

**CLEAN DEVELOPMENT MECHANISM
MONITORING REPORT**

Garganta da Jararaca Small Hydroelectric Power Plant (SHP)

(CDM Registration Reference Number 0809)

**Monitored Period:
31 July 2007 to 30 November 2008**

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Section A. General description of project activity

A.1. Title of the project activity

Project title: Garganta da Jararaca Small Hydroelectric Power Plant (SHP)

Document version number: 1.1

Document Date: 28/November/2008

Monitoring Report based on the PDD Version Number: 11, from 07/May/2007.

A.2. Description of the project activity

The project consists of a run-of-river small-hydro power plant (29.3 MW), that has a small reservoir (2.87 km²) with minor environmental impact. The project is located in the Midwest of Brazil, in the Sangue River, between Campo Novo do Parecis and Nova Maringá, state of Mato Grosso, at the intersection of longitude 57°37' West and latitude 13°23' South.

Project Participants have chosen the renewable crediting period and the total estimated emission reduction is 352,051 tCO₂e over the first 7-year crediting period (from 2007 to 2014). This monitoring report corresponds to the **first** verification of the project activity.

A.3. Monitoring Report

The GHG emissions reductions during the period from 31st July 2007 to 30th November 2008 were achieved through the dispatched electricity generated by Garganta da Jararaca SHP which displaced a mix of electricity generation in the Brazilian South-Southeast-Midwest interconnected grid.

The Monitoring Report is based on the electricity delivered to the grid by Garganta da Jararaca Small Hydroelectric Power Plant. The amount of energy delivered to the grid was monitored by the energy producer, Rio do Sangue Energia S.A, as well as by local concessionary CEMAT – *Centrais Elétricas Matogrossenses S.A.*, that controls all electricity delivered to the grid and assures, for the buyer, that the electricity generated is delivered to the grid.

CEMAT - *Centrais Elétricas Matogrossenses S/A* is responsible to inform CCEE – *Câmara Comercializadora de Energia Elétrica* about the total of the energy delivered to the grid. CCEE makes feasible and regulates the electricity energy commercialization. CEMAT also is responsible for the calibration and maintenance of the monitoring equipment.

Calculation of the emissions reduction is based on validated and registered parameters fixed in the PDD and justified during the validation. The baseline emission factor for small-scale project activities for the Brazilian South-Southeast-Midwest grid is 0.2647 tCO₂e/MWh.

A.4. Period of the monitoring report and amount of monitored emissions reductions
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Period of the monitoring report: 31st July 2007 to 30th November 2008

Amount of monitored emissions reductions: 59,422 tCO₂

A.5. Date of completing the monitoring report
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The date of completing the monitoring report was 28/11/2008.

A.6. Personnel Responsible

Project Manager and Monitoring – José Roberto Faro (Rio do Sangue Energia S/A)

Monitoring Report – A. Ricardo J. Esparta (Ecoinv Global Ltda.)

Section B. Monitoring methodology and plan

B.1. Name and reference of approved monitoring methodology applied to the project activity

Approved consolidated baseline methodology ACM0002 – “Consolidated methodology for grid-connected electricity generation from renewable sources”, May 19th 2006, version 6.

B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

The chosen methodology is applicable to grid-connected renewable power generation project activities, under the condition of electricity capacity additions from run-of-river hydro power plants, as it is the case with Garganta da Jararaca Small Hydroelectric Power Plant (SHP).

Beside of this, the Brazil's large territorial extension and its vast hydro potential have been determinative in the definition of the country's current electricity generation industry, which is predominantly hydro-based. The future scenario shows an increase in the consumption of fossil fuels, mainly natural gas, in accordance with the intention of the government to diversify the Brazilian's energy supply.

B.3. Data to be monitored:

ID number	Data type	Data variable	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of monitored data	How will the data be archived? (electronic/paper)	For how long is archived data to be kept?	Comment
1	Electricity generation of the Project delivered to grid	EG_y	MWh	M	15 minutes measurement and Monthly Recording	100%	Electronic	During the credit period and two years after	The electricity delivered to the grid is monitored both by the project owner (seller) and the energy buyer CEMAT – <i>Centrais Elétricas Matogrossenses S.A.</i> (the Local Distribution Company) controlled and monitored the electricity dispatched by the SHP to the national interconnected grid. CEMAT is responsible to inform CCEE about the total of the energy delivered to the grid. The amount of electricity delivered to the grid by the project activity is available in the invoices issued by CEMAT and in the Reports issued by CCEE.
2	CO ₂ emission factor of the grid	EF_y	tCO ₂ /MWh	C	Ex-post vintage, at every verification	100%	Electronic and Paper	During the credit period and two years after	Data will be archived according to internal procedures.
3	CO ₂ Operating Margin emission factor of the grid	$EF_{OM,y}$	tCO ₂ /MWh	C	Ex-post vintage, at every verification	100%	Electronic and Paper	During the credit period and two years after	
4	Fraction of time	λ_y		C	Ex-post	100%	Electronic	During the credit	

	during which low-cost/must-run sources are on the margin				vintage, at every verification		and Paper	period and two years after	
5	Area		m ²	M	At start of the project	100%	Electronic	During the crediting period	
6	CO ₂ Build Margin emission factor of the grid	$Ef_{BM,y}$	tCO ₂ /MWh	C	Ex-post vintage, at every verification	100%	Electronic and Paper	During the credit period and two years after	

Section C. Monitored data

The project is neither associated with leakage effects nor with new emissions of pollutants. All other pertinent data was analyzed and presented at the validation phase of the project. In this sense, during the crediting period the only data that has to be monitored is the electricity supplied to the grid by the project (EGy).

The emissions reductions are reached by applying an emissions factor of the electricity dispatched to the grid that is verified and monitored by a two party verification: by the power plant that sells the electricity and by the utility company that buys the electricity.

C.1. Data collected in order to monitor project emissions

According to the “Thresholds and criteria for the eligibility for the hydroelectric power plants with reservoirs as CDM project activity”¹, emissions from reservoirs, if there is any, shall be estimated considering the power density (W/m^2) of the plant. Considering that Garganta da Jararaca SHP has an installed capacity of 29.3 MW and a small reservoir of 2.87 km^2 of area, its power density will be 10.2 W/m^2 . The area of the reservoir did not change during the monitored period.

C.2. Data collected in order to monitor baseline emissions

	2007	2008
Month	Generation (MWh)	Generation (MWh)
January	-	17,737
February	-	15,147
March	-	14,401
April	-	11,740
May	-	15,487
June	-	11,825
July ²	430	13,205
August	13,584	12,741
September	11,767	12,315
October	14,006	13,516
November	15,227	14,424
December	16,938	-
Total	71,952	152,537

Table 1 – Electricity generation delivered to grid by Garganta da Jararaca Small Hydroelectric Power Plant

¹ EB 23 Report, Annex 5

² To be checked during the verification visit.

(Sources: CEMAT - Centrais Elétricas Matogrossenses S.A, CCEE – Câmara de Comercialização de Energia Elétrica, Rio do Sangue Energia S.A)

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid				
Baseline (including imports)	EF_{CM} [tCO ₂ /MWh]	Load [MWh]	LCMR [GWh]	Imports [MWh]
2002	0.8548	275,402,896	258,720	1,607,395
2003	0.9421	288,493,929	274,649	459,586
2004	0.8763	297,879,874	284,748	1,468,275
	Total (2002-2004) =	861,776,699	818,118	3,535,256
	$EF_{CM, simple-adjusted}$ [tCO ₂ /MWh]	$EF_{CM, 2004}$	Lambda	
	0.4332	0.0962	λ_{2002}	
	Alternative weights	Default weights	0.5053	
	$W_{CM} = 0.75$	$W_{CM} = 0.5$	λ_{2003}	
	$W_{SM} = 0.25$	$W_{SM} = 0.5$	0.5312	
	Alternative EF_{CM} [tCO ₂ /MWh]	Default EF_{CM} [tCO ₂ /MWh]	λ_{2004}	
	0.3490	0.2647	0.5041	

Table 2 – CO₂ emission factor of the grid/ CO₂ Operating Margin emission factor of the grid/
CO₂ Build Margin emission factor of the grid

Section D. Calculation of GHG emission by sources

The Monitoring Report applies the *ex ante* validated emission factor for Large Scale project activities for the Brazilian South-Southeast-Midwest interconnected grid. As shown in the table above, the CO₂ emission factor of the grid is 0.2647 tCO₂e/MWh

D.1 Describe the formulae used to calculate emissions reductions

The emission reductions by the project activity (ER_y) during a given period of year y are the product of the baseline emissions factor (EF_y , in tCO₂e/MWh) times the electricity supplied by the project to the grid at the same period of year y (EG_y , in MWh), as follows:

$$ER_y = EF_y \cdot EG_y \quad \text{Equation 1}$$

D.2 Tables providing values obtained when applying formulae above

Baseline emission factor of the Brazilian grid (tCO ₂ e/MWh)	0.2647
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2007				
Month	Electricity Generation (MWh)	Emissions Reduction (tCO₂e)	Project Emissions (tCO₂e)	Total Emission Reductions (tCO₂e)
January	-	-	-	-
February	-	-	-	-
March	-	-	-	-
April	-	-	-	-
May	-	-	-	-
June	-	-	-	-
July*	430	114	-	114
August	13,584	3,596	-	3,596
September	11,767	3,115	-	3,115
October	14,006	3,707	-	3,707
November	15,227	4,031	-	4,031
December	16,938	4,483	-	4,483
Total	71,952	19,046	0	19,046

2008				
Month	Electricity Generation (MWh)	Emissions Reduction (tCO₂e)	Project Emissions (tCO₂e)	Total Emission Reductions (tCO₂e)
January	17,737	4,695	-	4,695
February	15,147	4,009	-	4,009
March	14,401	3,812	-	3,812
April	11,740	3,108	-	3,108
May	15,487	4,099	-	4,099
June	11,825	3,130	-	3,130
July	13,205	3,495	-	3,495
August	12,741	3,373	-	3,373
September	12,315	3,260	-	3,260
October	13,516	3,578	-	3,578
November	14,424	3,818	-	3,818
December	-	-	-	-
Total	152,537	40,377	0	40,377

*preliminary information to be checked during the verification visit

Total Emission Reductions (July/2007 - November/2008)	59,422
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Annexes

Annex 1 - Contact information

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