

CDM Monitoring Report

CLEAN DEVELOPMENT MECHANISM MONITORING REPORT

Central Energética do Rio Pardo Cogeneration Project (CERPA)

(CDM Registration Reference Number 0209)

Monitored Period: 01 January 2008 to 31 December 2008

Crediting Period: 01 May 2003 to 30 April 2010

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Section A. General description of project activity

A.1. Title of the project activity

Central Energética do Rio Pardo Cogeneration Project (CERPA).

Document version number: 01, 24/04/2009.

Monitoring Report based on the PDD Version Number: 4B, from 21/12/2005.

A.2. Description of the project activity

The primary objective of the CERPA Cogeneration Project 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.

Usina da Pedra is a sugar mill located in Serrana, state of São Paulo. The company is owned by the Biagi family, which is one of the most traditional producers in the sugar industry in Brazil. Pedra Agroindustrial S/A, the family company, owns three other sugarcane mills (Ibirá Mill, Buriti Mill and Ipê Mill). Usina da Pedra produces sugar, anhydrous and hydrated alcohol, as well as generates its own electricity.

In 2003, CERPA upgraded its equipment with the objective of using bagasse more efficiently to cogenerate electricity. A more efficient cogeneration of this renewable fuel allows Usina da Pedra mill to sell a surplus of electricity to the grid and creates a competitive advantage. The electricity sold to the grid diversifies income to the mill and it helps 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.

In May 2003, CERPA, which is the thermoelectric plant of Usina da Pedra, sold its first MWh to the local power utility CPFL (*Companhia Paulista de Força e Luz*). Currently, there is a PPA signed with CPFL to commercialise 18 MW.

CERPA operates with a configuration using a high-pressure boiler and a multiple stage backpressure turbine coupled with two new 15 MW generators. There are 12 MW for internal consuming and 18 MW of power surplus, operating at full capacity during the crop-season (May to November) and part of the capacity out of the crop season, when the production allows it.

Usina da Pedra produced, during harvest 08/09 (2008 year) 4.006.495 tones of sugar cane, corresponding to 1,121,819 tones of bagasse. From this quantity, CERPA consumed the equivalent of 521,629 tones of bagasse to generate electricity, which represents 46,5% of the total produced in the project boundary, and the equivalent of 577,753 tones of bagasse to supply Usina da Pedra's and CERPA's thermal needs, which represent 51,5% of the total bagasse produced. The additional 2% of bagasse produced was stored (what can be checked on-site). Hence, there was plenty of bagasse residues to be used as fuel by CERPA.

The implementation of the project did not increase the bagasse production in the facility. In 2003, CERPA produced 3,699,457 tones of sugar cane. In 2006, they produced 4,101,266 tones of sugar cane and in 2007, 3,878,453 tones. It is important to emphasize that

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these variation is caused by production expansion and ethanol market, besides good climate conditions have influence in the productivity.

A.3. Cerpa Energia Monitoring Report

The GHG emissions reduction during the period from January 2008 to December 2008 was achieved through the dispatched electricity generated by Usina da Pedra, that 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 Usina da Pedra. The amount of energy delivered is monitored by the energy producer (seller) and by the power utility (buyer) meters. The power utility – Companhia Paulista de Força e Luz (CPFL) - 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.

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 project activities as Cerpa Project for the Brazilian South-Southeast-Midwest grid is 0.2677 tCO₂/MWh.

A.4. Period of the monitoring report and amount of monitored emissions reductions

Period of the monitoring report: 01 January 2008 – 31 December 2008

Amount of monitored emissions reductions: **28,195** tCO₂

Total crediting period of the project: 01 May 2003 – 30 April 2010

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Section B. Monitoring methodology and plan

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

AM0015 – “Bagasse-based cogeneration connected to an electricity grid”

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

CERPA is a cogeneration project connected to the electricity grid. The project has fulfilled all the “additionality” requisites (see application of the “additionality tool¹” below) and has demonstrated why the project would not occur in the absence of the CDM.

During a period of restructuring the entire electricity market, as is the current Brazilian situation, investment uncertainty is the main barrier for small renewable energy power projects. In this scenario these projects compete with existing plants (operating margin) and with new projects (build margin), which usually attract the attention of financial investors. Operating and Build Margins have been used to calculate the emission factor for the connected grid.

The methodology AM0015, for cogeneration projects, uses derived margins, which have been applied in the context of the project activity through the determination of the emissions factor for the South-Southeast-Midwest subsystem of the interconnected Brazilian grid (electricity system that is connected by transmission lines to the project electricity system and in which power plants can be dispatched without significant transmission constraints).

The sugarcane process capacity did not change between before and after the project activity, that is 24,000 ton per day. The variation in the annual processing amount to meet market demand is adjusted varying the days of operation of the plant.

¹ Tool for the demonstration and assessment of additionality. UNFCCC, CDM Executive Board 16th Meeting Report, 22 October 2004, Annex 1. Web-site: <http://cdm.unfccc.int/>

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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 and paper	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. A Brazilian government entity, CCEE – Câmara Comercializadora de Energia Elétrica - controls and monitors the electricity available on the national interconnected grid. The amount of electricity delivered to the grid by the project activity is available on CCEE's web-site.
2	CO ₂ emission factor of the grid	EF_y	tCO ₂ /MWh	c	At the validation	0%	Electronic	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	At the validation	0%	Electronic	During the credit period and two years after	
4	CO ₂ Build Margin emission factor of the grid	$Ef_{BM,y}$	tCO ₂ /MWh	c	At the validation	0%	Electronic	During the credit period and two years after	
5	Fraction of time during which low-cost/must-run sources are on the margin	λ_y	Non dimensional	c	At the validation	0%	Electronic	During the credit period and two years after	Data is available under request. Factors were calculated according to the Approved monitoring methodology AM0015.

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Section C. Monitored data

As the project is neither associated with leakage effects nor with new emissions of pollutants and all other pertinent data is necessary to be analysed and presented only at the validation phase of the project, the only data that has to be monitored going forward during the life of the contract is the electricity supplied to the grid by the project (EG_y).

The main data to be considered in determining the emissions reductions is the electricity exported to the grid. The emissions reduction is reached by applying an emissions factor through 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.

This data is monitored through a spreadsheet that collects information by meters installed in the exit of the mill and entrance of the transmission lines and by the sales receipts issued by the electricity utility to the mill.

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

According Monitoring Methodology AM0015 – “Bagasse-based cogeneration connected to an electricity grid”, data of CO₂ emissions from fossil fuels combusted due to the project activity at the project site are required, where relevant.

The only emissions due to fossil fuels at the project site are due to the transportation of sugar cane, by trucks, to the sugar mill. This transportation existed already in the baseline, and did not change because of the project, so that there are no net changes in CO₂ emissions from fossil fuels due to the project activity. A document provided by Equipalcool - the boilers' manufacturer - stating that the equipment was designed to burn sugar cane bagasse and must not be put in operation burning other types of fuels were presented to DOE.

Also, CERPA monitors constantly that there are no relevant sources of fossil fuel emissions due to the project activity at the project site, and confirms that project emissions are zero.

Considering information above, GHG emissions by the project activity are zero.

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

Table 1 – Electricity generation delivered to grid by Usina da Pedra (MWh)

MONTH	2008
January	10,735.06
February	0
March	0
April	2,274.23
May	11,023.41
June	12.245,23
July	13.118,88
August	11.651,62
September	11,270.61
October	8,835.61
November	11.520,00
December	12.650,00
TOTAL	105.324,64

Source: Usina da Pedra

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

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid				
Baseline (including imports)	EF _{OM} [tCO ₂ /MWh]	Load [MWh]	LCMR [GWh]	Imports [MWh]
2002	0,8504	275.402.896	258.720	1.607.395
2003	0,9378	288.493.929	274.649	459.586
2004	0,8726	297.879.874	284.748	1.468.275
	Total (2001-2003) =	861.776.699	818.118	3.535.256
	EF _{OM, simple-adjusted} [tCO ₂ /MWh]	EF _{BM, 2004}	Lambda	
	0,4310	0,1045	λ_{2002}	
	Alternative weights	Default weights	0,5053	
	w _{OM} = 0,75	w _{OM} = 0,5	λ_{2003}	
	w _{BM} = 0,25	w _{BM} = 0,5	0,5312	
	EF _{CM} [tCO ₂ /MWh]	Default EF _{OM} [tCO ₂ /MWh]	λ_{2004}	
	0,3494	0,2677	0,5041	

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Section D. Calculation of GHG emission by sources

The Monitoring Report applies the *ex ante* validated emission factor for project activities for the Brazilian South-Southeast-Midwest interconnected grid. Calculation of the emissions reduction is based on validated and registered parameters fixed in the PDD and justified during the validation. As shown in the table above, the CO₂ emission factor of the grid is 0.2677 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

USINA DA PEDRA EMISSION REDUCTION			
Year	Electricity Generation (MWh)	Baseline Emission Factor (tCO ₂ e/MWh)	Emissions Reduction (tCO ₂ e)
2008 (01 Jan 2008 to 31 Dec 2008)	105,325	0.2677	28,195

TOTAL (tCO₂e)	28,195
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