Project design document form

(Version 11.0)

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION	
Title of the project activity	Cachoeirao CDM Project (JUN1092)
Scale of the project activity	☒ Large-scale ☐ Small-scale
Version number of the PDD	3
Completion date of the PDD	29/06/2020
Project participants	Hidrelétrica Cachoeirão S.A.; Carbotrader Assessoria e Consultoria em Energia Eireli
Host Party	Brazil
Applied methodologies and standardized baselines	Methodology ACM0002 "Grid-connected electricity generation from renewable sources " version 20.0
Sectoral scopes	Sectoral scope: 1 - Energy industries (renewable - / non-renewable sources)
Estimated amount of annual average GHG emission reductions	34,059 tCO_2e

SECTION A. Description of project activity

A.1. Purpose and general description of project activity

>> The present project activity is the generation of electricity by renewable source (hydroelectric source) through construction of a Small Hydro Power plant (SHP) called Cachoeirão.

The total power installed SHP capacity is 28.05 MW and is located in the Manhuaçu River between the Pocrane and Alvarenga cities, Minas Gerais state in Brazil south-east region.

This enterprise has as main goal the generation of electricity that must be delivered to the National Interconnected System (SIN) compensating the thermal generation from fossil fuels in this system with the generation of renewable electricity. The SHP construction objective also helps meet the growing demand for energy in Brazil.

The project boundary is the area where the project is located which includes the reservoirs, dams, powerhouses included the turbines, generators, substations, metering systems and the National Interconnected Grid.

The baseline scenario is electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM) calculations described in "TOOL07: Tool to calculate the emission factor for an electricity system".

There are forecasted annual average emission reductions of 34,059 tCO_2e and a total of 238,415 tCO_2e during the total crediting period (7 years).

Moreover, help with the supply of electricity contributing to environmental sustainability by increasing the share of renewable energy in relation to total consumption of electricity in Brazil.

Considering that the project activity consists in a SHP with a small reservoir (1.021 km^2), it is virtually zero environmental impact when compared to large hydroelectric facilities. This fact is important because the construction of Small Hydro Power plants contributes to efficient use of natural resources and environment, thus avoiding the growth of environmental and social liabilities caused by new large hydroelectric plants.

In regard to project contribution for Greenhouse Gas emissions (GHG) avoidance, the project activity reduces emissions of these gases prevent the entry into operation of thermoelectric plants that use fossil fuels as energy inputs. In the absence of the project activity, fossil fuels would be burned in thermoelectric plants which are interconnected to the grid. The project activity initiative helps Brazil to meet its goals of promoting sustainable development.

The project activity is also aligned with the specific requirements of the CDM (Clean Development Mechanism) of the host country, because:

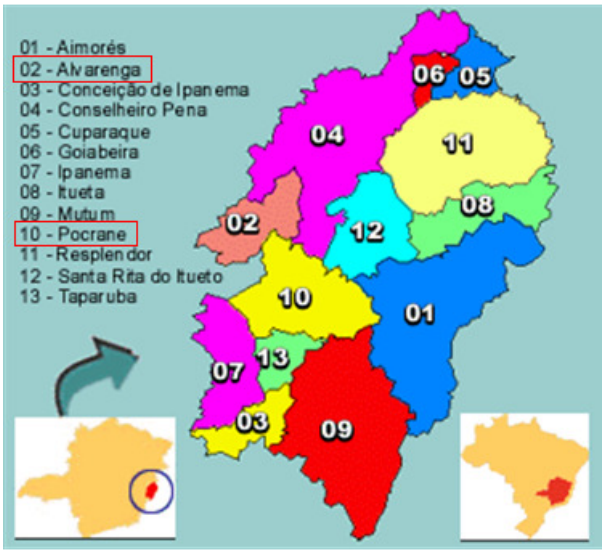
- It contributes to environmental sustainability with the avoidance to the use of fossil energy (non-renewable sources). Thus the project contributes to better use of natural resources with clean and efficient technologies;
- It contributes to better working conditions and increases the employment opportunity in rural area where the project is located;
- It contributes to better local economy, because the use renewable energy reduces fossil fuel dependence; reduce the amount of pollution and the associated social costs related to it.

A.2. Location of project activity

>> Southeast Region / Minas Gerais State – Brazil

The project activity is located in Manhuaçu River between Pocrane and Alvarenga cities, Minas Gerais State, Brazil. The dam geographical coordinates are: 19º 26' 12" S e 41º 36' 51" W. Below the Figure 1 illustrates the enterprise location:

Figure 1: Geographical location of Pocrane and Alvarenga cities.



Source: Wikipedia - pt.wikipedia.org and City Brazil - www.citybrazil.com.br[1]

A.3. Technologies/measures

The technology used in the enterprise is the Manhuaçu River (Rio Doce Basin) hydro energy, the gravitational energy of water is used to move the turbines and doing this, trigger generators that enable the electricity generation. This is a source of clean energy and renewable that presents minimal impact over the environment.
The SHP Cachoeirão is a venture classified as Small Hydro Power Plant because according to the Brazilian Resolution #652 of 09/12/2003 from National Electric Energy Agency (ANEEL), to be considered a SHP the reservoir area must be less than 3 Km^2 (300 ha) and the total installed capacity between 1 MW to 30 MW. The SHP Cachoeirão has 1.021 Km^2 of reservoir area and total installed capacity of 28.05 MW, so the power density is 27.47 W/m^2 (in accordance with CDM meth rules). The venture is also called a **"run of river"** plant which does not include significant water stocks.

The SHP Cachoeirão will dispatch generated energy to National Interconnected Grid (SIN - Sistema Interligado Nacional) through Conselheiro Pena Substation (far 32.8 Km from the SHP dispatch substation, 69 KV voltage) located in the Conselheiro Pena city, Minas Gerais state, Brazil.
The technology and equipment used in the project activity are developed and manufactured in Brazil so are not expected transfer of know-how or technology to the host country.

The emissions sources and GHGs involved are CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity and emissions of CH_4 from the reservoir.

The technical characteristics of equipment that will be implemented in the SHP are summarized in

[1] City Brasil – Percorrendo o Brasil de A a Z (A to Z walking Brazil). http://www.citybrasil.com.br

Table 1 below:

Table 1 : SHP technical characteristics

SHP Cachoeirão	
Installed Power (MW)	28.05
Single Reservoir (Km^2)	1.021
Plant Load Factor (MW)	16.37
Flow Rate River Average (m3/s)	47
Turbines	Francis, horizontal
Quantity	3
Power (kW)	9,300
Flow Rate (m3/s)	22.45
Rotation (rpm)	360
Generator	Synchronous, horizontal
Quantity	3
Nominal Power (kVA)	11,000
Effective Power (kW)	9,350
Voltage (kV)	13.8
Load Factor	0.85
Frequency (Hz)	60

The baseline scenario to the project activity is the same as the scenario existing prior to the start of implementation of the project activity.
More details on Section A.1. above.

A.4. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Brazil	Hidrelétrica Cachoeirão S.A **Private entity**	No
	Carbotrader Assessoria e Consultoria em Energia Eireli **Private entity**	

A.5. Public funding of project activity

>> The project activity did not receive public funding from Parties included in Annex I

A.6. History of project activity

>>

1. Confirm that:

   The proposed CDM project activity is neither registered as a CDM project activity nor included as a component project activity (CPA) in a registered CDM programme of activities (PoA) - **Not applicable.**

   (a) The proposed CDM project activity is not a project activity that has been deregistered – **Not applicable.**

2. Declare whether:

(a) The proposed CDM project activity was a CPA that has been excluded from a registered CDM PoA **– Not applicable.**
(b) A registered CDM project activity or a CPA under a registered CDM PoA whose crediting period has or has not expired (hereinafter referred to as former project) exists in the same geographical location as the proposed CDM project activity **– Not applicable.**
(c)

If the declaration on 2(a) or 2(b) above is positive, demonstrate that the proposed CDM project activity meets all conditions for registration in accordance with the applicable provisions in the project standard relating to registration of an excluded CPA as a CDM project activity or registration of a project activity that is in the same geographical location as a former project.

A.7. Debundling

>> This is a Large scale project activity, so **not applicable.**

SECTION B. Application of selected methodologies and standardized baselines

B.1. References to methodologies and standardized baselines

Approved baseline and monitoring methodology:

ACM0002 – "Grid-connected electricity generation from renewable sources" - Version 20.0
Link: https://cdm.unfccc.int/methodologies/DB/XP2LKUSA61DKUQC0PIWPGWDN8ED5PG

Furthermore, the following tools are also applied to the second crediting period of the project activity:

TOOL 05: "Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" – Version 03.0
Link: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-05-v3.0.pdf

TOOL 07: "Tool to calculate the emission factor for an electricity system", version 07.0
Link: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v7.0.pdf

TOOL 11: "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period", version 03.0.1
Link: https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-11-v3.0.1.pdf

B.2. Applicability of methodologies and standardized baselines

>>
The ACM0002 methodology is applicable to grid-connected renewable energy power generation project activities that:

(a) Install a Greenfield power plant – **applicable to this PA**;
(b) Involve a capacity addition to (an) existing plant(s) – **not applicable to this PA;**
(c) Involve a retrofit of (an) existing operating plants/units – **not applicable to this PA**.;
(d) Involve a rehabilitation of (an) existing plant(s)/unit(s) – **not applicable to this PA**.; or
(e) Involve a replacement of (an) existing plant(s)/unit(s) – **not applicable to this PA**.

Also the methodology is applicable under the following conditions:

(a) The project activity may include renewable energy power plant/unit of one of the following types: hydro power plant/unit with or without reservoir, wind power plant/unit, geothermal power plant/unit, solar power plant/unit, wave power plant/unit or tidal power plant/unit – **applicable to this PA (hydro power plant with reservoir).**
(b) In the case of capacity additions, retrofits, rehabilitations or replacements (except for wind, solar, wave or tidal power capacity addition projects) the existing plant/unit started

commercial operation prior to the start of a minimum historical reference period of five years, used for the calculation of baseline emissions and defined in the baseline emission section, and no capacity expansion, retrofit, or rehabilitation of the plant/unit has been undertaken between the start of this minimum historical reference period and the implementation of the project activity – **not applicable to this PA (no capacity additions, retrofit, rehabilitations or replacement).**

In case of hydro power plants, **one** of the following conditions shall apply:

(a) The project activity is implemented in existing single or multiple reservoirs, with no change in the volume of any of the reservoirs; or
(b) The project activity is implemented in existing single or multiple reservoirs, where the volume of the reservoir(s) is increased and the power density, calculated using equation (7), is greater than 4 W/m2; or
(c) The project activity results in new single or multiple reservoirs and the power density, calculated using equation (7), is greater than 4 W/m^2; - **applicable to this PA[2]**
(d) The project activity is an integrated hydro power project involving multiple reservoirs, where the power density for any of the reservoirs, calculated using equation (7), is lower than or equal to 4 W/m^2, all of the following conditions shall apply:

(i) The power density calculated using the total installed capacity of the integrated project, as per equation (8), is greater than 4 W/m^2;
(ii) Water flow between reservoirs is not used by any other hydropower unit which is not a part of the project activity;
(iii) Installed capacity of the power plant(s) with power density lower than or equal to 4 W/m^2 shall be:

a. Lower than or equal to 15 MW; and
b. Less than 10 per cent of the total installed capacity of integrated hydro power project.

In the case of integrated hydro power projects, project proponent shall:

(a) Demonstrate that water flow from upstream power plants/units spill directly to the downstream reservoir and that collectively constitute to the generation capacity of the integrated hydro power project; or
(b) Provide an analysis of the water balance covering the water fed to power units, with all possible combinations of reservoirs and without the construction of reservoirs. The purpose of water balance is to demonstrate the requirement of specific combination of reservoirs constructed under CDM project activity for the optimization of power output. This demonstration has to be carried out in the specific scenario of water availability in different seasons to optimize the water flow at the inlet of power units. Therefore, this water balance will take into account seasonal flows from river, tributaries (if any), and rainfall for minimum of five years prior to the implementation of the CDM project activity.

Booths, (a) and (b) criteria, are not applicable to this PA since this is not an integrated hydro power project.

The methodology is not applicable to:

(a) Project activities that involve switching from fossil fuels to renewable energy sources at the site of the project activity, since in this case the baseline may be the continued use of fossil fuels at the site - **not applicable to this PA (no fossil fuel).**
(b) Biomass fired power plants/units - **not applicable to this PA (no biomass).**

[2] The SHP Cachoeirão grid-connected construction is considered a renewable power generation plant with new single reservoir and Power Density greater than 4 W/m^2

In the case of retrofits, rehabilitations, replacements, or capacity additions, this methodology is only applicable if the most plausible baseline scenario, as a result of the identification of baseline scenario, is "the continuation of the current situation, that is to use the power generation equipment that was already in use prior to the implementation of the project activity and undertaking business as usual maintenance" - **not applicable to this PA (Greenfield).**

In addition, the applicability conditions included in the tools referred to below apply:

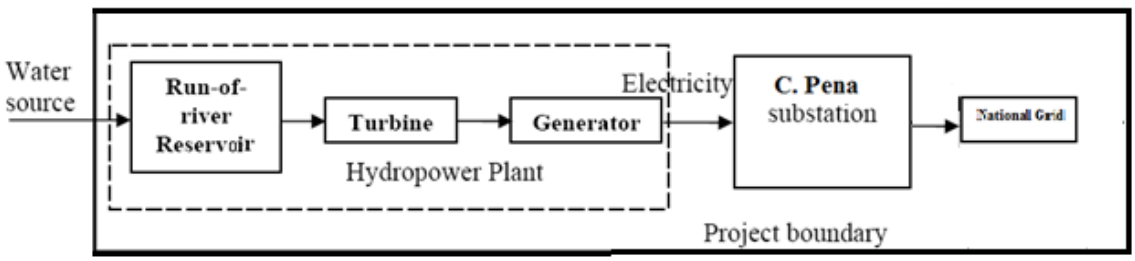
(a) "TOOL01: Tool for the demonstration and assessment of additionality" **– not used (PDD for 2nd credit period).**
(b) "TOOL02: Combined tool to identify the baseline scenario and demonstrate additionality" **– not used (PDD for 2nd credit period).**
(c) "TOOL03: Tool to calculate project or leakage CO2 emissions from fossil fuel combustion" **– not used (no fossil fuel sources).**
(d) "TOOL05: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation";
(e) "TOOL07: Tool to calculate the emission factor for an electricity system";
(f) "TOOL10: Tool to determine the remaining lifetime of equipment" **– not used (PDD for 2nd credit period).**
(g) "TOOL11: Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period";
(h) "TOOL32: Positive lists of technologies" **– not used (PDD for 2nd credit period).**

So the ACM0002 methodology is applicable and has included the standardized baseline.

B.3. Project boundary, sources and greenhouse gases (GHGs)

>>
The project boundary is the area where the project is located which includes the reservoir, dam, powerhouse included the turbines, generators, substation, metering systems and the National Interconnected Grid.

The diagram below presents the project boundary, main equipments and energy flow/balance:



Gases included: CO_2

Monitored Parameters: $EG_{facility,y}$ $EF_{grid,CM,y}$ Cap_{PJ} A_{PJ}

Regarding the project activity grid connection, the electricity will be dispatched to Conselheiro Pena substation – being this the connection point. The energy meters (main and backup) are also located in Conselheiro Pena substation.

The baseline emissions are related on B.6.1. Section with the tool to calculate the grid-connected emission factor[3].

[3] Comissão Interministerial de Mudanças Globais do Clima (CIMGC) – Interministerial Commission on Global Climate Change. "Tool to calculate the emission factor for an electricity system" - http://www.mct.gov.br/index.php/content/view/74689.html

The Power Density is greater than 10W/m^2. So, the project activity doesn't need to consider the emissions related to reservoir. (More details in Sections A.1 and B.6.1).

Source		Gas	Included?	Justification/Explanation
Baseline	CO_2 emissions from electricity generation in fossil fuel fired power plants that is displaced due to the project activity.	CO_2	Yes	Main emission source.
		CH_4	No	Minor emission source
		N_2O	No	Minor emission source.
Project activity	For dry or flash steam geothermal power plants, emissions of CH_4 and CO_2 from noncondensable gases contained in geothermal steam	CO_2	Yes	Main emission source. NA hydro power plant.
		CH_4	Yes	Main emission source. NA hydro power plant.
		N_2O	No	Minor emission source. NA hydro power plant.
	For binary geothermal power plants, fugitive emissions of CH_4 and CO_2 from noncondensable gases contained in geothermal steam	CO_2	Yes	Main emission source. NA hydro power plant.
		CH_4	Yes	Main emission source. NA hydro power plant.
		N_2O	No	Minor emission source. NA hydro power plant.
	For binary geothermal power plants, fugitive emissions of hydrocarbons such as n-butane and isopentane (working fluid) contained in the heat exchangers	Low GWP hydrocarbon/ refrigerant	Yes	Main emission source. NA hydro power plant.
	CO_2 emissions from combustion of fossil fuels for electricity generation in solar thermal power plants and geothermal power plants	CO_2	Yes	Main emission source. NA hydro power plant.
		CH_4	No	Minor emission source. NA hydro power plant.
		N_2O	No	Minor emission source. NA hydro power plant.
	For hydro power plants, emissions of CH_4 from the reservoir	CO_2	No	Minor emission source.
		CH_4	Yes	Main emission source – not considered since Power Density of the SHP is greater than 10 W/m^2
		N_2O	No	Minor emission source.

B.4. Establishment and description of baseline scenario

>>

According to the TOOL 11: "Assessment of the validity of the original/current baseline and update of the baseline at the renewal of the crediting period" a stepwise procedure to assess the continued validity of the baseline and to update the baseline at the renewal of a crediting period is necessary.

The tool consists of two steps. The first step provides an approach to evaluate whether the current baseline is still valid for the next crediting period. The second step provides an approach to update the baseline in case that the current baseline is not valid anymore for the next crediting period.

Step 1: Assess the validity of the current baseline for the next crediting period

The validity of the current baseline is assessed using the following Sub-steps:

Step 1.1: Assess compliance of the current baseline with relevant mandatory national and/or sectoral policies If the current baseline complies with all relevant mandatory national and/or sectoral policies which have come into effect after the submission of the project activity for validation or the submission of the previous request for renewal of the crediting period and are applicable at the time of requesting renewal of the crediting period, go to Step 1.2.

If the current baseline does not comply with relevant mandatory national and/or sectoral policies, then assess based on the examination of current practice in the country or region in which the policies apply, whether those policies are systematically not enforced and that non-compliance with those requirements is widespread in the country or region.

If the current baseline is not in compliance with the relevant mandatory national and/or sectoral policies or if it cannot be shown that the policies are systematically not enforced and that non-compliance with those policies is widespread in the country or region, then the current baseline needs to be updated for the subsequent crediting period.

The validity of the current baseline doesn´t need to be updated since still valid and in compliance with relevant mandatory brazilian policies. To summarize the SHP remains under the mandatory Brazilian policies below:

- Brazilian Resolution #652 of 09/12/2003 from National Electric Energy Agency (ANEEL) for Small Hydro Power Plant;
- ONS (*Operador Nacional do Sistema Elétrico*) module 12 rules/requirements. More details on Section B.7.3;
- CCEE SINERCOM Databank (electricity dispatched to the Grid). More details on Section B.7.3.

Step 1.2: Assess the impact of circumstances

Assess the impact of circumstances existing at the time of requesting renewal of the crediting period on the current baseline emissions, without reassessing the baseline scenario.
In the situation where the baseline scenario identified at the validation of the project activity was the continuation of the current practice without any investment, an assessment of the changes in market characteristics is required for the renewal of the crediting period.
Evaluate whether the conditions used to determine the baseline emissions in the previous crediting period are still valid. Assess the availability of new fuels or raw materials and the impact of electricity or fuel prices in the identification of the current practice for the baseline emissions;

If the new circumstances make a continued validity of the current baseline not plausible, then the current baseline needs to be updated for the subsequent crediting period.

The circumstances at the time of requesting renewal of the crediting period are the same described for the first crediting period as described just after the TOOL 11 evaluation on this section.

Step 1.3: Assess whether the continuation of use of current baseline equipment(s) or an investment is the most likely scenario for the crediting period for which renewal is requested.

This sub-step should only be applied if the baseline scenario identified at the validation of the project activity was the continuation of use of the current equipment(s) without any investment and, the projects proponents or third party (or parties) would undertake an investment later due, for example, to the end of the technical lifetime of the equipment(s) before the end of the crediting period or the availability of a new technology.
Assess whether the remaining technical lifetime of the equipment that would have continued to be used in the absence of the project activity, as determined in the CDM-PDD or CDM-PDD-REN, exceeds the crediting period for which renewal is requested.

Take into consideration the market penetration of different technologies. Evaluate the penetration rateof different technologies that are available in the market and evaluate how they could affect the baseline.

If the baseline scenario of the project activity is the continuation of use of the current equipment(s) without any investment and the projects proponents or third party(ies) will undertake an investment Later, but before the end of a crediting period, then the current baseline needs to be updated for that crediting period or the crediting of emission reductions should be limited to the period before the baseline equipment would cease its operation.

Not applicable since the technical lifetime of the main equipments from PA has more time than the end of the crediting period. The project proponents will not undertake an investment later before the end of crediting period.

Step 1.4: Assessment of the validity of the data and parameters

Assess whether data and parameters that were only determined at the start of the crediting period and not monitored during the crediting period are still valid or whether they should be updated.

Updates should be undertaken in the following cases:

• Where IPCC default values are used, the values should be updated if any new default values have been adopted and published by the IPCC, for example, in guidelines for national GHG inventories, IPCC assessment report or special reports by the IPCC;
• Where emission factors, values or emission benchmarks are used and determined only once for the crediting period, they should be updated, except if the emission factors, values or emission benchmarks are based on the historical situation at the site of the project activity prior to the implementation of the project and cannot be updated because the historical situation does not exist anymore as a result of the CDM project activity.

The emission factors should be updated since there are new values available.

Step 2: Update the current baseline and the data and parameters

This step is only applicable if any of the Steps 1.1, 1.2, 1.3 and/or 1.4 showed that the current baseline needs to be updated.

Step 2.1: Update the current baseline

Update the current baseline emissions for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology applicable to the project activity. The procedure should be applied in the context of the sectoral policies and circumstances that are applicable at the time of request for renewal of the crediting period.

Applicable, the current baseline emissions shall be updated for the subsequent crediting period, without reassessing the baseline scenario, based on the latest approved version of the methodology ACM0002.

Step 2.2: Update the data and parameters

If the application of Step 1.4 showed that the data and/or parameter(s) that were only determined at the start of the crediting period and not monitored during the crediting period are not valid anymore, project participants should update all applicable data and parameters, following the guidance in Step 1.4.

Applicable, the data and parameters shall be updated as described below and on Section B.7.1.

According to the methodology ACM0002, "if the project activity is the installation of a new grid-connected renewable power plant/unit, the baseline scenario is the following:
"The electricity delivered to the grid by the project would have otherwise been generated by the operation of a grid-connected power plant and by the addition of new generating sources, as reflected in the combined margin (CM) from "Tool to calculate the emission factor for an electricity system", described in the item B.6.1.2."
Also the baseline emissions are the kWh produced by the renewable generating unit multiplied by an emission coefficient, calculated in a conservative and transparent manner.

So in the Project activity absence, the electricity should be provided by the other grid-connected power plants included the fossil fuel based Power plants.

The project activity use as data source for National Interconnected System (SIN) Emission Factor calculation the operating margin and the build margin coefficients provided by the Designated National Authority (DNA) of the host country (public available).

The Emission Factor of CO_2 resulting from the generation of electric energy in the National Interconnected System (SIN) in Brazil is calculated based on generating records from plants centrally operated by the **National Electric System Operator (ONS)**, which includes thermoelectric plants that use fossil fuels as energy.

The method used to make this calculation is the method of dispatch analysis, which is the most appropriate in determining the emission factor of the electrical grid.

This information is needed for renewable energy projects connected to the electric grid and implanted in Brazil under the **Clean Development Mechanism (CDM)** of the Kyoto Protocol.

The data result from the work of the Electrical System Operator (ONS) of the Ministry of Mines and Energy (MME) and the Ministry of Science and Technology, which are available to proponents of CDM projects. Thus, they can be applied in calculating ex-ante emissions avoided by the project activity, where the emission reduction will be calculated ex-post.

Further details of the development of the project baseline can be viewed through the link: http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html.

More details in Section A.1. above.
More baseline facilities details on Section B.5. below.

B.5. Demonstration of additionality

>>
This item was elaborated based on the "ACM0002-Consolidated baseline methodology for grid connected electricity generation from renewable sources" - version 12.2.0 (valid from 17 September 2010 onwards) and the "Tool for the demonstration and assessment of additionality – version 06.0.0" prevailing the Methodology since this supersede the Tool.

Step 1: Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a: Define alternatives to the project activity:

According to the approved methodology, ACM0002 (Version 12.2.0/Sectoral Scope: 01, EB65), selected by the proposed project activity, the baseline scenario is "Electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generating sources, as reflected in the combined margin (CM) from 'Tool to calculate the emission factor for an electricity system'", described in the item B.6.1.

The Validation and Verification Manual from the CDM Executive Board states that “If the selected methodology requires use of tools (such as the “Tool for the demonstration and assessment of additionality” and the “Combined tool to identify the baseline scenario and demonstrate additionality”) to establish the baseline scenario, the DOE shall consult the methodology on the application of these tools.
In such cases, the guidance in the methodology shall supersede the tool.” [4].
Based on the information provided above, the approved methodology, ACM0002 prescribes the baseline scenario, so no further analysis is required, the credible and realistic alternatives are not needed to be identified in the PDD.
Only in the cases which "the project activity is the retrofit or replacement of existing grid-connected renewable power plant/unit(s) at the project site”, the same methodology determinates that a step-wise procedure to identify baseline scenario shall be used to identify alternative baseline scenarios for power generation. Therefore, considering that the SHP Cachoeirão is a new plant, no alternative scenarios shall
be used in the present project activity.

Sub-step 1b: Consistency with mandatory laws and regulations:

The SHP investment is in accordance with all regulations according to the following entities: National Electric System Operator (ONS - Operador Nacional do Sistema Elétrico), Electricity Regulatory Agency (ANEEL - Agência Nacional de Energia Elétrica), Minas Gerais Environmental Agency (FEAM - Fundação Estadual do Meio Ambiente) and the CDM Executive Board.

Step 2: Investment analysis

Determine whether the proposed project activity is not:

(a) The most economically or financially attractive; or
(b) Economically or financially feasible, without the revenue from the sale of certified emission reductions (CERs).

For the proposed project activity, the investment analysis determinates if the proposed project activity is
not economically/financially feasible without the revenues from the Certified Emission Reductions (CERs).

Sub-step 2a: Determine appropriate analysis method

In order to determine the appropriate analysis method, the following options are available to be used in
the additionality analysis:

- Option I - Apply simple cost analysis,
- Option II - Apply investment comparison analysis,
- Option III - Apply benchmark analysis

According to the Tool, if the CDM project activity and the alternatives identified in Step 1 generate financial or economic benefits other than CDM related income, then the investment comparison analysis (Option II) or the benchmark analysis (Option III) shall be used. The benchmark analysis will be applied, because it is most appropriated for this type of activity in Brazil. Moreover, the Option II shall be applied when there are credible alternative scenarios to the project activity, as there are no alternative to compare with the project’s indicator (Internal Rate of Return) the Option III shall be applied.

[4] CDM Executive Board, Clean Development Mechanism Validation and Verification Manual, Version 01.2, EB 55,Annex 1

So, the Option III was chosen.

Sub-step 2b: Option III. Apply benchmark analysis

The key indicator to be compared with the Benchmark should be the Project Activity Internal Rate Return (IRR), considered adequate to this kind of Project as well decision context. The financial indicator most appropriate for this type of project is the Internal Rate of Return (Project's IRR), because it is the compound rate of return annualized effective that can be obtained on invested capital.

To the Benchmark was considered the Brazilian Government Bond Rates 4 entire years average (maturity in the 2031 year – so long term .In line with the "Tool for the demonstration and assessment of additionality".

The data sources are public and easily accessible.

The table below presents the Benchmark composition:

Benchmark (Brazilian Gov. Bond Rates average)
23.30%

The Brazilian Government Bond Rates chosen was the NTN-C 4 entire years average that represents a Brazilian free risk rate of return (from January 2003 to December 2006).

Sub-step 2c: Calculation and comparison of financial indicators

The Project participants has presented the project cash-flow, which results in the project´s Internal Rate of Return (IRR), in a separated document with all information necessary to roll out the financial calculations. Thus the cash flow and assumptions of the spreadsheet will be presented to the Designated Operational Entity where will accomplish the validation. These data will be available for any CDM agent that asks for this information in order to assess the Project additionality.

The main parameters used in the financial calculations are the following:

Table 4: Relevant parameters used in the calculation of the Project's IRR.

Relevant parameter	Value	Comment
Investment cost (R$)	103,959,000.00	Project participants provided the whole detail of this investment in the spreadsheet "Quadro Usos e Fontes[5].xls". The investment of R$ 103,959,000.00 also can be confirmed in the BNDES bank registered document.
Energy Price (R$/MWh)	140.0	The energy price can be checked against the document "Comitê de Gerenciamento de riscos de Energia[6]-CGRE – 09/06/2006" from CEMIG (official document that belongs to the project sponsors) and it can be confirmed that the same values were used in another similar projects.
Plant load factor / assured energy (MWmed)	16.37	This is an official value calculated and made public available by ANEEL (Brazilian Electricity Regulatory Agency) and the value takes into account the historical river flow series. The source of the value can be

[5] Free translation: Table of Uses and Sources

[6] Free translation: Committee on Energy Risk Management

		viewed in the following link: http://www.aneel.gov.br/cedoc/prt2008010spde.pdf
Operational costs (R$/MWh)	9.44	All the Operational Costs can be confirmed in other similar projects from the same project sponsors (this information was registered in the internal minutes) that mentions that the same values of SHP Cachoeirão will be used in the referred project.

Also all parameters (and references of evidences) used in the financial calculations are presented in a separated spreadsheet which will be available at the CDM/UNFCCC's website in the time of request for registration.

The cash flow was established for the project operational lifetime (30 years), so with a Internal Rate Return (IRR) equal 18.67% (per year) without the Certified Emission Reduction (CERs) revenue, and 19.35% (per year) with the CERs revenue.

The finance/economic analysis is based on market standards parameters.

The benchmark analysis is done comparing the project activity IRR with the Benchmark so the table 5 summarizes the values:

Table 5: Comparative between project´s IRR and the benchmark

SHP Cachoeirão	Benchmark (% a.a.)	IRR (% year)	IRR (with CERs) (% year)
	23.30	18.67	19.35

The project's IRR has stayed below the benchmark, so the project activity is unlikely to be the most financially/economically attractive.

The CERs (Certified Emission Reduction) are highly significant instruments for entrepreneurs in overcoming barriers, improving investment quality and hence stimulating future investments in clean energy generation.

Sub-step 2d: Sensitivity analysis

In sensitivity analysis was verified the breaks even point to the project activity trough the sensitive parameters variation, such: Investment Value; Plant Load factor, Energy Price and the Plant Load Factor.

The results are presented below:

Table 6: Break even points

	SHP	Break Even Point	Project Values
Investment Value	-24.50%	R$78,489,045	R$103,959,000.00
Plant Load Factor	+31.15%	21.47 MWmed	16.37 MWmed
Energy Price	+28.64%	R$180.10/MWh	R$140.00/MWh
Operational Costs	-100%	not sensible enough to reach the benchmark	R$ 9.44/MWh

The project sponsors considered the variation level not feasible because:

Investment Value

The investment value was performed with positive variation (so above the initial investment value).

Energy Price

The actual values evidenced trough the public energy auction occurred in the CCEE brings values around R$144.00/MWh:
http://www.ccee.org.br/StaticFile/Arquivo/biblioteca_virtual/Leiloes/8_energia_nova/Resultado_planilha_completa.xls (8th New Energy Auction, Complete Spreadsheet)
Also the ANEEL Reference Value (VR) to the 2008 year has R$ 139.44/MWh as the value to be performed.
The Reference Value is the value at wich the energy distributors can afford for the energy price trough the Power Purchase Agreement to the small power generators in the concession area: http://www.ccee.org.br/StaticFile/Oficio%200312008%20SEM%20Aneel.pdf

Plant Load Factor

This is an official value calculated and made public by the ANEEL agency and the value is in line with the Project Proponent calculation. Both calculations take into account the historical river flow series.

Operational Costs:

The Operational costs parameter was also analyzed, but presented not sensible enough to reach the benchmark Adopting zero for this parameter the IRR becomes 19.90%, so lower than the benchmark (R$ 9.44/MWh are the sum of the O&M and Management costs after the start).

Conclusion

Based on the explanation above the proposed CDM project activity is unlikely to be the most financially/economically attractive It is evident that the project must become a CDM in order to join the carbon credits revenue into the project cash-flow becoming better the profitability when comparing to other options that could led to the higher emissions.

Step 3: Barrier analysis

No necessary. As concluded in the sensitivity analysis the Project activity is not financial attractive.

Step 4: Common practice analysis

Sub-step 4a: Analyze other activities similar to the proposed project activity:

Were provided an analysis of any other activities that are operational implemented previously or currently underway and that are similar to the proposed project activity (in the same country, similar technology, similar scale – in this case was considered the SHPs with installed power above 14.02 MW (-50% than the SHP Cachoeirao) until 30 MW.

Other CDM project activities (registered project activities and project activities which have been published on the UNFCCC website for global stakeholder consultation as part of the validation process) were not included in this analysis[7].

[7] The sources for the research (public information available) are in the UNFCCC website – http://unfccc.int
ANEEL Fiscalization Datas of the Generation (May/2009) - http://www.aneel.gov.br/area.cfm?id_area=37
ANEEL SHPs under PROINFA program - http://www.aneel.gov.br/area.cfm?id_area=37

Due this we have that there are two incentive mechanisms presented (this information is based on the public information available), the Clean Development Mechanism (CDM) and the PROINFA.

PROINFA is a Brazilian governmental program that seeks to motivate, through the financial point of view, the development of entrepreneurships that make use of renewable technologies, due to the difficulties in financing, in offering guarantees to the finance suppliers and in the necessity of investments considered reasonable to small organizations. This way, the Federal Government tries to motivate projects through differentiated lines of finance, besides the guarantees of minimal revenues through the compromise of establishing Power Purchase Agreements (PPAs), to be firmed with a mixed economy society, Eletrobrás, which will secure to the entrepreneur a minimal revenue of 70% of the energy purchased during the financing period and complete protection to the risks of exposure in the short-term market. The SHPs projects are one of the types eligible to participate in the PROINFA.

Among the SHPs that become operational from the 2005 (when the CDM becomes effective) until 2009 (May) years, we have that none of them were implemented without the PROINFA incentive.

Thus all this facts it can be established that the SHP construction without incentives is not a common practice.

Table 7: Similar Scale Brazilian SHPs that become operational from 2005 until 2009 (May) – excluded the CDM´s SHP

	SHP	State	Incentive
2005			
	Excluded the CDM´s SHP no other become operational		
2006			
1	Esmeralda	RS	Proinfa
2	Mosquitão	GO	Proinfa
3	Piranhas	GO	Proinfa
4	São Bernardo	RS	Proinfa
2007			
1	Flor do Sertão	SC	Proinfa
2	José Gelásio da Rocha	MT	Proinfa
3	Ludesa	SC	Proinfa
4	Rondonópolis	MT	Proinfa
5	Santa Laura	SC	Proinfa
2008			
1	Alto Irani	SC	Proinfa
2	Alto Sucuriú	MS	Proinfa
3	Boa Sorte	TO	Proinfa
4	Bonfante	MG/RJ	Proinfa
5	Caçador	RS	Proinfa
6	Calheiros	RJ/ES	Proinfa
7	Carangola	MG	Proinfa
8	Colino II	BA	Proinfa
9	Cotiporã	RS	Proinfa
10	Da Ilha	RS	Proinfa
11	Funil	MG	Proinfa
12	Irara	GO	Proinfa
13	Jataí	GO	Proinfa
14	Lagoa Grande	TO	Proinfa
15	Plano Alto	SC	Proinfa
16	Santa Fé I	MG/RJ	Proinfa
17	Santa Rosa II	RJ	Proinfa
18	São Joaquim	ES	Proinfa
2009			
1	Linha Emília	RS	Proinfa
2	Monte Serrat	RJ/MG	Proinfa
3	São Simão	ES	Proinfa
4	São Lourenço	MT	Proinfa

Sub-step 4b: Discuss any similar Options that are occurring:

To well define the energy risks, we´ll describe a short overview about the brazilian electric sector:

History of the Brazilian Electric Sector

In recent decades, the Brazilian Electric Sector has undergone several changes until the current model. The energy sector was composed almost exclusively of government-owned companies, but since 1995, due to an increase in international interest rates and the incapacity of investment, the government was forced to seek for alternatives. The recommended solution was to begin a privatization process and deregulation of the market.

The table below shows a summary of the main changes between the pre-existing models and the current model, which ultimately result in changes in the activities of some agents of the sector.

Table 8: Summary of the several changes in the Brazilian Electric Sector.

Former Model (until 1995)	Free Market Model (1995 to 2003)	New Model (2004)
Financing using public funds	Financing using public and private funds	Financing using private and public funds
Verticalized Companies	Companies classified by activity: generation, transmission, distribution and commercialization	Companies classified by activity: generation, transmission, distribution, commercialization, imports and exports.
Predominantly State-controlled companies	Opening up of the market and emphasis on the privatization of the Companies.	Coexistence between State-controlled and Private Companies.
Monopolies – No competition	Competition in generation and commercialization.	Competition in generation and commercialization.
Captive Consumers	Both Free and Captive Consumers	Both Free and Captive Consumers
Tariffs regulated throughout all sectors	Prices are freely negotiated for the generation and commercialization.	In a free environment: Prices are freely negotiated for the generation and commercialization. In a regulated environment: auctions and bids for the least tariffs.
Regulated Market	Free Market	Coexistence between Free and Regulated Markets.
Determinative Planning – Coordinator Group for the Planning of Eclectic Systems (GCPS)	Indicative Planning accomplished by the National Council for Energy Policy (CNPE)	Planning accomplished by the Energy Research Company (EPE)
Hiring: Market 100%	Hiring : Market 85% (until August/2003) and Market 95% (until December/2004)	Hiring: Market 100% + reserve
Energy Surplus/Deficit shared between the buyers.	Energy Surplus/Deficit sold in the Wholesaler Energy Market (MAE)	Energy Surplus/Deficit sold in the CCEE. Distributors Energy Surplus/Deficit compensation mechanism (MCSD).

Source: Electric Power Commercialization Chamber - CCEE[8]

Comparing the proposed project activity to any other similar activities it´s noted that the similar options enjoyed certain benefits that rendered it financially/economically attractive. The projects under PROINFA (http://www.mme.gov.br/programas/proinfa/ - Proinfa Programs) enjoy [9]:

- No liquidity risk: The Eletrobrás company is the responsible for the energy payment under a pre determined price;
- No legal risk (e.g. the agreement between the parties): With PROINFA established by law, this legal risk can be considered negligible. Because legally the institution is fully supported;
- No credit risk: With the issuance of the Eletrobrás papers, which has a local classification "AA" indicated by Standard & Poor's, it is considered that the company ability to honor commitments financial is very high;
  (source: http://www.acionista.com.br/home/investimentos/120805_fidc.htm)
- No market risk: With PROINFA, which has a pre determined value for energy prices during the 20-year contract, the volatility no longer exists, and the investor has certainty about the future sales. Then a fully short-term market risk exposure protection.

In the light of all explanation provided we can conclude, as outcome of the sub-step 4a and 4b, that the proposed project activity is not the common practice.

Event	Date	Evidences
CDM benefits were considered decisive factor in the decision to proceed with the project	nov/05	Agreement between the project sponsors
Proposal from a consultant, considering developing the project activity under Kyoto Protocol	mar/06	CDM Consultant proposal
Service Order to the power plant construction start (Start Date)	mar/07	Project Schedule / Service Order document
SHP assembly Services beginning (Mobilization)	mar/07	ANEEL and Project Schedule
Studies to the CERs selling (upfront payment)	apr/07	E-mails / Documents
DOE offers requisition for validation services	aug/07	E-mails / DOE Offers
Unit #1 assembly beginning	may/08	Project Schedule
New DOE offers requisition for validation services due to the PDD development delay.	may/08	E-mails / DOE offers
Unit #2 assembly beginning	jul/08	Project Schedule
Unit #3 assembly beginning	aug/08	Project Schedule
Unit #1 commercial operation start date	dec/08	ANEEL
Unit #2 commercial operation start date	feb/09	ANEEL
Unit #3 commercial operation start date	feb/09	ANEEL
PDD registered	Feb/12	CDM EB

[8] Electric Power Commercialization Chamber – CCEE. Changes Made to the Brazilian Electric Power System: http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=3df6a5c1de88a010VgnVCM100000aa01a8c0RCRD

[9] reference: http://www.cerpch.unifei.edu.br/Adm/artigos/619c3388da6cf7c7a73c9b6ae4c7ec09.pdf (Unifei articles)

B.6. Estimation of emission reductions

B.6.1. Explanation of methodological choices

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As per methodology ACM0002 the emission reductions of project activity (ER_y) are quantified through the subtraction of project emissions ($PE_{HP,y}$) from baseline emissions (BE_y).

$$ER_y = BE_y - PE_y$$

Where:
ER_y = Emission reduction in year y (tCO_2e/year);
BE_y = Baseline emissions in year y (tCO_2e/year);
PE_y = Project emission from water reservoirs for hydro power plants in year y (tCO_2e/year)

Project emissions *($PE_{HP,y}$)*

According to the methodology ACM0002, for hydro power project activities that result in new reservoirs, project proponents shall account for CH_4 and CO_2 emissions from the reservoir, estimated as follows:

a) If the power density of the single or multiple reservoirs (PD) is higher than 4W/m^2 and lower than or equal to 10W/m^2:

$$PE_{HP,y} = \frac{EF_{Res} \cdot TEG_y}{1000}$$

Where:

$PE_{HP,y}$ Emission from water reservoirs (tCO_2e/yr);
EF_{Res} Default emission factor for emissions from reservoirs of hydro power plants in year y (kgCO2e/MWh).
TEG_y Total electricity produced by the project activity, including the electricity supplied to the grid and the electricity supplied to internal loads, in year *y* (MWh).

b) If power density of project is greater than 10 W/m^2:

$PE_{HP,y} = 0$

The power densities of the project activity are calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD Power density of the project activity, in W/m^2.
Cap_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity (W).
Cap_{BL} Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero.
A_{PJ} Area of the single or multiple reservoirs measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2).
A_{BL} Area of the single or multiple reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

PD $_{SHP\ Cachoeirao}$ = (28,050,000 W – 0) / (1,021,000 m^2 – 0) = 27.47 W/m^2

Baseline Emissions *(BE_y)*

Baseline emissions (BE_y in tCO_2) are the product of the baseline emissions factor ($EF_{grid,CM,y}$ in tCO_2/MWh) multiplied by the electricity supplied by the project activity to the grid ($EG_{PJ,y}$ in MWh), as follows:

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

Where:

BE_y Baseline emissions in year y (tCO_2e/yr);
$EG_{PJ,y}$ Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr);
$EF_{grid,CM,y}$ Combined margin CO_2 emission factor for grid connected power generation in year y, calculated using the latest version of the "Tool to calculate the emission factor for an electricity system" (tCO_2/MWh).

Energy Generated ($EG_{PJ,y}$)

The project activity is the installation of a new grid-connected renewable power plant/unit at site where no renewable power plants were operated prior to the project activity implementation, thus classified as a Greenfield renewable energy power plant.

The $EG_{PJ,y}$ is based on energy estimative to be annually inputted into the grid by the Project activity, which considers the net electricity generation from the power plants, information provided by ANEEL and Brazilian Mines and Energy Ministry. Then:

$$EG_{PJ,y} = EG_{facility,y}$$

Where:

$EG_{PJ,y}$ Quantity of net electricity generation that is produced and fed into the grid as a result of the implementation of the CDM project activity in year y (MWh/yr);
$EG_{facility,y}$ Quantity of net electricity generation supplied by the project plants/units to the grid in year y (MWh/yr).

$$EG_{PJ,y} = 143{,}401 \text{ MWh/yr}$$

Value available on Section B.6.3.

Emission Factor calculation ($EF_{grid,CM,y}$)

For baseline emission factor calculation, the six steps below should be followed:

STEP 1. Identify the relevant electricity systems;
STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional);
STEP 3. Select a method to determine the operating margin (OM);
STEP 4. Calculate the operating margin emission factor according to the selected method;
STEP 5. Calculate the build margin (BM) emission factor;
STEP 6. Calculate the combined margin (CM) emissions factor

Step 1: Identify the relevant electricity systems

Considering the stated in the "Tool to calculate the emission factor for an electricity system[10]" and the fact that Brazilian DNA has published the Resolution nº 8 issued on May 26th, 2008, which defines the **Brazilian Interconnected Grid** as a single system that covers all the five macro-geographical regions of the country (North, Northeast, South, Southeast and Midwest), the boundaries of Brazilian electricity system are clearly defined.

Step 2: Choose whether to include off-grid power plants in the project electricity system (optional)

Since the Brazilian DNA has made available the emission factor calculation based on information of the grid power plants only, the off-grid power plants are not considered (Option I).

Step 3: Select a method to determine the operating margin (OM)

The method adopted to calculate the operating margin is "Dispatch data analysis OM" (Option c). The calculation is performed by the Brazilian DNA and made publicly available.

Step 4: Calculate the operating margin emission factor according to the selected method

The selected method is the "*Dispatch data analysis OM*".

The Dispatch Data emission factor (OM), is calculated as follows:

$$EF_{grid,OM-DD,y} = \frac{\sum_{h} EG_{PJ,h} \cdot EF_{EL,DD,h}}{EG_{PJ,y}}$$

Where:

$EF_{grid,OM-DD,y}$ = Dispatch data analysis operating margin CO_2 emission factor in year y (tCO_2/MWh);
$EG_{PJ,h}$ = Electricity displaced by the project activity in hour h of year y (MWh);
$EF_{EL,DD,h}$ = CO_2 emission factor for grid power units in the top of the dispatch order in hour h in year y (tCO_2/MWh);
$EG_{PJ,y}$ = Total electricity displaced by the project activity in year y (MWh).
h = Hours in year *y* in which the project activity is displacing grid electricity
y = Year in which the project activity is displacing grid electricity

$EF_{EL,DD,h}$ approach is defined by the Brazilian DNA who is the responsible for the calculation.

Step 5: Calculate the build margin (BM) emission factor

According to the tool, the build margin emission factor (BM) is calculated as follows:

$$EF_{grid,BM,y} = \frac{\sum_{m} EG_{m,y}.EF_{EL,m,y}}{\sum_{m} EG_{m,y}}$$

Where:

[10] "*If the DNA of the host country has published a delineation of the project electricity system and connected electricity systems, these delineations should be used"*

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EG_{m,y}$ = Net quantity of electricity generated and delivered to the grid by power unit m in year y (MWh)
$EF_{EL,m,y}$ = CO_2 emission factor of power unit m in year y (tCO_2/MWh)
m = Power units included in the build margin
y = Most recent historical year for which electricity generation data is available

The CO_2 emission factor of each power unit *m* ($EF_{EL,m,y}$) should be determined as per the tool in Step 4 (a) for the simple OM, using options A1, A2 or A3, using for *y* the most recent historical year for which electricity generation data is available, and using for *m* the power units included in the build margin.

The power units included in the build margin are defined by the Brazilian DNA who is responsible for the operating margin and build margin calculations. The results of these are made publicly available in its web site for consultation.

When applying Option 2 for the second crediting period, the build margin emissions factor should be calculated ex ante as described in Option 1 of the "Tool to calculate the emission factor for an electricity system"..
So for the second crediting period, the build margin emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE (2018 year).

Step 6 : Calculate the combined margin emissions factor (CM)

For calculation of combined margin emission factor the weighted average CM method (Option a) should be used as the preferred option.

$$EF_{grid,CM,y} = EF_{grid,OM,y} \times w_{OM} + EF_{grid,BM,y} \times w_{BM}$$

Where:

$EF_{grid,BM,y}$ = Build margin CO_2 emission factor in year *y* (tCO_2/MWh)
$EF_{grid,OM,y}$ = Operating margin CO_2 emission factor in year *y* (tCO_2/MWh)
w_{OM} = Weighting of operating margin emissions factor (per cent)
w_{BM} = Weighting of build margin emissions factor (per cent)

Considering that the project activity is SHP based, the calculation of the combined margin emissions factor shall use the following default values for w_{OM} and w_{BM}:

w_{OM} = 0.25 and w_{BM} = 0.75 for the second and third crediting period.

Calculations available on Section B.6.3.

B.6.2. Data and parameters fixed ex ante

Data / Parameter	$EF_{grid,BM,y}$
Data unit	tCO_2/MWh
Description	CO_2 Build Margin emission factor of the grid, in a year *y*
Source of data	Based on data provided by DNA (Designated National Authority).
Value(s) applied	0.1370
Choice of data or measurement methods and procedures	According procedures established by the most recent version of "Tool to calculate the emission factor for an electricity system".
Purpose of data	Calculation of baseline emissions.
Additional comment	2018 value. Based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE.

Data / Parameter	Cap_{BL}
Data unit	W
Description	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero
Source of data	Project site.
Value(s) applied	0
Choice of data or measurement methods and procedures	The methodology for which this value is applied in new hydroelectric plants.
Purpose of data	Calculation of project emissions.
Additional comment	

Data / Parameter	A_{BL}
Data unit	m^2
Description	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.
Source of data	Project site.
Value(s) applied	0
Choice of data or measurement methods and procedures	Not applicable.
Purpose of data	Calculation of project emissions.
Additional comment	

B.6.3. Ex ante calculation of emission reductions

>>
The baseline methodology considers the determination of the grid emissions factor which the project activity is connected to as the core data to be determined in the baseline scenario. In Brazil, the grid is interconnected though the SIN in a single system[11].

Emission Factor calculation *($EF_{grid,CM,y}$)*

For calculation of the baseline emission factor, the six steps below should be followed:

[11] http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html

STEP 1. Identify the relevant electricity system.

Considering the stated by the "Tool to calculate the emission factor for an electricity system", and the fact that the Brazilian DNA has published the Resolution nº 8 issued on May 26th, 2008, which defines Brazilian Interconnected Grid as a single system that covers all five macro-geographical regions of the country (North, Northeast, South, Southeast and Midwest), the Brazilian electricity system boundaries are clearly defined.

STEP 2. Choose whether to include off-grid power plants in the project electricity system (optional).

Since the Brazilian DNA has made available the emission factor calculation based on information of the grid power plants only, the off-grid power plants are not considered.

STEP 3. Select a method to determine the operating margin (OM).

The method adopted to calculate the operating margin is "Dispatch data analysis OM". The calculation is performed by the Brazilian DNA and made publicly available.

The Dispatch Data emission factor (OM), is summarized as follows:

$$EF_{grid,OM-DD,y} = \frac{\sum_{h} EG_{PJ,h} \cdot EF_{EL,DD,h}}{EG_{PJ,y}}$$

Where:

$EF_{grid,OM-DD,y}$ = Dispatch data analysis operating margin CO_2 emission factor in year y (tCO_2/MWh);
$EG_{PJ,h}$ = Electricity displaced by the project activity in hour h of year y (MWh);
$EF_{EL,DD,h}$ = CO_2 emission factor for grid power units in the top of the dispatch order in hour h in year y (tCO_2/MWh);
$EG_{PJ,y}$ = Total electricity displaced by the project activity in year y (MWh).
h = Hours in year *y* in which the project activity is displacing grid electricity (h)
y = Year in which the project activity is displacing grid electricity

STEP 4. Calculate the operating margin emission factor according to the selected method.

For effect of ex-ante estimation to $EF_{grid,OM-DD,y}$ value, was calculated the arithmetic average of 12 months emission factors of the operating margin, published by the DNA (data available to year 2018)[12].

Table 4: Emission Factor of Operating Margin for year 2018

OPERATING MARGIN												
Average Emission Factor (tCO_2 / MWh)												
	MONTH											
	January	February	March	April	May	June	July	August	September	October	November	December
2018	0.5652	0.5559	0.5750	0.5058	0.5461	0.6691	0.5989	0.5948	0.5718	0.5782	0.3654	0.3423

Thus, the Emission Factor of Operating Margin is:

[12] http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html

$$EF_{grid,OM\text{-}DD,y} = 0.5390$$

STEP 5. Calculate the build margin (BM) emission factor.

When applying Option 2 for the second crediting period, the build margin emissions factor should be calculated ex ante as described in Option 1 of the "Tool to calculate the emission factor for an electricity system".
So for the second crediting period, the build margin, $EF_{grid,BM,y}$, emission factor will be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE (2018 year[13])

Table 5: Latest data from Brazilian DNA to Emission Factor Build Margin (2018)

BUILD MARGIN	
Average Emission Factor (tCO_2/MWh) - **ANNUAL**	
2018	
	0.1370

So, we have that the Build Margin Emission Factor is:

$$EF_{grid,BM,y} = 0.1370$$

STEP 6. Calculate the combined margin (CM) emission factor.

To calculation of combined margin emission factor (combination of operation and build margins) is used a weighted-average formula, considering $w_{OM} = 0.25$ and $w_{BM} = 0.75$ (second credit period). As a conservative approach, below is presented the emission factor calculated using four decimal places, rounded down. Thus, the result is:

$$\underline{\boldsymbol{EF_{grid,CM,y}}} = 0.25 \times 5390 + 0.75 \times 0.1370 = 0.2375 \ (tCO_2/MWh)$$

The baseline emissions would be then proportional to the electricity delivered to the grid throughout the project's lifetime. Are calculated multiplying the electricity baseline emissions factor ($EF_{grid,CM,y}$) by the electricity generation of the project activity.

$$BE_y = EG_{PJ,y} * EF_{grid,CM,y}$$

$$BE_y = 143{,}401 * 0.2375 = 34{,}059 \ tCO_2/yr$$

Moving back to the emission reductions of project activity (ER), we have the annual ex-ante estimated CO_2 reductions as:

$$ER_y = BE_y - PE_{HP,y}$$

Where:
ER = Emission reductions in year y (tCO_{2e}/yr)
BE = Baseline emissions in year y (tCO_2/yr)
PE = Project emissions in year y (tCO_{2e}/yr)

[13] For the second crediting period, the build margin emission factor should be updated based on the most recent information available on units already built at the time of submission of the request for renewal of the crediting period to the DOE (TOOL07 para 72).

http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html

Considerening the emissions related to the SHP reservoirs are zero, the Project activity emissions reductions are calculated as below:

$$ER_y = 34,059 – 0 = 34,059 \ (tCO_2/yr)$$

B.6.4. Summary of ex ante estimates of emission reductions

Year	Baseline emissions (t CO_2e)	Project emissions (t CO_2e)	Leakage (t CO_2e)	Emission reductions (t CO_2e)
03/02/2019	30,980	0	0	30,980
2020	34,059	0	0	34,059
2021	34,059	0	0	34,059
2022	34,059	0	0	34,059
2023	34,059	0	0	34,059
2024	34,059	0	0	34,059
2025	34,059	0	0	34,059
02/02/2026	12,965	0	0	12,965
Total	**238,415**	**0**	**0**	**238,415**
Total number of crediting years	7			
Annual average over the crediting period	34,059	0	0	34,059

B.7. Monitoring plan

B.7.1. Data and parameters to be monitored

Data/Parameter	$EG_{facility,y}$
Data unit	MWh/year
Description	Quantity of net electricity generation supplied by the project plant/unit to the grid in year y.
Source of data	Energy Meters in Conselheiro Pena Substation, serial numbers PT-0801A126-01 and PT-0801A128-01 (can be exchanged during the CP in case of failure).
Value(s) applied	143,401
Measurement methods and procedures	The net electricity delivered to the grid will be checked through the electricity meters (one main and one back-up). Also the electricity delivered from the grid shall be checked through the same meters since they are bidirectionals. For safety, the meters were sealed after calibration.
Monitoring frequency	Continuous measurement and at least monthly recording
QA/QC procedures	These data will be used for calculate the emission reductions. The data will be archived monthly (electronic) and will be archived during the credit period and two years after. The data from the energy meters will be cross checked with the CCEE databank in order to verify the coherency of the data.
Purpose of data	Calculation of baseline emissions.
Additional comment	

Data/Parameter	$EF_{grid,CM,y}$
Data unit	tCO_2/MWh
Description	Combined Margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".
Source of data	Based on data provided by DNA (Designated National Authority).
Value(s) applied	0.2375
Measurement methods and procedures	The Combined Margin is calculated through a weighted-average formula, considering the $EF_{grid,OM-DD,y}$ and the $EF_{grid,BM,y}$ and the default weights are $w_{OM} = 0.25$ and $w_{BM} = 0.75$. As per the "Tool to calculate the emission factor for an electricity system".
Monitoring frequency	Annually.
QA/QC procedures	As per the "Tool to calculate the emission factor for an electricity system".
Purpose of data	Calculation of baseline emissions.
Additional comment	

Data/Parameter	$EF_{grid,OM-DD,y}$
Data unit	tCO_2/MWh
Description	CO_2 Operating Margin emission factor of the grid, in a year *y*
Source of data	Data provided by DNA (Designated National Authority) to the year *y*.
Value(s) applied	0.5390
Measurement methods and procedures	According procedures established by the most recent version of "Tool to calculate the emission factor for an electricity system".
Monitoring frequency	Annually.
QA/QC procedures	This data will be annually updated to be applied in ex-post calculation of the Emission Factor of Combined Margin
Purpose of data	Calculation of baseline emissions.
Additional comment	

Data/Parameter	Cap_{PJ}
Data unit	W
Description	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data	Project site.
Value(s) applied	28,500,000
Measurement methods and procedures	Technical specifications on the installed equipments
Monitoring frequency	Once at the beginning of each crediting period
QA/QC procedures	
Purpose of data	Calculation of project emissions
Additional comment	

Data/Parameter	A_{PJ}
Data unit	m^2
Description	Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full.
Source of data	Reservoir in the Project site.
Value(s) applied	1,021,000
Measurement methods and procedures	Measured from topographical surveys, maps, satellite pictures, etc.
Monitoring frequency	Once at the beginning of each crediting period

QA/QC procedures	
Purpose of data	Calculation of the project emissions
Additional comment	

B.7.2. Sampling plan

>>
Not applicable.

B.7.3. Other elements of monitoring plan

>>
The monitoring plan for the project activity is based on the methodology ACM0002 and consist of the monitoring of the electricity generation from the proposed project activity, the surface area of reservoir at the full reservoir level, the installed capacity of the plant after project implementation and emission factors.

1) Power generation and measurement system:

General characteristics of the measurement system:

The procedures design for monitoring electricity generation by the project activity follows the parameters and regulations of the Brazilian energy sector. The National Grid Operator (ONS) and the Electric Power Commercialization Chamber (CCEE) are the entities responsible for specification of the technical requirements of energy measurement system for billing, that is, those bodies monitor and approve projects for accurate accounting of energy.

The agent responsible for the measurement system for billing (SMF) develop the project in accordance with the technical specifications of the measurements for billing, which should include the location of measurement points, panels of measurement, meters and systems for local and remote measurement.

The measurement system makes the measure and records the energy. This is installed in the panels of measurement, which are located in the control room or cabins of measurement. For this system is guaranteed the inviolability of data, which must be sealed for safety after calibration or sealed with electronic passwords.

The measurement system contains also a communication system that has the function of sending the data from dispatched electricity for the grid to the CCEE.

Data monitoring:

The readings of meters are used for calculating the emission reductions. The monitoring steps are as follows:

(1) The data will be measured hourly and recorded monthly (Meters Serial Numbers PT-0801A126-01 and PT-0801A128-01);
(2) The power output settlement sheet from CCEE databank will be used as cross check (from CCEE databank – SINERCON);
(3) The project owner provides DOE with readings record of meters located in Conselheiro Pena Substation, and access to CCEE data readings;
(4) The SHP operational structure will be managed by a third party company[14];

[14] The third party company works with automation systems, assuring greater security, agility and efficiency, the company is able to do the power plant and substations control remotely, through the Operation Centre.
For more details: http://www.grupoenergisa.com.br/Default.aspx?tabid=3995

(5) The operational structure should be managed by the Hidrelétrica Cachoeirão management responsible;
(6) The emission reductions and any project emission should be managed by Carbotrader project manager responsible.

Quality control:

(1) Calibration of meters
The calibration of meters conducted by qualified organization must comply with national standards and industrial regulations to ensure the accuracy. The meters must be sealed for safety after calibration. The calibration records must be archived together with other monitoring records. The class of accuracy in the equipment that will be used in the project activity is under the national standards (NBR 14519 from Associação Brasileira de Normas Técnicas – Brazilian Association of Technical Standards). It can be viewed in the Grid Procedures from the National Grid Operator: Module 12, Sub-module12.3 Maintenance of the Measurement System for Billing in the link:

http://www.ons.org.br/%2FProcedimentosDeRede%2FM%C3%B3dulo%2012%2FSubm%C3%B3dulo%2012.3%2FSubm%C3%B3dulo%2012.3%202016.12.pdf (Procedures from the ONS – Module 12)

(2) Emergency treatment

In case of unavailability of measures from any point of measurement, due to maintenance, commissioning or for any other reason, will be used the methodology to estimate data as the item 14.3 of the Procedure of Energy Commercialization PdC ME.01[15]

Data Management:

All the project activity issues regarding the SHP's construction will be treated by the responsible SPE Cachoeirão Energy Directors.

The crediting to be generated will be calculated regularly by the project proponents and kept for the verification phase

All data monitored and required for verification and issuance should be kept for two years after the end of the crediting period or the last issuance of CERs for this project activity, whichever occurs later.

Training Procedures:

All the training necessary for the plant operational team (eventually remote and local operators) will be provided or will be required from the third party service provider during the plant construction and during the plant commercial operation

Furthermore, operation, maintenance and calibration procedures will follow the national guidelines set by the National Grid Operator.

2) Emission Factors:

The Emission Factor related to this project activity ($EF_{grid,CM,y}$, $EF_{grid,OM\text{-}DD,y}$ e $EF_{grid,BM,y}$) as mentioned previously, are available by the brazilian DNA and it can be viewed at its website (http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html). Thus, the monitoring of this data will be ex-post through periodic access to data provided by DNA.

15

ttp://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=67778d3ef9a3c010VgnVCM1000005e01010aRCRD

3) Installed capacity of the hydro power plant – Cap_{PJ}:

The installed capacity of the hydro power plant after the implementation of the project activity will be monitored yearly through one of the following options:

- Technical specifications on the installed equipments;
- Installed plaques in the equipments;
- Factsheets.

In Brazil, the installed capacity of hydropower plants is determined and authorized by the competent regulatory agency. Furthermore, any modification must also be authorized and made available to the public. Thus, annually, any new authorization to increase the installed capacity of plan will be monitored. It will be used to installed capacity, which is also a recognized standard to assure the designed project and technical characteristics.

4) Area of the reservoir – A_{PJ}:

The area of the single reservoir will be measured once (in Credit Period renewal) in the surface of the water, after the implementation of the project activity, when the reservoir is full.

Measured from topographical surveys, maps, satellite pictures, etc.

Authority and Responsibility

The Hidrelétrica Cachoeirão S.A is the responsible for the maintenance and calibration of the monitoring equipments, compliance to operational requirements and corrective actions related to the functionality of the project activity. Moreover, the company has authority and responsibility for registration, monitoring, and measurement as well as managing all issues about the project activity, also to organize staff and third party training to use appropriated techniques related to the applicable legislation.

The Baseline, Project Emissions (if applicable) and Emissions Reductions calculations will be performed by the Carbotrader which should report the results in a proper way to the entities related to CDM process.

SECTION C. Start date, crediting period type and duration

C.1. Start date of project activity

>>
09/03/2007 (Service Order to the power plant construction start, so the Project participant's commitments with majore expenditures – evidenced trough the service order).

C.2. Expected operational lifetime of project activity

>>
30 years and 0 months after the operational start.

C.3. Crediting period of project activity

C.3.1. Type of crediting period

>>
Renewable crediting period, being this the second period.

03/02/2019 until 02/02/2026 the Second Crediting Period.

C.3.2. Start date of crediting period

>>03/02/2019

C.3.3. Duration of crediting period

>>
7 years.

SECTION D. Environmental impacts

D.1. Analysis of environmental impacts

>>
With respect to regulatory permits:

The **Cachoeirão** Small Hydro Power Plant has autorizations issued by ANEEL:

- ANEEL Resolution # 282, dated 26 July 2000 - authorizes Empresa de Luz e Força Santa Maria SA-ELFSM (27.00 MW) to implement and explore Cachoeirão SHP;
- ANEEL Resolution 557, dated 15 October 2002 - transfers the authorization to implement and explore Cachoeirão SHP from ELFSM to Santa Maria Energética SA.;
- ANEEL Dispatch # 1,214, dated 23 April 2007 - approves the Cachoeirão basic project (27.0 MW) and defines a reservoir area of 1.021 km2 and coordinates 19º 26' 12" S 41º 36' 51" W;
- ANEEL Authorization Resolution # 908, dated 8 May 2007 - transfers the authorization to implement and explore Cachoeirão SHP from Santa Maria Energética S.A. to Hidrelétrica Cachoeirão S.A.;
- ANEEL Decree # 18, dated 25 May 2007 - defines a 16.37 MW (average) assured energy for the Cachoeirão SHP;
- ANEEL Dispatch # 4830, dated 30 December 2008 - authorizes 9,000 kW generator unit # 1 to start operation;
- ANEEL Dispatch # 559, dated 11 February 2009 - authorizes 9,000 kW generator unit # 2 to start operation;
- ANEEL Dispatch # 714, dated 27 February 2009 - authorizes 9,000 kW generator unit # 3 to start operation.
- ANEEL Resolution # 407, dated 19 October 2000, establishes that if the present/real installed capacity is greater than +/- 5 % of the authorized (granted) installed capacity, a revision of the authorized installed capacity should be requested.

With respect to environmental permits legislation requires issuing of following licenses:

- **Preliminary License (LP):** preliminary phase of planning activity in which concept and location of enterprise are evaluated. In this phase Environmental Impact Study (EIA) and Environmental Impact Report (RIMA) are analysed, or, depending on the case, the Environmental Control Report (RCA).
- **Installation License (LI):** authorizes implementation of enterprise. In this phase, the Environmental Control Plan (PCA) is analysed, it contains projects for systems of treatment and/or disposing of liquid and atmospheric effluents and solid residue etc.
- **Operation License (LO):** authorizes operation of enterprise after verification of compliance with measures determined in phases of LP and LI.

The **Cachoeirão** Small Hydro Power Plant has the following Environmental License:

- LO – Operation License – COPAM in 10/10/2008 (this one replace the prior licenses).
- APEF – Forest Explorer Authorization issued by the Forest State Institute - Instituto Estadual de Florestas (IEF) - in 13/07/2007.
- APEF – Forest Explorer Authorization issued by the Forest State Institute - Instituto Estadual de Florestas (IEF) - in 10/04/2008.

D.2. Environmental impact assessment

>>
The environmental impacts from SHPs activities are not considered significant by the participants of the project. But several environmental improvement actions were made.

All SHP from the Project activity has a Environmental Management Guidelines (Plano de Controle Ambiental – PCA). The studies have a project influence area environmental diagnostic, and, more than this has a variety of programs and activities that foresee to minimize the negative effects and assesses the changes resultants from the hydro system installations.

The SHP Cachoeirão main activities are described as the following:

- Social Communication Projects, Environmental Education and the Monitoring of Social-Economic Aspects.
- Monitoring Programs of Forest Fragments, Ichthyofauna, Herpetofauna, Birds and Mammals threatened of extinguishing and Aquatic Macrophyte/Freshwater Mollusc Fauna Control.
- Water Quality Monitoring, Affluent and Deffluent Flows to the Reservoir , Freatic Sheet and Climate Programs.
- Programs of Rescue of the Fauna and Fishes during the transposition of the River and full filling of the Reservoir.
- Soil Conservation Projects, Reconstitution of the Ciliar Flora and Recovery of Degraded Areas.
- Elaboration of Viability Study of Implantation of the RPPN at Entrepreneur Lands.
- Sewer Treatment Project for the Barra Mansa and Cachoeirão inhabitants.
- Managing Reservoir Plan and Around.
- Promotion to Husbandry Program.

SECTION E. Local stakeholder consultation

E.1. Modalities for local stakeholder consultation

>>
In accordance to Ruling nº.1, dated 11 September 2003 and Ruling nº7, of the Inter-Ministry Commission on Global Climate Change (CIMGC), any CDM projects shall send a letter describing the project and request commentaries by local interested parties.

The project activity applies to only one state of the federation, thus, the invitations of comments should be addressed to the following actors involved and affected by the project activities:

- City Hall and City Councils;
- State environmental body and Municipal environmental body;
- Brazilian Forum of NGOs and Environmental and Development Social Movements - http://www.fboms.org.br;
- Community associations;
- State Prosecutors Office;
- National Prosecutors Office.

In order to satisfy and comply with this ruling the project proponents sent invitation letters describing the project, and requested commentaries by the following interested parties:

- Alvarenga City Hall;
- Alvarenga City Council;
- Alvarenga Environmental Secretary;
- Alvarenga Comunity Association;
- Pocrane City Hall;
- Pocrane City Council;
- Pocrane Environmental Secretary;
- Cachoeirão Comunity Development Association;
- FEAM – State environmental body;
- Brazilian Forum of NGOs;
- Minas Gerais State Prosecutors Office;
- National Prosecutos Office.

The interested parties above were invited to present their concerns and provide comments on project activity during a period of 30 days after receipt of the invitation letter.

E.2. Summary of comments received

>>
No comments were received from interested parties.

E.3. Consideration of comments received

>>
Not applicable due to the item E.2.

SECTION F. Approval and authorization

>> The Letter of Approval was obtained after the DOE´s Final Validation Report issuance and before the CDM Executive Board project request for registration on 28/03/2011

Appendix 1. Contact information of project participants

Organization name	Hidrelétrica Cachoeirão S.A.
Country	Brazil
Address	Rodovia Km 27 da Estrada de Pocrane, Povoado de Cachoeirão
Telephone	+55 37 3721-5785
Fax	
E-mail	robson@elfsm.com.br
Website	
Contact person	Robson Gomes

Organization name	Carbotrader Assessoria e Consultoria em Energia Eireli
Country	Brazil
Address	90, St Maestro Manoel Antiqueira
Telephone	+55 11 4522-7180
Fax	
E-mail	carbotrader@carbotrader.com
Website	www.carbotrader.com
Contact person	Arthur Augusto Clessie de Moraes

Appendix 2. Affirmation regarding public funding

There is no Kyoto Protocol Annex 1 country public fund financing this project activity.

Appendix 3. Applicability of methodologies and standardized baselines

No further information.

Appendix 4. Further background information on ex ante calculation of emission reductions

The CO_2 emission factors resulting from the generation of electricity verified in Brazilian National Interconnected System (SIN) are calculated from the power plants generation records issued centrally by the National Grid Operator, especially in thermoelectric plants. This information is necessary to renewable energy projects connected to the national grid and implemented in Brazil under the Kyoto Protocol's Clean Development Mechanism (CDM).

The ex ante emission reductions are calculated according to the "Tool to calculate the emission factor for an electricity system". With this methodology the National Grid Operator (ONS) is tasked with explaining the SIN (National Interconnected System) operational practices regulated by the ANEEL (Brazilian Electricity Regulatory Agency) to the work group made up by the Ministry of Science and Technology (MCT) and Ministry of Mines and Energy (MME). According to this

system, the CO_2 Emission Factors applicable to the project activity will be calculated by the National Grid Operator (ONS) for the single system since 27th May 2008.

The latest available data of the Brazilian grid emission factor used on emissions reductions calculations is available in the link:
http://www.mctic.gov.br/mctic/opencms/ciencia/SEPED/clima/textogeral/emissao_despacho.html

Appendix 5. Further background information on monitoring plan

The monitoring of the project activity is based on the baseline methodology and monitoring applicable to this project and, as described in items B 7.1 and B 7.3., the metering equipments of generated energy is used for verification of renewable energy generated by the project activity.

After energy generation data has been collected, there will be a reconciliation of this data with the reports/data issued by the CCEE. We emphasize that the energy data from CCEE are audited by this entity and must not contain errors. This procedure will be adopted in order to give consistency to the data.

It should be noted that all collected data in the monitoring scope will be electronically filed and kept for at least 2 years after the last credit period or the last issuance of CERs for this project activity, whichever occurs later.

This monitoring plan is based on the Large Scale Methodology ACM0002 – "**Consolidated baseline methodology for grid-connected electricity generation from renewable sources**", as well as on the "**Tool to calculate the emission factor for an electricity system**".

Appendix 6. Summary report of comments received from local stakeholders

Not applicable.

Appendix 7. Summary of post-registration changes

Not applicable.

Document information

Version	*Date*	*Description*
11.0	31 May 2019	Revision to: • Ensure consistency with version 02.0 of the "CDM project standard for project activities" (CDM-EB93-A04-STAN); • Make editorial improvements.
10.1	28 June 2017	Revision to make editorial improvement.
10.0	7 June 2017	Revision to: • Improve consistency with the "CDM project standard for project activities" and with the PoA-DD and CPA-DD forms; • Make editorial improvement.
09.0	24 May 2017	Revision to: • Ensure consistency with the "CDM project standard for project activities" (CDM-EB93-A04-STAN) (version 01.0); • Incorporate the "Project design document form for small-scale CDM project activities" (CDM-SSC-PDD-FORM); • Make editorial improvement.
08.0	22 July 2016	EB 90, Annex 1 Revision to include provisions related to automatically additional project activities.
07.0	15 April 2016	Revision to ensure consistency with the "Standard: Applicability of sectoral scopes" (CDM-EB88-A04-STAN) (version 01.0).
06.0	9 March 2015	Revision to: • Include provisions related to statement on erroneous inclusion of a CPA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Provisions related to the Host Party; • Make editorial improvement.
05.0	25 June 2014	Revision to: • Include the Attachment: Instructions for filling out the project design document form for CDM project activities (these instructions supersede the "Guidelines for completing the project design document form" (Version 01.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the project activity in B.7.4 and Appendix 1; • Change the reference number from F-CDM-PDD to CDM-PDD-FORM; • Make editorial improvement.

Version	*Date*	*Description*
04.1	11 April 2012	Editorial revision to change version 02 line in history box from Annex 06 to Annex 06b.
04.0	13 March 2012	Revision required to ensure consistency with the "Guidelines for completing the project design document form for CDM project activities" (EB 66, Annex 8).
03.0	26 July 2006	EB 25, Annex 15
02.0	14 June 2004	EB 14, Annex 06b
01.0	03 August 2002	EB 05, Paragraph 12 Initial adoption.

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