CLEAN DEVELOPMENT MECHANISM
PROPOSED NEW METHODOLOGY: MONITORING (CDM-NMM)
Version 01 - in effect as of: 1 July 2004

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SECTION A. Identification of methodology

A.1. Title of the proposed methodology:

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

A.2. List of category(ies) of project activity to which the methodology may apply:

The UNFCCC has not provided a list of categories of project activities. Therefore, it is proposed to use the categories used for the accreditation of operational entities. Following this criterion, the category of project activity to which the methodology may apply is the Sectoral Scope 1 corresponding to "Energy industries (renewable / non-renewable sources)."

A.3. Conditions under which the methodology is applicable to CDM project activities:

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.

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.

A.4. What are the potential strengths and weaknesses of this proposed new methodology?

Since there are no methodologies approved by the UNFCCC, at this time, specific to this type of projects, the strengths and weaknesses of the methodology need to be evaluated on their own merits.

The ***strengths*** of the methodology are:

- Simple and easy to use, based on data normally already collected at the project site.
- Data on electricity generation is good and accessible.
- Complete compatibility with calculation of baseline emissions.
- Baseline emissions are automatically determined in a dynamic manner, based on electricity generation data, in the spreadsheet model associated with the monitoring plan.
- The spreadsheet model permits GHG emission reductions to be automatically calculated, taking into account the above considerations.

- The emission intensity of the electricity system may be monitored *ex post*, which allows a relative accurate estimation of emission reductions.

The ***weaknesses*** of the methodology are:

- Running the model every year requires excess monitoring procedures.
- The dynamic calculation of emissions from thermal plants involves the adjustment of parameters *ex post*.

SECTION B. Proposed new monitoring methodology

B.1. Brief description of the new methodology:

This methodology was specifically developed for the case involving a new renewable power plant to be connected to a centrally dispatched hydrothermal interconnected power system.

This methodology is closely related to the proposed new baseline methodology denominated "Baseline methodology for new capacity that displaces electricity generation in a centrally dispatched hydrothermal interconnected power system."

The monitoring plan permits the determination of anthropogenic GHG emissions generated by the project activity, and in the baseline, in a straightforward manner.

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.

GHG emissions following project implementation are determined from the above data. The baseline emissions basically comprise CO_2 emissions from fossil fuel (e.g. natural gas, coal, fuel oil, etc.) combustion in the thermal plants. There are also some methane and nitrous oxide emissions from fossil fuel combustion. In the case of new hydroelectric plants, project emissions are due to the construction of the power plant (which take place before power generation takes place) and methane emissions from the reservoir (which are assumed to be constant in time in this model). Thus, project GHG emissions are *entirely determined* before project implementation and remain unchanged throughout the crediting period.

However, baseline emissions are determined in a dynamic manner from monitored data, which also permit estimation of emission reductions achieved by the project activity. This type of project will require only straightforward collection of data, described below.

Considering the project boundary, the following data need to be monitored in order to estimate baseline emissions and emission reductions:

GHG related data:
- Simulation model input data.
- Monthly electricity generation of the project power plant. (The generation company is likely to be taking measurements every hour, but only monthly results will be considered.)
- Monthly electricity generation of all thermal plants serving the interconnected national system.

- The share of thermal and hydro-electricity in the grid.
- Changes of power plant emission factors (e.g. due to efficiency improvements, retrofits, inclusion of new plants, plant shutdown, fuel substitution, power capacity redefinitions, etc.), including reported annual thermal plant specific consumptions for each fuel and its corresponding lower heating value.

Non-GHG related data:

- The generation company should execute an Environmental Management Plan in order to deal with environmental, social and economic aspects of the region and their inhabitants.

In order to register monitoring data a spreadsheet model is proposed. This spreadsheet takes monitored data as input, and automatically calculates baseline emissions, for each year following project implementation, in a dynamic manner.

The spreadsheet model is an electronic GHG monitoring and calculation workbook for electricity generation projects to be connected to a national interconnected grid. The electronic workbook serves as the data management and analysis system for the project managers and operators, and can be used throughout the lifetime of the project.

The spreadsheet is structurally very similar to that used in order to determine baseline emissions and estimate emission reductions. Baseline emissions depend on electricity generation of the project activity and electricity generation of all thermal plants, and are determined in a dynamic manner from data entered into the spreadsheet. The spreadsheet thus also determines emissions reductions as a result of project implementation.

The staff responsible for Project monitoring should complete the electronic worksheets on a monthly basis. Given that some of these data may be collected more frequently, data need to be aggregated to allow monthly inputs into the spreadsheet. The spreadsheet automatically provides annual totals in terms of GHG reductions achieved through the implementation of the project.

The spreadsheet determines the emissions associated with project implementation. The model contains a series of worksheets with different functions:

- Data entry sheets:
  - *Historical hydrological series.*
  - *Annual electricity demand.*
  - *Power plant and grid configuration data.*
  - *Thermal power plant specific consumptions of each fuel.*
  - *Lower heating value of each fuel.*
  - *Monthly electricity generation of the project activity.*
  - *Monthly electricity generation of each thermal plant in the interconnected system.*
  - *Annual share of thermal and hydro-electricity in the grid.*
- Calculation sheets:
  - *Monthly thermal power plant emission factors.*

- *Monthly and annual electricity generation of each thermal plant in the interconnected system, and the total.*
- *Monthly and annual CO_2-equivalent emissions associated with each thermal plant, and the total.*
- *Monthly difference between actual total thermal generation and that obtained from the simulation model.*
- *Monthly difference between actual project generation and that obtained from the simulation model.*
- *Annual total CO_2-equivalent emissions in the baseline.*

- Result sheet:
  - *Annual reduction of CO_2-equivalent emissions.*

B.2. Option 1: Monitoring of the emissions in the project scenario and the baseline scenario:

B.2.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:								
ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

There are no project emissions that require monitoring, except for the case of geothermal sources. Project participants shall use the consolidated methodology ACM0002 to accout for project emissions for this kind of project activity. They shall refer latest approved version of this methodology. Currently ACM0002 corresponds to the to Version 1, “Approved consolidated methodology for grid-connected electricity generation from renewable sources”, 3 September 2004, EB15; specifically, pages 16 to 18.

B.2.2. Description of formulae used to estimate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Project emissions

a) Methane emissions due to biomass decomposition in flooded areas by the project:

Since some confusion remains over this issue, mainly as a consequence of disregarding the project scale into the discussion, an extremely conservative assumption is proposed, consisting of bounding methane emissions by an upper limit extracted from literature.

For example, Hydro Québec[1] has collected information from several serious studies and provide methane emission factors for different kind of power plants in terms of electricity output, when the so-called life-cycle assessment is carried out, including emissions from fuel extraction, processing and transportation, as well as from power plant construction and electricity generation. The result obtained by applying this proposal must be compared with other already suggested approaches and with emissions one step upstream estimated independently in a more direct way.

The annual average methane emissions can be estimated by:

Emissions (tonne CO_2e/year) = Generation (GWh/year) × Emission factor (tonne CO_2e/GWh) (B.2.1)

This methodology proposes to use the World Bank approach,[2] whereby methane emissions can be estimated from equation (B.2.2), below. Hydro Québec values can be optionally considered as a cross check.

Flooding of land due to the construction of hydroelectric dams and reservoirs, construction or preservation of wetlands, or other land-use activities results in emissions of CH_4 generated by the anaerobic decomposition of (1) vegetation on the flooded land, (2) vegetation that re-grows in the water, dies, and settles to the bottom, and (3) soil carbon.

Methane emissions from the flooding of land are calculated as the product of (1) the area of land to be flooded, (2) the number of days per year that the land is flooded, and (3) an average daily CH_4 emission rate. This rate, expressed in units of mg CH_4-C/m^2-day, varies according to land type, climate, and duration of flooding.

Annual emissions of methane are calculated according to equation (B.2.2). As explained above, in spite of the fact that the flooded area does not give rise to organic matter decomposition, a precautionary value is even reported.

[1] Greenhouse Gas Emissions from Power Generation Options, by Luc Gagnon, Hydro Québec (January 2003). http://www.hydroquebec.com/environment.

[2] Greenhouse Gas Assessment Handbook, A Practical Guidance Document for the Assessment of Project-level Greenhouse Gas Emissions, Paper Nº 064, Sept. 1998, The World Bank.

Area of Flooded Land		Duration of Flooding		Average Daily CH_4 Emission Rate		Conversion Factor		Molecular/ Atomic Weight Ratio		Annual CH_4 Emissions Produced
	×		×		×		×		=	
(m^2)		(days/year)		(mg CH_4-C/m^2-day)		(tonne/mg)		(tonne CH_4/ton CH_4-C)		(tonne CH_4/year)

Estimation of methane emissions from land flooding (B.2.2)

b) Fugitive emissions of CH_4 and CO_2 for geothermal[3] project activities:

Project participants shall use the consolidated methodology ACM0002 to deal with project emissions realted to geothermal sources. Monitoring procedures and plan shall follow he guidance provided by ACM0002.

[3] This type of project activities shall refer to ACM0002, from which the current procedure was extracted.

B.2.3. Relevant data necessary for determining the baseline of anthropogenic emissions by sources of greenhouse gases (GHG) within the project boundary and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
B.1	Historical hydrological series	Hydrological stations	m^3/s	m	monthly	100%	Electronic and Paper	
B.2	Power plant and grid configuration data (a big set of parameters)	National Dispatch Center	-	m	yearly	100%	Electronic and Paper	
B.3	Annual electricity system demand *D*	Ministry of Energy	*GWh/year*	m	yearly	100%	Electronic and Paper	Data will be monitored monthly although annual values will be used for calculation
B.4	Annual electricity generated by the project power plant g_P	Project developer	*GWh/year*	m	monthly	100%	Electronic and Paper	Data will be monitored monthly although annual values will be used for calculation
B.5	Annual electricity generated by thermal power plant *n* g_n	National Dispatch Center	*GWh/year*	m	monthly	100%	Electronic and Paper	Data will be monitored monthly although annual values will be used for calculation

B.6	Specific consumption of thermal power plant *n* for the fuel *f* * $sc_{n,f}$	Generators	*tonne fuel/GWh*	m	monthly	100%	Electronic and Paper	This data can result unnecessary if emission factors are provided
B.7	Lower heating value of fuel *f* * LHV_f	Fuel distribution company	*TJ/ktonne fuel*	m	monthly	100%	Electronic and Paper	This data can result unnecessary if emission factors are provided
B.8	Share of thermal and hydro-electricity in the grid	National Dispatch Center	-	m	yearly	100%	Electronic and Paper	

* Eventually, total fuel consumption could be needed instead of specific consumptions and lower heating values.

B.2.4. Description of formulae used to estimate baseline emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

The baseline is supposed to be applied to electricity generation projects in centrally dispatched interconnected hydrothermal systems, under the assumption that the project displaces a portion of thermal energy that would have been delivered by other thermal plants serving the system in the absence of the proposed project activity.

The following steps identify the baseline methodology.

Step 1

Collect data needed to run the simulation dispatch model. These data are obtained from verifiable and/or official sources. National and sectoral circumstances influencing the baseline are included in this step, gathering information on characteristics of the interconnected electricity system, historical trends and activity levels, capacity expansion plans, prospective analyses on future electricity demand, fuel prices, unavailability of generation plants and transmission lines, programmed maintenance activities, energy reserves, historical hydrology, scenario analysis under political and economic trends of the sector and the country, relevant data for estimating emission factors (net calorific values, physical properties and chemical composition of fuels, specific emission factors for fuels used in the local industry, efficiencies, etc.). See Section E.2 and step 3 below.

Step 2

Estimate the power plant emission factors per unit of generated energy for the fuel *f*, based on local or national data and eventually using default values from international sources (IPCC, International Energy Agency, etc.). The already collected necessary data in step 1 is going to be used in this step. Equation (D.6.1) proposes an alternative way of estimating the emission factors, $ef_{n,f}$, corresponding to each thermal power plant centrally dispatched in the interconnected system.

$$ef_{n,f}\,(tonne\ CO_2\,/\,GWh) = sc_{n,f}\,(ktonne\ fuel\,/\,GWh) \times EF_f\,(tonne\ CO_2\,/\,TJ) \times LHV_f\,(TJ\,/\,ktonne\ fuel) \times OF_f, \qquad \text{(D.6.1)}$$

where $sc_{n,f}$ is the specific consumption of the plant *n* for the fuel *f*, EF_f is the carbon dioxide emission factor of the fuel *f*, and LHV_f is the lower heating value of the fuel *f*. These factors are adjusted for incomplete combustion, OF_f, taking into account combustion efficiency default values for the different fuels burned in thermal power plants. Other alternatives can be used, depending on the initial data that can be obtained. In the absence of reliable base information, IPCC default values should be used, from the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories.

Emission factors are going to be recalculated every time there are relevant changes in the power plants of the electricity grid (e.g. due to efficiency improvements, retrofits, inclusion of new plants, plant shutdown, fuel substitution, power capacity redefinition, etc.) and the information is available. These emission factors shall be revised every year, when the dispatch model is re-run.

Step 3

Load input data into the software platform to run the simulation model. These data include, among others (see a complete set of parameters in Section E.2 below):

a. Configuration and topology of the power plants belonging to the interconnected system and operating data. This includes technical data of the power plants and the system; identification of the centrally dispatched power plants; specific technology; nominal and net capacity; water flow, production factor and storage capacity of hydro plants; fuel efficiencies and specific consumption of thermal plants; bar and load data of the transmission lines; etc. (Section E.2 deals with these data in more detail).
b. Historical hydrology of the year for which the simulation is run.
c. Electricity demand of the year for which the simulation is run.
d. Load curve discriminated in five hourly demand blocks.
e. Annual distribution of new plants according to the Reference Expansion Plan prior to project implementation (for the simulation without the project activity, step 5 below) and actual additions to the system (for the simulation with the project activity, step 6 below).

Step 4

Build margin: In order to determine the influence of the project in investment decisions and the impact it causes delaying the construction of new power plants, the following approach applies.

Sub-step 4.1.1. Identify and list the power plants that are going to enter into operation for every year during the period covered by the expansion plan.

Sub-step 4.1.2. Set the date of entering into operation of the power plants listed in sub-step 4.1.1 (according to the dates established in the expansion plan), which will remain fixed for the entire period covered by the expansion plan. That is, every year when the dispatch model is run, the above listed set of plants will be loaded into the simulation (under the assumption that they belong to the sceanrio that would have occurred in the absence of the porject activity). Actual evolution of the system additions should reflect the delay introduced by the presence of the proposed project activity. This is a conservative assumption, because the situation that will typically happen in practice is that power plants are actually delayed more time than the one expected to occur due to build margin effects. In that case, the baseline is including more efficient power plants (under the logical assumption that the expansion plan is tending to increase efficiency of the system). Therefore, baseline emissions are lower than those that would have been ocurred, thus lowering emission reductions of the project. Otherwise, build margin effects would have been not relevant at all, but even in this case the approach is conservative.

Operating margin:

Step 5

Run the simulation model without including the project and considering the latest expansion plan published just prior[4] to project implementation. The additions considered in this expansion plan will be fixed and used for running the dispatch model every year, during the period covered by the expansion plan. After the end of this period, the simulation shall be run with the power plant system composition that have occurred every year (the same used for the simulation that includes the project).

[4] This plan can be the most recent expansion plan published by an official and reliable source (e.g. a government agency), but not beyond the last two years (i.e. a project activity that starts operation in 2006 shall use the latest expansion plan, which could be the one corresponding to the years 2004, 2005, or 2006).

Step 6

Run the simulation model including the project and the capacity additions that have occurred during the year that is used in the *ex post* simulation. This procedure shall be repeated every year during the crediting period.

Step 7

Gather the outputs (daily power plants generation, $\tilde{g}_{n\pm}$, where "+" stands for the simulation with the project and "–" without the project) in order to estimate relevant emissions from steps 5 and 6, formatted in MS Excel files on a monthly and yearly easily-to-handle basis. Here, "~" stands for variables estimated through the simulation model, to distinguish them from the same variables obtained in real conditions.

This step can be considered the first step of the methodology after running the simulation model (the model is an already sound computer program, and only input and output are relevant).

Step 8

Calculate annual emissions of thermal power plant *n*, $\tilde{e}_{n+}$, for the simulation performed in step 6.

$$\tilde{e}_{n+}\,(tonne\ CO_2\,/\,year) = \sum_{f} \tilde{g}_{n+,f}\,(GWh\,/\,year) \times ef_{n,f}\,(tonne\ CO_2\,/\,GWh), \qquad \text{(D.6.2)}$$

where $\tilde{g}_{n+,f}$ is the electricity generated by the thermal power plant *n* in a year, while consuming the fuel *f* (in case that more than one fuel is consumed by the power plant *n*). For the sake of simplicity, from now on it goes without saying that different fuels can be involved in $\tilde{g}_{n+}$.

Step 9

Calculate total CO_2 emissions per year, $\tilde{E}_{+}^{(th)}$, of the thermal power plants serving the system from results derived in step 8.

$$\tilde{E}_{+}^{(th)}\,(tonne\ CO_2\,/\,year) = \sum_{n=1(th)}^{N} \tilde{e}_{n+}\,(tonne\,CO_2\,/\,year)\,, \qquad \text{(D.6.3)}$$

where *N* is the number of thermal plants in the system and the sum extends only over thermal (*th*) plants.

Step 10

Calculate the total amount of thermal electricity generated in a year, $\tilde{G}_{\pm}^{(th)}$, from results of steps 5 and 6 (with (+) and without (–) the project).

$$\tilde{G}_{\pm}^{(th)}\,(GWh\,/\,year) = \sum_{n=1(th)}^{N} \tilde{g}_{n\pm}\,(GWh\,/\,year)\,. \qquad \text{(D.6.4)}$$

Step 11

Obtain the annual average CO_2 emissions, $\langle \widetilde{E} \rangle_+$, of the thermal plants serving the system, combining steps 9 and 10.

$$\langle \widetilde{E} \rangle_+ (tonne\ CO_2 / GWh) = \widetilde{E}_+^{(th)}\ (tonne\ CO_2 / year) \,/\, \widetilde{G}_+^{(th)}\ (GWh / year). \qquad (D.6.5)$$

Step 12

Calculate the thermal generation displacement factor, $\widetilde{F}$, as the rate between the difference of the energies obtained in step 10 (‘without the project’ minus ‘with the project’) over the energy generated by the project itself.

$$\widetilde{F} = \frac{\widetilde{G}_-^{(th)} - \widetilde{G}_+^{(th)}}{\widetilde{g}_P}. \qquad (D.6.6)$$

$\widetilde{F}$ is the only parameter obtained from simulation model results. It allows one to correlate emissions, when the power system includes the proposed project activity, with those that would have occurred in the absence of the proposed project activity. $\widetilde{G}_+^{(th)}$ and $G_+^{(th)}$ as well as $\widetilde{g}_P$ and g_P shall be compared during monitoring in order to decide whether $\widetilde{F}$ remains realistic.

Step 13

Calculate baseline emissions.

Baseline emissions are defined as:

$$E_B \equiv g_P \times \langle \widetilde{F} \rangle \times \langle E \rangle_+ . \qquad (D.6.7)$$

The last equation is the key equation of the proposed methodology. It reads: baseline emissions represent the amount of thermal plant emissions displaced by the project activity, where $\langle \widetilde{F} \rangle$ accounts for the fraction of this thermal energy with respect to the energy generated by the project; $(1 - \langle \widetilde{F} \rangle)$ is the hydroelectric energy displaced by the project. Moreover, $\langle \widetilde{F} \rangle \times \langle E \rangle_+$ can be considered as a system emission factor, $\langle E \rangle_{sys}$, which includes part of the hydroelectric contribution. Every year a new value of $\langle \widetilde{F} \rangle$ is calculated running the simulation model again to update results with actual data. This is an important step since hydrothermal systems with reservoirs storing water for use during dry seasons alter the marginal dispatch by shifting thermal emissions and thus making unviable an estimation of emission reductions as that achieved by displacing marginal plants on a hourly or daily basis. The simulation

model itself provides reliable outputs when considering the long-term behaviour of the hydrothermal system. This is one of the main characteristics of the systems to which the methodology applies.

Recall that $\langle \tilde{F} \rangle$ is different from 1 because a part of the displaced energy generation is also hydroelectric, due to the value of water and consequent storage by hydropower generators, implying that some hydro plants are at the margin (this is one of the main characteristics of a hydrothermal interconnected system), and also because a part of thermal energy cannot be displaced due to transmission capacity limitations.

No ~ is written in $\langle E \rangle_+$ and g_P since they are calculated in actual conditions. $\langle \tilde{E} \rangle_+$ and $\tilde{g}_P$ are only used from the model in order to perform the first estimation of baseline emissions, but not for monitoring purposes.

The factor $\langle \tilde{F} \rangle$ includes the information about the situation that would occur without implementing the proposed project activity. But this situation never happens in reality, then the methodology, Equation (D.6.7), provides a way to estimate avoided emissions due to the project activity, monitoring *ex post* variables and fixing a parameter. The advantage of this formulation is motivated by the fact that, under actual conditions, it is not possible to obtain power plant generation, g_{n-} (since they can only be estimated through the simulation model). The parameter fixed through the simulation has less sensitivity to variations in real conditions, since $\langle \tilde{F} \rangle$ is based on the difference between correlated scenarios (under the same assumptions and input data).

Running the simulation model again, after actual conditions have happened every year, allows obtaining more accurate baseline emissions, but nevertheless depending on the simulation of a situation that does not happen in reality but that can be strongly correlated to actual conditions regarding hydrology, demand, and system capacity.

Output results can be obtained in a daily, monthly, or yearly basis. It is recommended to use a monthly basis –to save disk space– and thus combining these data to obtain annual values. This completes the overall description of the proposed baseline methodology steps.

To improve accuracy the simulation model shall be re-run every year based on updated data.

B.3. Option 2: Direct monitoring of emission reductions from the project activity:

N/A

B.3.1. Data to be collected or used in order to monitor emissions from the project activity, and how this data will be archived:

ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e),	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

B.3.2. Description of formulae used to calculate project emissions (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

B.4. Treatment of leakage in the monitoring plan:

No leakage is perceived to occur under this approach.

B.4.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project activity:

ID number *(Please use numbers to ease cross-referencing to table B.7)*	Data variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

B.4.2. Description of formulae used to estimate leakage (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

N/A

B.5. Description of formulae used to estimate emission reductions for the project activity (for each gas, source, formulae/algorithm, emissions units of CO_2 equ.):

Emission reductions are given by:

$$ER = E_B - E_P = g_P \times \langle \widetilde{F} \rangle \times \langle E \rangle_+ - E_{Pr} - E_{Ps} - E_{Pf} \qquad \text{(B.5.1)}$$

Baseline emissions are given by Eq. (B.2.10) and project emissions are fixed *ex ante* using the baseline methodology.

B.6. Assumptions used in elaborating the new methodology:

The monitoring methodology and its application is compatible with the baseline methodology and the development of the baseline scenario for this type of project.

The assumptions regarding heating values, specific fuel consumptions, and emissions factors of fuels used in the thermal power plants are country specific and should be established in the PDD.

The table below describes QA/QC procedures for with each data variable, together with additional relevant information on each variable.

B.7. Please indicate whether quality control (QC) and quality assurance (QA) procedures are being undertaken for the items monitored:		
Data *(Indicate table and ID number e.g. 3.-1.; 3.2.)*	Uncertainty level of data (High/Medium/Low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.
B.1	Medium	These data will be taken from hydrological stations, and those reporting to the National Dispatch Center.
B.2	Medium	These data will be taken from the National Dispatch Center.
B.3	Low	These data will be obtained from official sources.
B.4	Low	These data will be directly used for calculation of emissions reductions. QA/QC procedures are those requested by the electricity regulation entity.
B.5	Low	These data will be used as supporting information to calculate emission reductions by project activity. QA/QC procedures are those requested by the electricity regulation entity.
B.6	Medium	These data will be updated when it is necessary. Information cross-check shall be used to assure and control quality.
B.7	Medium	These data will be updated when it is necessary. Information cross-check shall be used to assure and control quality.
B.8	Low	These data serve for controlling model assumptions along time. National entities provide these data on a quite reliable basis.

QA/QC procedures are partially adapted from existing procedures in the project sponsor company (commonly ISO standard) and other are complemented in the MVP spreadsheet and presented to the Designated Operational Entity in charge of validating the project. Interconnected systems are regulated by a national regulation entity, which settles QA/QC procedures for measuring and reporting activity data in a standardized form, so that the system itself is periodically audited by the regulation entity and by the own generators, since business are involved in the electricity market and accuracy and quality are essential to guarantee that the system works. For the same reason, generators and the entities regulating fuel policies serve also as a way to assure and control quality. If one of the actors of the electricity system behaves out of the QA/QC procedures, the system detects it almost automatically, since its bad behavior negatively affects the rest of the operators.

B.8. Has the methodology been applied successfully elsewhere and, if so, in which circumstances?

The proposed methodology has not been previously applied.

Standard procedures for calibrating metering devices used to measure power plant electricity output are already a part of routine good practices of all generators in the electricity market.

With minor modifications, the spreadsheets can be adapted to unforeseen variations in the key parameters (corrective actions).

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