CLEAN DEVELOPMENT MECHANISM
MONITORING REPORT

Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity

(CDM Registration Reference Number 0773)

Monitored Period: 01 March 2005 to 31 December 2006
Crediting Period: 01 March 2005 to 29 February 2012

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Section A. General description of project activity

A.1. Title of the project activity

Ceran's Monte Claro Run-of-river Hydropower Plant CDM Project Activity

Document version number: 03, 28 September 2007.

Monitoring Report based on the PDD Version: 6, 05 September 2006.

A.2. Description of the project activity

The primary objective of the Ceran 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.

The Latin America and the Caribbean region countries have expressed their commitment towards achieving a target of 10% renewable energy of the total energy use in the region. Through an initiative of the Ministers of the Environment in 2002 (UNEP-LAC, 2002), a preliminary meeting of the World Summit for Sustainable Development (WSSD) was held in Johannesburg in 2002. In the WSSD final Plan of Implementation no specific targets or timeframes were stated, however, their importance was recognized for achieving sustainability in accordance with the Millennium Development Goals[1].

The privatization process initiated in 1995 arrived with an expectation of adequate tariffs and better prices for generators. It drew the attention of investors to possible alternatives not available in the centrally planned electricity market. At the end of the 1990's a strong increase in demand in contrast with an under-average increase in installed capacity caused the supply crisis/rationing from 2001/2002. One of the solutions the government provided was flexible legislation favoring smaller independent energy producers. Furthermore the possible eligibility under the Clean Development Mechanism of the Kyoto Protocol drew the attention of investors in hydropower projects.

This indigenous and cleaner source of electricity will also have an important contribution to environmental sustainability by reducing carbon dioxide emissions, avoiding electricity generation by fossil fuel sources (and CO_2 emissions) which would have occurred otherwise in the absence of the project.

The Ceran Project improves the supply of electricity with clean, renewable hydroelectric power while contributing to the regional/local economic development. Small to medium scale hydropower run-of-river plants provide local distributed generation and provide site-specific reliability and transmission and distribution benefits including:

[1] WSSD Plan of Implementation, Paragraph 19 (e): "Diversify energy supply by developing advanced, cleaner, more efficient, affordable and cost-effective energy technologies, including fossil fuel technologies and renewable energy technologies, hydro included, and their transfer to developing countries on concessional terms as mutually agreed. With a sense of urgency, substantially increase the global share of renewable energy sources with the objective of increasing its contribution to total energy supply, recognizing the role of national and voluntary regional targets as well as initiatives, where they exist, and ensuring that energy policies are supportive to developing countries' efforts to eradicate poverty, and regularly evaluate available data to review progress to this end."

- Increased reliability, shorter and less extensive outages;
- Lower reserve margin requirements;
- Improved power quality;
- Reduced lines losses;
- Mitigation of transmission and distribution congestion, and;
- Increased system capacity with reduced T&D investment.

It can be said that fair income distribution is achieved from job creation and an increase in people's wages, however better income distribution in the region where the Ceran Project is located is obtained from less expenditures and more income in the local municipalities. The surplus of capital that these municipalities will have could be translated into investments in education and health which will directly benefit the local population and indirectly impact a more equitable income distribution. This money would stay in the region and be used for providing the population better services which would improve the availability of basic needs. A greater income comes from the local investment on the local economy, and a greater tax payment, which will benefit the local population.

The project activity is a run-of-river hydropower plant with a total installed capacity of 130 MW, located in the cities of Bento Gonçalves, Nova Roma do Sul and Veranópolis, state of Rio Grande do Sul, South region of Brazil. The first Kaplan turbine (65MW) started its operation in December 29th 2004. The second one (65MW), starts its operations in November 29th, 2006.

The Project Company has the following shareholder's structure:

- CPFL Geração de Energia S.A.: 65%
- CEEE – Companhia Estadual de Energia Elétrica: 30%
- Desenvix S.A.: 5%

A.3. Monte Claro Monitoring Report

The GHG emissions reduction during the period from March 2005 to December 2006 was achieved through the dispatched electricity generated by Monte Claro Hydropower Plant, 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 Monte Claro Hydropower Plant. The amount of energy delivered is monitored by the energy producer (seller) meters and CCEE – *Câmara de Comercialização de Energia Elétrica*. Monte Claro Hydropower Plant has four meters that were calibrated by Eletrosul Centrais Elétricas S/A and Instituto de Tecnologia para o Desenvolvimento - Lactec.

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 Ceran Project for the Brazilian South-Southeast-Midwest grid is 0.2647 tCO2/MWh.

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

Period of the monitoring report: 01 March 2005 – 31 December 2006

Amount of monitored emissions reductions: 135,689 tCO_2e

Total crediting period of the project: 01 March 2005 – 29 February 2012

A.6. Personnel responsible for the information

Project Manager – Vendolino Fischer (Ceran - Cia. Energética Rio das Antas)

Monitoring Report – Karen M. Nagai (Ecoinvest Carbon Brasil 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 baseline methodology for grid-connected electricity generation from renewable sources", May 19th 2006, Version 06.

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 Ceran Project.

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 variable	Source of data	Data unit	Measured (m), calculated (c) or estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (Electronic/ paper)	Comment
1. EG_y	Electricity generation of the Project delivered to grid	Energy metering connected to the grid and Report emitted by CCEE	MWh	M	15-minutes-measurement and Monthly recording	100%	Electronic	The electricity delivered to the grid is monitored by the Project as well as by the CCEE. The electricity generation will be monitored by the project participants. The electricity generation will be double-checked by report emitted by CCEE anually.
2. EF_y	CO_2 emission factor of the grid	Calculated	tCO_2/MWh	C	At the validation	n.a.	Electronic and Paper	It will be used the emission factor of the grid calculated at the validation during the credit period.
3. $EF_{OM,y}$	CO_2 Operating Margin emission factor of the grid	Data provided by ONS (National dispatch center). Calculated according the approved methodology – ACM0002	tCO_2/MWh	C	At the validation	n.a.	Electronic and Paper	Data will be archived during the credit period according to internal procedures.
4. $Ef_{BM,y}$	CO_2 Build Margin emission factor of the grid	Data provided by ONS. Calculated according the approved methodology – ACM0002	tCO_2/MWh	C	At the validation	n.a.	Electronic and Paper	Data will be archived during the credit period according to internal procedures.
5. λ_y	Fraction of time during which low-cost/must-run sources are on the margin	Data provided by ONS. Calculated according the approved methodology – ACM0002		C	At the validation	n.a.	Electronic and Paper	Data will be archived during the credit period according to internal procedures.

Section C. Monitored data

As the project is neither associated with leakage effects nor with new emissions of pollutants and all other pertinent data are 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 project 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, which is verified and monitored by a double checked verification: by Ceran – *Cia. Energética Rio das Antas* that monitors its energy generated and by CCEE – *Câmara de Comercialização de Energia Elétrica* that check and writes up the electricity delivered to the grid. CCEE makes feasible and regulates the electricity energy commercialization.

There are four meters in Ceran Project:

Meter	Metering
At the generator 1	Gross energy
At the generator 2	Gross energy
Principal	Net energy dispached to Brazilian grid
Rearguard	Net energy dispached to Brazilian grid

Dispatched energy data are collected in real time by the four meters and, later, stored in the meters database with five minutes measuring intervals. Meters utilized in Monte Claro power plant are according stipulated specifications by CCEE. The Maintenance Department is responsible for creating energy generation sheets monthly of the four meters. The Operation Department is responsible for consolidating the energy generation information and sends to CPFL Comercialização Brasil S/A.

Every first day of the each month, the Systems Technician - from the Maintenance Department - collects data about the gross and net energy from the meters database related to the previous month. Then, sheets with consolidated hourly energy data are generated. The Maintenance Department is also responsible for making backups of the energy generation information during 9 years, considering crediting period plus two years.

The Operation Coordinator – from the Operation Department - analyses the data and the total of the energy in the month collected by the System Technician. After, he sends energy data to CPFL Comercialização Brasil S/A monthly and stores this information in the data server G:\Operaçao\OPERAÇÃO\Registros SE - Medições Energia. When information is received, CPFL inserts data at CCEE's website through Sinercom software.

In summary, 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.

Currently, an Energy Data Collection System (from the Portuguese SCDE – Sistema de Coleta de Dados de Energia), a system administrated by CCEE, is available at the project site. The Energy Data Collection System (SCDE) is a system that collects the net and gross generated energy and the consumption in the metering points daily of the Brazilian grid. The Operation Department is responsible for supervising the SCDE. Through Ceran's Metering Collection Central Unit (from the Portuguese UCM – Unidade Central de Coleta de Dados), data is sent online to SCDE and CCEE has access related to the energy generated directly.

Then, the monitoring involves the following entities:

I – CERAN: it has the responsibility to check, calibrate its four meters and also make backups of the energy generated during the credit period plus two years. Ceran sends energy generation information to CPFL Comercialização Brasil S/A. Currently, Ceran gives CCEE access to the Metering Collection Central Unit where is possible to collect generated energy information;

II – CCEE: receives information about energy's generation inserted by CPFL Comercialização Brasil S/A through Sinercom software and writes up and monitors all energy from Brazilian national grid. Currently, CCEE has accesses to the Metering Collection Central Unit through SCDE and takes generated energy information to make the accountability of the amount of energy supplied in the National Interconnected System (SIN – Sistema Interligado Nacional). When requested, CCEE emits a generated energy report;

III – CPFL Comercialização Brasil S/A: It was hired by CERAN to be responsible for all work that involves relationship with CCEE. CPFL Comercialização Brasil S/A is responsible for inserting correctly energy generation's data in the CCEE's software called Sinercom, being subjected to conferences. Besides of that, CPFL Comercialização Brasil S/A has to verifiy and confirm the information reported by CCEE about the amount of energy supplied in its system by the Monte Claro Hydropower Plant. Currently, energy generated is transferred directly to CCEE through SCDE and CPFL does not need to insert data in Sinercom.

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

GHG emissions by the project activity are zero.

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

Monte Claro Hydropower Plant Generation (MWh)		
Months	**2005**	**2006**
January	-	19,804
February	-	10,821
March	4,429	10,335
April	43,040	7,420

May	39,581	6,970
June	14,565	23,804
July	38,989	30,139
August	44,949	44,241
September	46,545	33,413
October	3,639	13,105
November	0	34,145
December	7,886	34,796
TOTAL	**243,623**	**268,993**

Table 1 – Electricity generation delivered to grid by Monte Claro Hydropower Plant
(Sources: Ceran - Cia. Energética Rio das Antas)

Emission factors for the Brazilian South-Southeast-Midwest interconnected grid

Baseline (including imports)	EF_{OM} [tCO2/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**
	$EF_{OM,\ simple\text{-}adjusted}$ [tCO2/MWh]	$EF_{BM,2004}$	Lambda	
	0.4332	0.0962	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	
	Alternative EF_{OM} [tCO2/MWh]	Default EF_{OM} [tCO2/MWh]	λ_{2004}	
	0.3490	**0.2647**	0.5041	

Table 2 – CO_2 emission factor of the grid/ CO_2 Operating Margin emission factor of the grid/ CO_2 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 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 0.2647 tCO2e/MWh.

D.1 Describe the formulae used to calculate emissions reductions

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

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

D.2 Tables providing values obtained when applying formulae above

Monte Claro Hydropower Plant

Year	Electricity Generation (MWh)	Baseline Emission Factor (tCO2e/MWh)	Emissions Reduction (tCO2e)
2005 (01/Mar/2005 to 31/Dec/2005)	243,623.14	0.2647	64,487.04
2006 (01/Jan/2006 to 31/Dec/2006)	268,992.64	0.2647	71,202.35
		Total (tCO2e)	**135,689.40**

Annexes

Annex 1 - Contact information

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