

Monitoring Report - PARAÍSO SMALL HYDROPOWER PLANT

UNFCCC Clean Development Mechanism Monitoring Report

PARAÍSO SMALL HYDROPOWER PLANT – PCH PARAÍSO

(CDM Registration Reference Number: 1317)
Version 1

Monitoring Period:
11 Feb 2008 – 31 Dec 2008

Date of Report: 17/02/2009

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1. Introduction:

The purpose of this monitoring report is to report the emission reductions generated by the PARAÍSO SMALL HYDROPOWER PLANT (CDM registration reference number: 1317) during the first monitoring period "11/02/2008 – 31/12/2008 ", and to serve as the basis for verification, certification and issuance of CERs.

Further background on this project can be found in the PDD and associated documents, which are available on the UNFCCC website:

<http://cdm.unfccc.int/Projects/DB/BVQI1188558574.2>

2. General description of the project

2.1 Project activity

In this context we would like to present the project activity PCH Paraíso. PCH Paraíso is a small Hydropower Plant of 21.6 MW installed capacity, located in the city of Costa Rica in the State of Mato Grosso do Sul. PCH Paraíso utilizes the Paraíso river Hydropower potential to generate electricity.

PCH Paraíso has the objective to generate electricity to supply the country's economic growth demands for energy, through the use of sustainable renewable sources, such Hydropower Plants generation. This project consists in the installation of a Small Hydropower Plant with a reservoir of approximately 1,2 km². PCH Paraíso does not require an extensive reservoir. It is limited to a lake of approximately 1.2 km².

The Plant Potency is 21.6 MW. This qualifies PCH Paraíso to fit in the ACM0002 methodological framework.

2.2 Technology employed by the project activity

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. The technology employed at PCH Paraíso Project is well known established technology in the industry.

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The Francis turbine is the most widely used among water turbines. This turbine is a type of hydraulic reactor turbine in which the water flow exists the turbine blades in the radial direction. Francis turbines are common in power generation and are used in applications where high flow rates are available at medium hydraulic head. Water enters the turbine through a volute casing and is directed onto the blades by wicket gates. The low momentum water then exists the turbine through a draft tube. In the model, water flow is supplied by a variable speed centrifugal pump. A load is applied to the turbine by means of a magnetic brake, and torque is measured by observing the deflection of calibrated springs. The performance is calculated by comparing the output to the energy supplied. A run-of-river project presents low environmental impact.

3. Calculation of emission reductions:

3.1 Emission reductions calculation equation

In accordance with the ACM0002, Emission reductions are calculated according to the following formula:

$$ER_y = BE_y - PE_y - L_y$$

With:

- ER_y , emission reductions in year y ,
- BE_y , baseline emissions in year y ,
- PE_y , project emissions in year y ,
- L_y , leakage in year y .

3.2 Project emissions

The project involves the operation of a zero-emission wind farm, so project emissions are considered zero, i.e. $PE_y = 0$.

3.3 Leakage

The project activity involves the operation of a hydropower station and does not have emergency fossil-fuel fired generator capacity (i.e. diesel generators) installed at the project site.

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In accordance with the ACM0002, leakage (arising from power plant construction, fuel handling, etc.) can be ignored. The project participants also do not claim emission reductions resulting from a reduction of these emissions under the baseline level.

Considering the above, the leakage is considered zero, i.e. $L_y = 0$.

3.4 Baseline emissions

In accordance with the ACM0002, Baseline emissions are calculated according to the following formula:

$$BE_y = EG_y \cdot EF_y$$

With:

- BE_y , baseline emissions in year y,
- EG_y , net electricity supplied by the project to the grid in year y,
- EF_y , the emission factor in year y

The emission factor EF_y is equal to 0,2383 tCO₂/MWh. EF_y . The emission factor is calculated regarding data from the Brazilian DNA who provides build emission factor and operating emission factor. In this case, for conservative reasons the build emission factor was considered 0 (zero).

The formula for calculating baseline emissions is:

$$BE_y = EG_y \cdot 0,2383 \text{ tCO}_2/\text{MWh}$$

Monitoring Period	MWh
11/2-29/02/2008	6.366,309
mar/08	10.698,932
apr/08	9.362,168
mai/08	8.849,983
jun/08	7.405,074
jul/08	6.754,926
aug/08	6.131,090
sept/08	5.493,790
oct/08	7.297,519
nov/08	9.126,580
dec/08	8.530,598
Total	86.016,969

Source: CCEE-SINERCOM

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3.5 Emission reductions

Considering the above, the calculation of emission reductions is presented below:

$$ER_y = BE_y = EG_y \cdot EF_{y\backslash}$$

$$ER_y = 86.016,969 \text{ MWh} \cdot 0,2383 \text{ tCO}_2/\text{MWh} = 20.497,84 \text{ tCO}_2$$

Total emission reductions during the monitoring period are calculated as 20.497,84 tCO₂e

4. Monitoring methodology and plan:

The project applies the approved consolidated monitoring methodology ACM0002 – “Consolidated monitoring methodology for zero-emissions grid-connected electricity generation from renewable sources”.

In keeping with the monitoring methodology, the following parameter needs to be monitored:

EG_y : Net electricity supplied to the grid.

Data / Parameter:	EG_y
Data unit:	MWh / ano
Description:	Generation of electricity of the project dispatched in the grid
Source of data to be used:	Measured energy connected at the grid and receipt of sales
Measurement procedures (if any):	Directly measured and publicly available official data. Distribution of electricity in Brazil is a government concession and is regulated by the Brazilian Electricity Agency (ANEEL acronym from the Portuguese “ <i>Agência Nacional de Energial Elétrica</i> ”). In accordance with legal and regulatory requirements determined by ANEEL (see ANEEL, Resolução Normativa N° 163, 1° of august 2005).
Monitoring frequency:	Measurement of 15 minutes and monthly recording
QA/QC procedures to be applied:	The electricity delivered by PCH Paraíso is cross-checked by the meters.
Any comment:	-

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5. Quality Control (QC) and Quality Assurance(QA):

ID	Uncertainty level of data	QA/QC procedures
EG _y	Low	The supply of electricity to the grid by the Project is continuously measured through national standard electricity metering instruments and monthly recorded by the project owner. Sale receipts/records from the grid are used for cross-checking.

6. Submission and authorization:

This monitoring report has been prepared and submitted by the Project Entity, Energias do Brasil. The below officer declares that the contents of the report provide an accurate representation of the monitoring results.

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Position: Director

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