MONITORING REPORT FORM (CDM-MR)*
Version 01 - in effect as of: 28/09/2010

CONTENTS

* As contained within the document entitled "*Guidelines for completing the monitoring report form (CDM-MR)*" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version number 1, dated 15/03/2012

Garganta da Jararaca Small Hydroelectric Power Plant (SHP)
Reference Number 0809
4th monitoring period: 01/01/2011 – 31/12/2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

The primary objective of the Atiaia Project Activity is to help meet Brazil's rising demand for energy due to economic growth and to improve the supply of electricity, while contributing to the environmental, social and economic sustainability by increasing renewable energy's share of the total Brazilian (and the Latin America and the Caribbean region's) electricity consumption.

This indigenous and cleaner source of electricity has also an important contribution to environmental sustainability by reducing carbon dioxide emissions that would have occurred otherwise in the absence of the project. The project activity reduces emissions of greenhouse gas (GHG) by avoiding electricity generation by fossil fuel sources (and CO_2 emissions), which would be generating (and emitting) in the absence of the project.

The project activity consists of a small hydro power plant with 29.3 MW installed capacity and 2.87 km^2 reservoir area and is located in Campo Novo do Parecis and Nova Maringá municipalities, state of Mato Grosso, Midwest region of Brazil, between geographic coordinates 13º23' South Latitude, 57º37' West Longitude. For the electricity generation, it was employed 2 units of Kaplan "S" turbine of 15.10 MW each and 2 Synchronous Generators 14.65 MW, 60 Hz at 13.8 kV each.

Relevant dates for the project activity are as follows:

- Construction date: February, 2005;
- Commissioning phase: September, 2006;
- Commercial operation phase: November, 28th 2006[1].

The GHG emission reductions during the period from 1st January 2011 to 31st December 2011 were achieved through the dispatched electricity generated by PCH[2] Garganta da Jararaca which displaced a mix of electricity generation in the Brazilian South-Southeast-Midwest interconnected grid. This monitoring report presents information related to the **fourth** verification of the project activity which covers the period of January, 1st 2011 to December, 31st 2011. The total emission reductions by the project activity over the monitored period are **57,872 tCO_2e**.

[1] It corresponds to the date when the first generating unit started.
[2] PCH from the Portuguese "*Pequena Central Hidrelétrica*", small hydro facility.

A.2. Project Participants

Name of Party involved ((host) indicates a host Party)	Private and/or public entity(ies) Project participants (as applicable)	Kindly indicate if the Party involved whishes to be considered as project participant (Yes/No)
Brazil (host)	Rio do Sangue Energia S.A.	No
	Ecopart Assessoria em Negócios Empresariais Ltda.	
Japan	Sumitomo Mitsui Banking Corporation	
Norway	Norwegian Ministry of Finance	

A.3. Location of the project activity:

The project activity is located in the Sangue River, in Campo Novo do Parecis and Nova Maringá municipalities, state of Mato Grosso, Midwest region of Brazil, at geographic coordinates 13º23' South Latitude, 57 º37' West Longitude.

A.4. Technical description of the project

PCH Garganta da Jararaca is a small hydro power plant with 29.3 MW of installed capacity and a reservoir area of 2.87 km^2. This small dam stores water in order to generate electricity. A low-level diversion dam raises the water level in the river sufficiently to enable an intake structure to be located on the side of the river. The intake consists of a trash screen and a submerged opening with an intake gate.

Water from the intake is normally taken through a pipe (called a penstock) downhill to a power station constructed downstream of the intake and at as low a level as possible to gain the maximum head on the turbine.

Figure 1 – PCH Garganta da Jararaca. A) Power House; B) Penstock; C) Dam

Inside the power house system comprising two turbines and two generators are installed. The type of turbine installed is the Kaplan, manufactured by Alstom. In the Kaplan turbine the water flows through the propeller and sets the latter in rotation. In this turbine the area through the water flows is as big as it can be – the entire area swept by the blades. For this reason Kaplan turbines are suitable for very large volume flows and they have become usual where the head is only a few meters. The water enters the turbine laterally, is deflected by the guide vanes, and flows axially through the propeller. For this reason, these machines are referred to as axial-flow turbines (Figure 2).

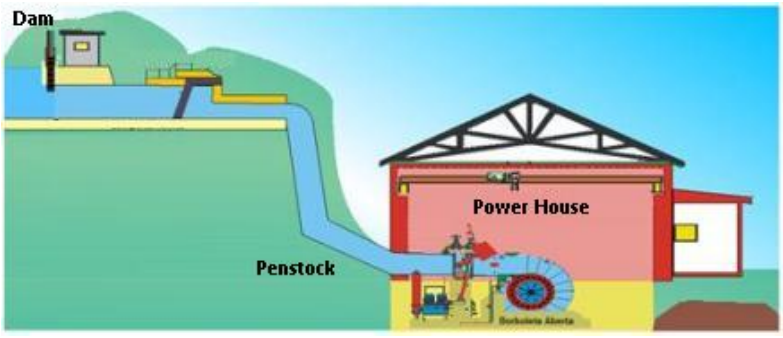

Figure 2 – Schematic diagram of a small hydropower plant

Source: Portal PCH[3]

The turbine system possesses 2 units of 15.10 MW and 2 generators of 14.65 MW at 13.8 kV each. The main design characteristics of PCH Garganta da Jararaca are shown below:

Garganta da Jararaca SHPP	
Power	29.3 MW
Energy output	190,000 MWh
Capacity Factor	82%
Waterfall	34.71 meters
Reservoir	2.87 km^2

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

The methodology applied to the project is ACM0002 – "Consolidated methodology for grid-connected electricity generation from renewable sources" (version 6).

A.6. Registration date of the project activity:

The CDM project activity was registered on July 31st, 2007.

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

The project activity opted for the renewable crediting period which started on July 31st, 2007. Therefore, the first crediting period lasts until July 30th, 2014.

[3] Available at: <http://www.portalpch.com.br/index.php?option=com_content&view=article&id=96&Itemid=187>.

A.8. Name of responsible person(s)/entity(ies):

Name of person/entity responsible for completing the monitoring report form (CDM-MR):

Company:	Ecopart Assessoria em Negócios Empresariais Ltda.
Address:	Rua Padre João Manoel, 222
Zip code:	01411-000
City address:	São Paulo, SP
Country:	Brazil
Telephone number:	+55 (11) 3063-9068
Fax number:	+55 (11) 3063-9069
Contact person:	Ms. Renata O. Freitas
E-mail:	renata.freitas@eqao.com.br

SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

PCH Garganta da Jararaca was implemented and is currently operational accordingly to what was stated in the registered PDD, *i.e.* no modifications took place since the CDM project activity was registered. The plant is operational since November 28th, 2006, when the first generating unit started commercial operation[4]. The second generating unit started commercial operation in December 07th, 2006[5].

No special events - such as overhaul times, downtimes of equipment, exchange of equipment – occurred during the monitored period. Therefore, there were no events or situations that could have impacted the applicability of the methodology.

B.2. Revision of the monitoring plan

This section has been left blank on purpose. A revision of the monitoring plan is not applicable to this monitoring period.

B.3. Request for deviation applied to this monitoring period

This section has been left blank on purpose. A deviation of the monitoring plan is not applicable to this monitoring period.

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[4] ANEEL Ordinance nr. 2,791 issued on November 28th, 2006. Available at: <http://www.aneel.gov.br/cedoc/dsp20062791.pdf>.

[5] ANEEL Ordinance nr. 2,904 issued on December 7th, 2006. Available at: <http://www.aneel.gov.br/cedoc/dsp20062904.pdf>.

B.4. Notification or request of approval of changes

This section has been left blank on purpose. A notification or request of approval of changes is not applicable to this monitoring period.

SECTION C. Description of the monitoring system

The monitoring report is based on electricity delivered to the grid by the PCH Garganta da Jararaca. The amount of energy delivered is monitored by the following entities:

1) Rio do Sangue Energia S/A: the owner and controller of Garganta da Jararaca small hydropower plant. Rio do Sangue Energia S/A is responsible for the project management, as well as for organizing and training of the staff in the appropriate monitoring, measurement and reporting techniques. The SHPP is operated with a local manager, who has operational and managerial knowledge, two technicians (responsible for electromechanical tasks), two maintenance auxiliaries and one caretaker (responsible for the external areas of the plant). All the operation is centralized in Cuiabá – MT, in the Generation Operation Center (from the Portuguese *Centro de Operação de Geração – COG*)[6], which has been controlling the operation of the other SHPs of Atiaia Group (including Garganta da Jararaca). COG is operated with sixteen professionals: one director of operations, one maintenance manager engineer, one operation manager engineer, one administrative coordinator, one environmental manager, three engineers responsible for O&M, five system operators and three auxiliaries (shift work, 24 hours a day). All the procedures are done by telecommand from COG in Cuiabá, but in the SHPP both technicians are capable of operating the whole plant, in case of communications failure with COG.

2) Centrais Elétricas Matogrossenses S.A. (CEMAT): the local power utility company. CEMAT is responsible for the calibration and maintenance of meters located at the power plant, for dealing with possible monitoring data adjustments and uncertainties, for review of reported results/data, for internal audits of GHG project compliance with operational requirements and for corrective actions. In addition, CEMAT is responsible to inform the National Chamber of Electricity Commercialization (from the Portuguese *Câmara de Comercialização de Energia Elétrica – CCEE*) about the total energy delivered to the grid by energy producers in the region.

3) Câmara de Comercialização de Energia Elétrica (CCEE): writes up the national energy dispatched to the grid and makes feasible/regulates the energy commercialization. CCEE has online access of the energy exported to the grid of all power producers. Then, CCEE checks if energy exported to the grid is according to the ones informed by CEMAT. CCEE determinates the utilization of a standard proceedings (12.2 - *Instalação de Medição e Faturamento*) from the National Electric System Operator (from the Portuguese *Operador Nacional do Sistema Elétrico – ONS*), which establish that energy readings have to be registered every five minutes in the meters database. Given that, meters used by Garganta da Jararaca are programmed for five minutes-measurement, with a frequency greater than established in the monitoring plan of the registered PDD (and therefore more conservative). In fact, measurement is done in a continuous way and data are collected every five minutes (measurement interval). From the raw data collected, first hourly (for internal use) and then monthly (to be sent to CCEE), consolidations are made. Considering the explanations above, the monitoring plan of Garganta da Jararaca is being carried out according to the description in the registered PDD.

[6] Former Systems Operation Center (from the Portuguese *Centro de Operação do Sistema – COS*).

All operations related to Garganta da Jararaca small hydropower plant are centralized in Cuiabá, state of Mato Grosso, in the Generation Operation Center (from the Portuguese *Centro de Operação de Geração – COG*). The management plan as well as training measures is controlled in COG. The table below presents technical specifications of the meters used at PCH Garganta da Jararaca.

Table 1: Energy Meters of Garganta da Jararaca small hydro power plant

Description		***Manufacturer***	***Type / Model***	***Number***
Garganta da Jararaca SHPP	Principal	Power Measurement	ION8600	PT-0606A006-01
	Back-up	Power Measurement	ION8600	PT-0606A009-01

CCEE determinates the utilization of a standard proceedings (*12.2 - Instalação de Medição e Faturamento*) from the National Electric System Operator (from the Portuguese *Operador Nacional do Sistema Elétrico – ONS*), which establish that energy readings have to be registered every five minutes in the meters database. Given that, meters used by Garganta da Jararaca are programmed for five minutes-measurement, with a frequency greater than established in the monitoring plan of the registered PDD (and therefore more conservative).

In fact, measurement is done in a continuous way and data are collected every five minutes (measurement interval). From the raw data collected, first hourly (for internal use) and then monthly (to be sent to CCEE), consolidations are made. Considering the explanations above, the monitoring plan of Garganta da Jararaca is being carried out according to the description in the registered PDD.

Although PCH Garganta da Jararaca isn't obliged to follow the Grid Procedures as established by the Electric System National Operator (from the Portuguese *Operador Nacional do Sistema Elétrico* - ONS) the plant operator is committed to follow the procedures of calibration established by ONS, *i.e.* calibration of energy meters every two years.

The table below presents the dates in which the meters mentioned above were last calibrated as well as the correspondent calibration certificates number. All of the meters possess a precision class of 0.2%.

Table 2: Calibration dates of the energy meters

Description		***Number***	***Date of the Last Calibration***	***Re-Calibration Certificate # - Date***
Garganta da Jararaca SHPP	Principal	PT-0606A006-01	10/12/2009	03/01/2012
	Back-up	PT-0606A009-01	10/12/2009	03/01/2012

As it can be seen from data presented in the above table, the recalibrations of the both energy meters were delayed. Therefore, the "*Guidelines for assessing compliance with the calibration frequency requirements"* was to be used when calculating the emission reductions by the CDM project activity.

Considering that the recalibration date of both energy meters were delayed the provisions of paragraph 4.(a) of the guidelines were applied. The results of the delayed calibration show that the error is smaller than the maximum permissible error. Therefore, the maximum permissible error of the meter (*i.e.* 0.2%) was discounted from energy generation on December 01st, 2011 to December 31th, 2011[7].

The energy meters described in Table 2 is located at the plant according to diagram below:

[7] The discount was applied to the entire month of December, as a conservative approach.

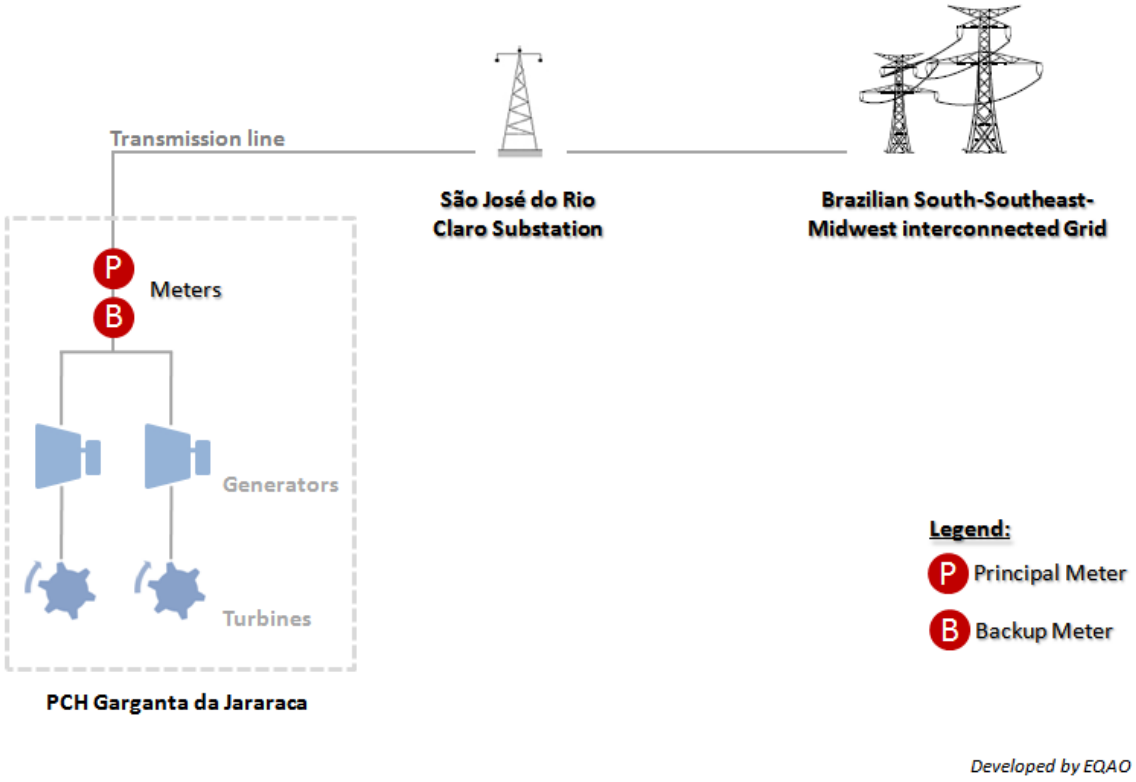

Figure 3 - Diagram of meters installed at the plant

SECTION D. Data and parameters

Parameters used to calculate baseline, project, and leakage emissions as well as other relevant parameters required by the approved methodology and the monitoring plan; and specific information on how data and parameters have been monitored during the monitoring period are presented in this section.

Data determined only once for the crediting period which were used after registration of the project activity were included under section D.1.

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	***Reservoir Area***
Data unit:	km^2
Description:	Area of the reservoir measured in the surface of the water.
Source of data used:	Surface area at full reservoir level.
Value(s):	2.87
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This parameter is used to calculate the project emissions.
Additional comment:	Parameter monitored at start of the project.

D.2. Data and parameters monitored

Data monitored and required for verification and issuance will 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.

Data / Parameter:	$\boldsymbol{EF_y}$
Data unit:	tCO_2/MWh
Description:	CO_2 emission factor of the grid.
Measured /Calculated /Default:	Calculated.
Source of data:	Spreadsheet "BR Grid EF ex post SSECO-2010-2011.04.25.xls". CO_2 emission factors for 2010 year was calculated by Ecopart and Econergy through daily reports of the National Electricity Grid Operations – from January 1st, 2010 to December 31st, 2010 – published by ONS (National Dispatch Center).
Value(s) of monitored parameter:	0.3083[8]
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This parameter is used to calculate the baseline emissions.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	
Measuring/ Reading/ Recording frequency:	Ex-post vintage, at every verification.
Calculation method (if applicable):	Calculated according to the approved methodology – ACM0002 (version 6).
QA/QC procedures applied:	-

Data / Parameter:	$\boldsymbol{EF_{OM,y}}$
Data unit:	tCO_2/MWh
Description:	CO_2 operating margin emission factor of the grid.

[8] The 2011 emission factor will be updated because this information isn't available yet. However, the 2010 emission factor was used only for estimative.

Measured /Calculated /Default:	Calculated.
Source of data:	Data related to the year of 2010 were provided by ONS (National Dispatch Center).
Value(s) of monitored parameter:	0.4958
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The information is used to calculate the baseline emission.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Ex-post vintage, at every verification.
Calculation method (if applicable):	Calculated according to the approved methodology – ACM0002, version 6 (2006).
QA/QC procedures applied:	-

Data / Parameter:	$EF_{BM,y}$
Data unit:	tCO_2/MWh
Description:	CO_2 build margin emission factor of the grid.
Measured /Calculated /Default:	Calculated.
Source of data:	Data related to the year of 2010 were provided by ONS (National Dispatch Center).
Value(s) of monitored parameter:	0.1209
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The information is used to calculate the baseline emission.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Ex-post vintage, at every verification.
Calculation method (if applicable):	Calculated according to the approved methodology – ACM0002, version 6 (2006).
QA/QC procedures applied:	-

Data / Parameter:	λ_y
Data unit:	-
Description:	Fraction of time during which low-cost/ must-run sources are on the margin.
Measured /Calculated /Default:	Calculated.
Source of data:	Data related to the year of 2010 were provided by ONS (National Dispatch Center).

Value(s) of monitored parameter:	0.4636
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	The information is used to calculate the baseline emission.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	Ex-post vintage, at every verification.
Calculation method (if applicable):	Calculated according to the approved methodology – ACM0002, version 6 (2006).
QA/QC procedures applied:	-

Data / Parameter:	EG_y
Data unit:	MWh
Description:	Electricity generation of the project delivered to the grid during 2011.
Measured /Calculated /Default:	Measured.
Source of data:	Internal records of the company.
Value(s) of monitored parameter:	187,714
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	This information is used to calculate the baseline emissions.
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	There are two electricity meters (principal and backup) which continuously monitoring the electricity generated by the plant and delivered to the grid. Their specifications are detailed above in section C. As per the information presented in the Section C, they are calibrated every two years following the recommendations of the System National Operator. Last calibration of the equipment took place in 2009. In this sense, the calibration is still valid and is due in 2011. Considering that the recalibration date of both meters (principal and backup) of the plant were delayed the provisions of paragraph 4(a) of the guidelines were applied. As conservative approach and for simplicity the maximum permissible error of the meter (*i.e.* 0.2%) was discounted from energy generation registered on December 01st, 2011 to December 31th, 2011. More details about the discount applied in the energy generation please refer to the spreadsheet calculation.
Measuring/ Reading/ Recording frequency:	Electricity is measured continuously, 5-minutes-measurement [9] and monthly recording.
Calculation method (if applicable):	Not applicable.
QA/QC procedures applied:	The electricity delivered to the grid is monitored by the Project as well as by the energy buyer. As mentioned above, energy meters are

[9] The measurement frequency is greater than established in the monitoring plan of the registered PDD (and therefore more conservative).

	calibrated every two years following recommendations of the System National Operator.

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

According to the methodology, baseline emissions are the product of the baseline emissions factor (EF_y) times the electricity supplied by the project activity to the grid (EG_y) (Equation 1). Electricity produced by the plant during the monitored period is presented in Table 4.

$$BE_y = EG_y \cdot EF_y \qquad \textbf{Equation 1}$$

The baseline emission factor was calculated as the average of the "operating margin" and the "build margin", where:

(a) The average of the "operating margin" and the "build margin", where:

(i) The "operating margin" emission factor ($EF_{OM,simple\text{-}adjusted,y}$) is the weighted average emissions (in tCO_2e/MWh) of all generating sources serving the system, excluding hydro, geothermal, wind, low-cost biomass, nuclear and solar generation. Using the notation from approved methodology,

$$EF_{OM,simple-adjusted,y} = (1-\lambda_y)\frac{\sum_{i,j} F_{i,j,y} \cdot COEF_{i,j}}{\sum_j GEN_{j,y}} + \lambda_y \cdot \frac{\sum_{i,k} F_{i,k,y} \cdot COEF_{i,k}}{\sum_k GENk_{k,y}} \qquad \textbf{Equation 2}$$

Where,

λ_y = Share of hours in year *y* (in %) for which low-cost/must-run sources are on margin,

$F_{i,j,y}$ = Amount of fuel *i* (in mass or volume unit) consumed by relevant power sources *j* (analogous for sources *k*) in year(s) *y*,

$COEF_{i,j,y}$ = CO_2e emission coefficient of fuel *i* (tCO_{2e}/mass or volume unit of the fuel), taking into account the carbon content of the fuels used by relevant power sources *j* (analogous for sources *k*) and the percent oxidation of the fuel in year(s) *y*,

$GEN_{j,y}$ = Electricity (MWh) delivered to the grid by source *j* (analogous for sources *k*) ,

j = Power sources delivering electricity to the grid, not including low-operation cost and must-run power plants, and including imports to the grid.

The CO_2e coefficient $COEF_i$ is obtained as,

$$COEF_i = NCV_i \cdot EF_{CO2,i} \cdot OXID_i \qquad \textbf{Equation 3}$$

Where,

NCV_i = Net calorific value (energy content) per mass or volume unit of fuel *i*,

$OXID_i$ = Oxidation factor of the fuel *i*,

$EF_{CO2,i}$ = CO_2e emission factor per unit of energy of the fuel *i*,

(ii) The "build margin" emission factor ($EF_{BM,y}$) is the weighted average emissions (in tCO_2e/MWh) of recent capacity additions to the system, which capacity additions are defined as the greater (in MWh) of most recent 20% of existing plants or the 5 most recent plants,

$$EF_{BM,y} = \frac{\sum_{i,m} F_{i,m,y} \cdot COEF_{i,m}}{\sum_{m} GEN_{m,y}} \qquad \textbf{Equation 4}$$

Where $F_{i,m,y}$, $COEF_{i,m}$ and $GEN_{m,y}$ are analogous to the variables described above for the operating margin for plants *m* (sample group *m* defined in (ii)), based on the most recent information available on plants already built.

The baseline emission factor EF_y is the average of the operating margin factor ($EF_{OM,y}$) and the build margin factor ($EF_{BM,y}$),

$$EF_y = 0.5 \cdot EF_{OM,y} + 0.5 \cdot EF_{BM,y} \qquad \textbf{Equation 5}$$

As mentioned in the registered PDD, CO_2 emission factor of the grid and parameters utilized in its calculation are monitored. CO_2 emission factor for 2010 year was calculated by Ecopart and Econergy through daily reports of the National Electricity Grid Operations – from January 1st, 2010 to December 31st, 2010[10] – published by ONS. Then, CO_2 emission factor of the grid is as follows:

Table 3 – Emission factors for the Brazilian South-Southeast-Midwest interconnected grid for the year 2010

Prepared by Ecopart/Ecoinvest, Econergy			
Emission factor for the Brazilian South-Southeast-Midwest grid			
Baseline 2010	EF_{OM} [tCO_2/MWh] 0.9242	(1-λ) 0.5364	EF[tCO_2/MWh] all other projects 0.3083
	$EF_{OM,simple-adjusted}$ [tCO_2/MWh] 0.4958	EF_{BM} [tCO_2/MWh] 0.1209	
	wind/solar projects w_{OM} = 0.75 w_{BM} = 0.25	all other projects w_{OM} = 0.50 w_{BM} = 0.50	wind/solar projects 0.4021

[10] The 2011 emission factor will be updated because this information isn't available yet. However, the 2010 emission factor was used only for estimative.

Electricity exported to the grid of Garganta da Jararaca Small Hydro Power Plant and baseline emissions are presented in the table below:

Table 4 – Electricity dispatched to the grid by the plant and emission reductions by the project over the monitored period

Month	*Electricity dispatched to grid by the plant (MWh)*	*Emission Reductions (tCO_2e)*
January	17,299	5,333
February	16,155	4,981
March	19,853	6,121
April	18,549	5,719
May	16,426	5,064
June	14,778	4,556
July	14,536	4,481
August	12,375	3,815
September	13,098	4,038
October	14,370	4,430
November	14,594	4,499
December[11]	15,681	4,834
TOTAL	**187,714**	**57,872**

E.2. Project emissions calculation

According to the applicable methodology, the power density of the project is greater than $10W/m^2$. Thus, project emissions by the project activity are zero.

E.3. Leakage calculation

According to the applicable methodology, indirect emissions can result from project construction, transportation of materials and fuel and other upstream activities. Nevertheless no significant net leakage from these activities was identified. Thus, leakage emissions by the project activity are zero.

E.4. Emission reductions calculation / table

Considering there are neither project emissions nor leakage emissions associated with the implementation of the project activity, emissions reductions are equivalent to baseline emissions and are calculated as follows:

[11] Following the provisions of EB 52, Annex 60, a discount was applied to the energy generated by the plant from December 01st, 2011 to December 31th, 2011. The maximum permissible error in the calibration test was applied (paragraph 4a of the guidelines) in the PCH Garganta da Jararaca energy generation. The final energy generation (*i.e.* already considering the discount as per the guidelines) is presented in Table 4. The original energy generation for this month was: 15,712 MWh. For details about the calibration delays and discounts applied please refer to section B.3.

$$ER_y = EF_y \cdot EG_y$$ **Equation 6**

Summarizing data discussed above, the total of the emission reductions achieved during the monitoring period are:

- Total baseline emissions: 57,872 tCO_2e
- Total project emissions: 0 tCO_2e
- Total leakage: 0 tCO_2e
- Total emission reductions: 57,872 tCO_2e

Table 5 – Total emission reductions during the monitored period

Month	*Total baseline emissions (tCO_2e)*	*Total project emissions (tCO_2e)*	*Total leakage emissions (tCO_2e)*	*Total emission reductions (tCO_2e)*
January	5,333	0	0	5,333
February	4,981	0	0	4,981
March	6,121	0	0	6,121
April	5,719	0	0	5,719
May	5,064	0	0	5,064
June	4,556	0	0	4,556
July	4,481	0	0	4,481
August	3,815	0	0	3,815
September	4,038	0	0	4,038
October	4,430	0	0	4,430
November	4,499	0	0	4,499
December	4,834	0	0	4,834
TOTAL	**57,872**	**0**	**0**	**57,872**

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

Below table presents a comparison between the actual values of emission reductions achieved during the monitoring period and the estimations as per the registered CDM-PDD.

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	50,293	57,872

E.6. Remarks on difference from estimated value in the PDD

Project Participants clarify that the increase in the emission reductions presented in this Monitoring Report to the ones estimated in the registered Project Design Document (PDD) is related to the CO_2 emission factor of the South-Southeast-Midwest grid.

In the registered PDD, an estimated emission reduction of 50,293 tCO_2e/year is based on the baseline emission factor of 0.2647 tCO_2/MWh. Since the CO_2 emission factor (EF) was chosen as an *ex-post* parameter during validation, a new value was calculated for the purpose of this 4th verification of Garganta da Jararaca project. As demonstrated in this report, the EF_{2010} considered in this project verification is 0.3083 tCO_2/MWh, which results in 57,872 tCO_2e. However, if the emission reductions of 2011 year would be based on the EF 0.2647 tCO_2/MWh (calculated during the validation of the project), an amount of 49,688 tCO_2e would be reduced, *i.e.*, less than the estimated emission reduction presented in the registered PDD (50,293 tCO_2e/year). Therefore, it is demonstrated that differences of the actual emission reduction claimed in this verification with the estimate in the registered PDD is due to the EF parameter.

In addition, considering that the recalibration date of both energy meters of the plant were delayed the provisions of paragraph 4.(a) of the guidelines were applied. The maximum permissible error of the meter (*i.e.* 0.2%) was discounted from energy generation, totalizing 10 tCO_2e, on December 01st, 2011 to December 31th, 2011.

It is important to mention that the emission factor for 2011 was not calculated yet, and the value used in this report is based on 2010 data. Baseline emission factor will be updated during verification.

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History of the document

Version	Date	Nature of revision
01	EB 54, Annex 34 28 May 2010	Initial adoption.
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