources and data quality:**

a) *Indicate which data sources are used and how the data are obtained (e.g. official statistics, expert judgement):*

According to NMB0125:

*“Most necessary data must be provided by the manager of the wholesale electricity market or the government department in charge of dispatch decisions ... Other data are provided by national or regional centers taken as official sources, which in turn collect data from involved companies ...”*

b) *Give your expert judgement on whether the data used are adequate, consistent, accurate and reliable:*

Can be appropriate, if publicly and verifiable input data to simulation models is available. With “input data” it is here meant all the necessary data (variables, parameters, initial conditions, etc) to run the simulation model.

c) *State possible data gaps:*

Without a detailed description of the dispatch model it is impossible to say.

**(4) Assessment of the description of the proposed methodology and its applicability:**

a) *State whether the proposed methodology has been described in an adequate manner:*

The dispatch simulation model itself is not described as the availability of a model that reasonably describes the hydrothermal interconnected power system operation a dispatch model is assumed.

If the assumption is considered reasonable, the monitoring methodology was described in a adequate manner.

b) *State whether the proposed methodology is appropriate for the referred proposed project activity and the referred project context (described in Sections A - E of the draft CDM-PDD and*

*submitted along with CDM-NMM):*

Under the above assumption, yes.

*c) State whether this proposed monitoring methodology is compatible with the proposed baseline methodology described in CDM-NMB of the draft CDM-PDD:*

Under the above assumption, yes.

**(5) Leakage** *(please elaborate, if appropriate):*

No monitoring for leakage is considered as no associate leakage is assumed.

**(6) Quality assurance and control procedures** *(please explain):*

Part of the monitored data has QA/QC procedures defined by the electricity regulation entity. The rest of the data will be obtained from official sources with QA/QC procedures forecasted.

**(7) Potential strengths and weaknesses of the proposed monitoring methodology** *(please explain):*

The main potential strength and weakness of the methodology are due to the key dependence on official data sources. If available it is a strength, if not, the methodology is unfeasible.

**(8) Applicability of the proposed methodology across project types and regions** *(please indicate):*

The methodology is applicable to grid-connected renewable power generation project activities in a centrally dispatched hydrothermal electricity system, where there is an official source that provides verifiable and indisputable input data for simulation model.

**(9) Any other comments:**

*a) State whether any other source of information (i.e. other than documentation on this proposed methodology available on the UNFCCC CDM web site) has been used by you in evaluating this methodology. If so, please provide specific references:*

Various documents on approved and proposed methodologies available on the UNFCCC CDM website have been used.

*b) Indicate any further comments:*

Please revise the language of the text, as some passages are not completely clear, both grammatically and regarding the content.

Signature of desk reviewer .....

Date:    /    /

#### Information to be completed by the secretariat

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Date when the form was received at UNFCCC secretariat

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