MONITORING REPORT TITLE

Prepared by:

CARBOTRADER

Project Title	Engenheiro Ernesto Jorge Dreher and Engenheiro Henrique Kotzian SHPs VCS Project (JUN1120).
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Table of Contents

CONTENT

1 PROJECT DETAILS

1.1 Summary Description of Project

The project activity consists in electricity generation by renewable source (hydro), through the construction of two small hydropower plants (SHPs) located in the Júlio de Castilhos and Salto Jacuí municipalities, both in Rio Grande do Sul state – south region of Brazil.

According to the dispatches 1,180 and 1,805 issued by National Electric Energy Agency – *ANEEL* (from Portuguese *Agência Nacional de Energia Elétrica*) on 18th April 2007 and 18th May 2009 respectively, both the power plants of project activity are located on the Ivaí river, Atlantic Southeast Basin.

The Engenheiro Ernesto Jorge Dreher SHP has an installed power of 17.95 MW and a new reservoir which in its higher water level occupies an area of 0.83 km^2.

The Engenheiro Henrique Kotzian SHP has an installed power of 13.23 MW and a new reservoir which in its higher water level occupies an area of 0.66 km^2.

The project activity purpose is to provide electric power to the National Interconnected System - *SIN* (from portuguese *Sistema Interconectado Nacional*), displacing the thermal generation from fossil fuels presents in the system with the generation of renewable sources of energy. Moreover, the SHPs construction helps to meet the growing energy demand on Rio Grande do Sul state, to decrease the external energy dependency and contributes to the environmental sustainability, as it increases the share of renewable energy in relation to the total consumption of electricity of Brazil.

The table 1 shows when and which equipments the project activity operates.

Table 1: Operational timeline of Eng. Ernesto Jorge Dreher and Eng Henrique Kotzian SHPPs.

YEAR	ACTIVE
2009	01 July 2009 – Generating units number 1, 2 and 3 with total installed capacity of 17,145 MW (Eng. Ernesto Jorge Dreher SHP) start inputting energy into the grid. 01 November 2009 – Generating unit number 4 with installed capacity of 326,6 kW (Eng. Ernesto Jorge Dreher SHP) start inputting energy into the grid.
2010	01 September 2010 - Generating units number 2 and 3 with total installed capacity of 8,82 MW (Eng. Henrique Kotzian SHP) start to input energy into the grid. 01 October 2010 - Generating unit number 1 with installed capacity of 4,41 MW (Eng. Henrique Kotzian SHP) start to input energy into the grid.

1.2 Sectoral Scope and Project Type

As per UNFCCC`s (*United Nations Framework Convention on Climate Change*) definitions, the project activity is according the sectoral scope 1 that refers to energy industries (renewable or non renewable sources). It isn't a grouped project.

1.3 Project Proponent

Organization:	BME Rincão do Ivaí Energia S.A.
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Building:	Hermani
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Mobile:	-----

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1.4 Other Entities Involved in the Project

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1.5 Project Start Date

01/07/2009

1.6 Project Crediting Period

Crediting period - 01/07/2009 to 30/06/2019

Total number of crediting years - 10 years (renewable).

1.7 Project Location

At the pictures below is it possible to verify the regional position of both municipalities where the hydro plants are located in Rio Grande do Sul state, region South of Brazil. The municipalities are Júlio de Castilhos (figure 1) and Salto Jacuí (figure 2). The stretch of Ivaí river, where the power plants of the project activity are located on, flows between these two municipalities, being one of their geographical

limits. The Engenheiro Ernesto Jorge Dreher SHP is located at 29º07'13"S and 53º22'04"W, and the Engenheiro Henrique Kotzian SHP is located at 29°07'34"S and 53°19'06"W.

Figure 1: Localization of Júlio de Castilhos city.

Figure 2: Localization of Salto do Jacuí city.

1.8 Title and Reference of Methodology

The project make use of the Clean Development Mechanism (CDM) methodology: ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources" (Version 12.1.0), also approved by the VCS Program.

2 IMPLEMENTATION STATUS

2.1 Implementation Status of the Project Activity

Within the period covered by this report, the project activity has installed all the forecasted power capacity to its both plants. The generating unit 5 of SHPP Jorge Dreher is already working. Since its starting date was forecasted to September 2011, the target was accomplished. So, the SHP Ernesto Jorge Dreher is generating with all it generating unit since then. The reductions forecasted by the time of validation process were overcome by the performed due the increase of the CO_2 emission factor of the Brazilian grid correspondent to the year of 2010. This increase promoted the increase of emission reductions performed to the period. No significant events that could impact the GHG emission reductions of project activity were registered.

2.2 Deviations from the Monitoring Plan

There are no deviations from the monitoring plan.

2.3 Grouped Project

This is not a grouped project.

3 DATA AND PARAMETERS

3.1 Data and Parameters Available at Validation

Data Unit / Parameter:	Cap_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity. For new hydro power plants, this value is zero.
Source of data:	Project site.
Value applied:	0
Purpose of the data:	Used to determine the installed capacity based on recognized standards.
Any comment:	-

Data Unit / Parameter:	A_{BL}
Data unit:	m^2
Description:	Area of the reservoirs measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m2). For new reservoirs, this value is zero.
Source of data:	Project site.
Value applied:	0
Purpose of the data:	Used to determine de power densities of the project activity plants in order to considerate the project emissions if applicable.
Any comment:	-

3.2 Data and Parameters Monitored

Data / Parameter:	$EG_{Engenheiro\ Ernesto\ Jorge\ Dreher,2009\ /\ 2010}$
Data unit:	MWh/year
Description:	Quantity of net electricity generation supplied by the SHPP Engenheiro Ernesto Jorge Dreher to the grid in the years 2009 and 2010, recorded by two meters.
Source of data:	Project owners
Description of measurement methods and procedures to be applied:	The net electricity delivered to the grid will be checked through the electricity unidirectional meters (one main and one back-up installed in Salto do Jacuí Hydropower Substation). The meters must comply with national standards stated by ONS module 12.2 (which can be viewed through the link http://www.ons.org.br/procedimentos/modulo_12.aspx), and industry regulation to ensure the accuracy (class 0.2). For safety, the meter will be sealed after calibration.
Frequency of monitoring/recording:	Continuous measurement and at least monthly recording
Value monitored:	2009 - 49,732.32 2010 - 77,313.37
Monitoring equipment:	Electricity meters: TYPE: ELO 2180SP, Accuracy Cass 0,2 Number: 90011045 / 90011046 /90011047 / 90011048 /90011049 / 90011050
QA/QC procedures to be applied:	These data will be used to calculate the emission reductions. The data will be archived monthly (electronic) and kept archived during the credit period and two years after. The data from the energy meters will be cross checked with the CCEE databank in order to verify the coherency of the data.
Calculation method:	
Any comment:	$EG_{facilities,y} = EG_{PJ,y} = EG_{Engenheiro\ Ernesto\ Jorge\ Dreher,y} + EG_{Engenheiro\ Henrique\ Kotzian,y}$

Data / Parameter:	$EG_{Engenheiro\ Henrique\ Kotzian,2009\ /\ 2010}$
Data unit:	MWh/year
Description:	Quantity of net electricity generation supplied by the SHPP Engenheiro Henrique Kotzian to the grid in the years 2009 and 2010, recorded by two meters .
Source of data:	Project owners
Description of measurement methods and procedures to be applied:	The net electricity delivered to the grid will be checked through the electricity unidirectional meters (one main and one back-up installed in Salto do Jacuí Hydropower Substation). The meters must comply with national standards stated by ONS module 12.2 (which can be viewed through the link http://www.ons.org.br/procedimentos/modulo_12.aspx), and industry regulation to ensure the accuracy (class 0.2). For safety, the meter will be sealed after calibration.

Frequency of monitoring/recording:	Continuous measurement and at least monthly recording
Value monitored:	2009 – 0 2010 – 19,059.60
Monitoring equipment:	Electricity meters: TYPE: ELO 2180SP, Accuracy Cass 0,2 Number: 90011045 / 90011046 /90011047 / 90011048 /90011049 / 90011050
QA/QC procedures to be applied:	These data will be used to calculate the emission reductions. The data will be archived monthly (electronic) and kept archived during the credit period and two years after. The data from the energy meters will be cross checked with the CCEE databank in order to verify the coherency of the data.
Calculation method:	
Any comment:	$EG_{facilities,y} = EG_{PJ,y} = EG_{Engenheiro\ Ernesto\ Jorge\ Dreher,y} + EG_{Engenheiro\ Henrique\ Kotzian,y}$

Data / Parameter:	$EF_{grid,CM,2009\ /\ 2010}$
Data unit:	tCO_2e/MWh
Description:	Combined Margin CO_2 emission factor for grid connected power generation in the years 2009 and 2010, calculated using the latest version of the "Tool to calculate the emission factor for an electricity system".
Source of data:	Based on data provided by DNA (Designated National Authority).
Description of measurement methods and procedures to be applied:	The Combined Margin is calculated through a weighted-average formula, considering the $EF_{grid,OM-DD,y}$ and the $EF_{grid,BM,y}$ and the weights w_{OM} and w_{BM} default 0.5. As per the "Tool to calculate the emission factor for an electricity system".
Frequency of monitoring/recording:	Continuous measurement and annual update to recalculate ex-post project emission reductions.
Value monitored:	2009 – 0.1337 2010 – 0.3433
Monitoring equipment:	-
QA/QC procedures to be applied:	This data will be applied in the project emission reductions calculation.
Calculation method:	According procedures established by "Tool to calculate the emission factor for an electricity system", version 2.
Any comment:	

Data / Parameter:	$EF_{grid,OM,2009\ /\ 2010}$
Data unit:	tCO_2e/MWh
Description:	CO_2 Operating Margin emission factor of the grid, in the years 2009 and 2010.
Source of data:	Data provided by DNA (Designated National Authority) to the years 2009 and 2010.
Description of measurement methods	The Operating Margin Emission Factor will be

and procedures to be applied:	collected in the DNA website, which is responsible for this calculation.
Frequency of monitoring/recording:	Continuous measurement and annual update to recalculate ex-post project emission reductions.
Value monitored:	2009 – 0.1879 2010 – 0.5463
Monitoring equipment:	-
QA/QC procedures to be applied:	This data, updated, will be applied in ex-post calculation of the Emission Factor.
Calculation method:	According procedures established by "Tool to calculate the emission factor for an electricity system", version 2.
Any comment:	-

Data / Parameter:	$EF_{grid,BM,2009 / 2010}$
Data unit:	tCO_2e/MWh
Description:	CO_2 Build Margin emission factor of the grid, in the years 2009 and 2010.
Source of data:	Data provided by DNA (Designated National Authority) to the years 2009 and 2010.
Description of measurement methods and procedures to be applied:Measurement procedures (if any):	The Build Margin Emission Factor is collected in the DNA website, which is responsible for this calculation.
Frequency of monitoring/recording:	Continuous measurement and annual update to recalculate ex-post project emission reductions.
Value monitored:	2009 – 0.0794 2010 – 0.1404
Monitoring equipment:	-
QA/QC procedures to be applied:	This data, updated, is applied in ex-post calculation of the Combined Margin Emission Factor.
Calculation method:	According procedures established by "Tool to calculate the emission factor for an electricity system", version 2.
Any comment:	-

Data / Parameter:	$Cap_{PJ – Ernesto Jorge Dreher SHP}$
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data:	Equipments plaques at project site.
Description of measurement methods and procedures to be applied:	Technical specifications on the installed equipments.
Frequency of monitoring/recording:	Continuous.
Value monitored:	17,471,600
Monitoring equipment:	-
QA/QC procedures to be applied:	This data will be applied for the Power Density calculation.
Calculation method:	-
Any comment:	-

Data / Parameter:	$Cap_{PJ – Henrique Kotzian SHP}$

Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity.
Source of data:	Equipments plaques at project site.
Description of measurement methods and procedures to be applied:	Technical specifications on the installed equipments.
Frequency of monitoring/recording:	Continuous.
Value monitored:	13,230,000
Monitoring equipment:	-
QA/QC procedures to be applied:	This data will be applied for the Power Density calculation.
Calculation method:	
Any comment:	Determine the installed capacity based on recognized standards.

Data / Parameter:	$A_{PJ\ –\ Ernesto\ Jorge\ Dreher\ SHP}$
Data unit:	m^2
Description:	Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full.
Source of data:	Operation License issued by FEPAM on 18th June 2009 - LO_2968/2009-DL.
Description of measurement methods and procedures to be applied:	Measured from topographical surveys or satellite pictures.
Frequency of monitoring/recording:	Annual.
Value monitored:	830,000
Monitoring equipment:	-
QA/QC procedures to be applied:	The preventive erosion environmental measures and the permanent preservation area (APP) recovering program will allow to monitor the slopes` and the reservoirs` margins stability, providing additional data about the reservoir area.
Calculation method:	Area measurement
Any comment:	This data is applied for the Power Density calculation.

Data / Parameter:	$A_{PJ\ –\ Henrique\ Kotzian\ SHP}$
Data unit:	m^2
Description:	Area of the reservoir measured in the water surface, after the implementation of the project activity, when the reservoir is full.
Source of data:	Installation License issued by FEPAM on 7th May 2010 - LI_495/2010-DL.
Description of measurement methods and procedures to be applied:	Measured from topographical surveys or satellite pictures.
Frequency of monitoring/recording:	Annual.
Value monitored:	660,000
Monitoring equipment:	-
QA/QC procedures to be applied:	The preventive erosion environmental measures and the permanent preservation area (APP) recovering program will allow to monitor the slopes` and the reservoirs` margins stability,

	providing additional data about the reservoir area.
Calculation method:	Area measurement.
Any comment:	This data is applied for the Power Density calculation.

Data / Parameter:	$TEG_{Engenheiro\ Ernesto\ Jorge\ Dreher,y}$
Data unit:	MWh/year
Description:	Total electricity produced by the SHPP Engenheiro Ernesto Jorge Dreher, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.
Source of data:	Project activity site.
Description of measurement methods and procedures to be applied:	Electricity meters
Frequency of monitoring/recording:	Continuous measurement and at least monthly recording.
Value monitored:	Not currently applicable.
Description of measurement methods and procedures to be applied:	Meters of the plant.
QA/QC procedures to be applied:	-
Any comment:	Applicable if the power densities of project activity become greater than 4 W/m^2 and less than or equal to 10 W/m^2, so it is not currently applicable.

Data / Parameter:	$TEG_{Engenheiro\ Henrique\ Kotzian,y}$
Data unit:	MWh/year
Description:	Total electricity produced by the SHPP Engenheiro Henrique Kotzian, including the electricity supplied to the grid and the electricity supplied to internal loads, in year y.
Source of data:	Project activity site.
Description of measurement methods and procedures to be applied:	Electricity meters
Frequency of monitoring/recording:	Continuous measurement and at least monthly recording.
Value monitored:	Not currently applicable.
Description of measurement methods and procedures to be applied:	Meters of the plant.
QA/QC procedures to be applied:	-
Any comment:	Applicable if the power densities of project activity become greater than 4 W/m^2 and less than or equal to 10 W/m^2, so it is not currently applicable.

3.3 Description of the Monitoring Plan

1) Power generation and measurement system - $EG_{facility,y}$ (= $EG_{PJ,y}$):

General characteristics of the measurement system:

The procedures designed for monitoring electricity generation by the project activity follows the parameters and regulations of the Brazilian energy sector. The National Grid Operator (*ONS*) and the

Electric Power Commercialization Chamber (*CCEE* from Portuguese *Câmara de Comércio de Energia Elétrica*) are the organs responsible for specification of technical requirements of energy measurement system for billing, i.e, those bodies monitor and approve projects for accurate accounting of energy.

The agent responsible for the measurement system for billing (*SMF* from the Portuguese *Sistema de Medição para Faturamento*) develops the project in accordance with the technical specifications of the measurements for billing, which should include the location of measurement points, panels of measurement, meters and systems for local and remote measurement.
As stated by the sub-module 12.1 of Grid Procedures[1], the SMF is a system composed of main and back-up meters, instrument transformers, communication channels between the agents and CCEE; and data collecting systems to billing measures.

The measurement system measures and records the energy. There are six meters to register the energy generation of project activity (three main meters and three back up meters). There are one main and one back up meter installed in panels located at the power houses of each plant of project activity. Those meters send generation information to project owners (BMEs), to the operational team (COPREL) and to SINERCOM/CCEE (generation monitoring system of Electric Power Commercialization Chamber). Those information are used by CCEE to establish how much each plant generate (before transmission losses). The measurement of energy effectively inputted into the grid is performed by the third pair of meters (main and back up) installed at the substation of Salto do Jacuí Hydropower, point where the energy generated by project activity is inputted into the grid. This third pair of meters records the energy generated by both plants of project activity since the transmission lines which come from both the plants are joined at some point before reach this meters. Crossing the data recorded by the three pairs of meters, the regulatory agency can establish how much energy is generated by each plant.

Despite being located inside the substation o Salto do Jacuí Hydropower, the pair of meters above referred is independent from the energy generated by the plant. It only measures the energy generated from project activity plants.

To an easier understanding, see the figure below.

[1] http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.1_Rev_1.0.pdf

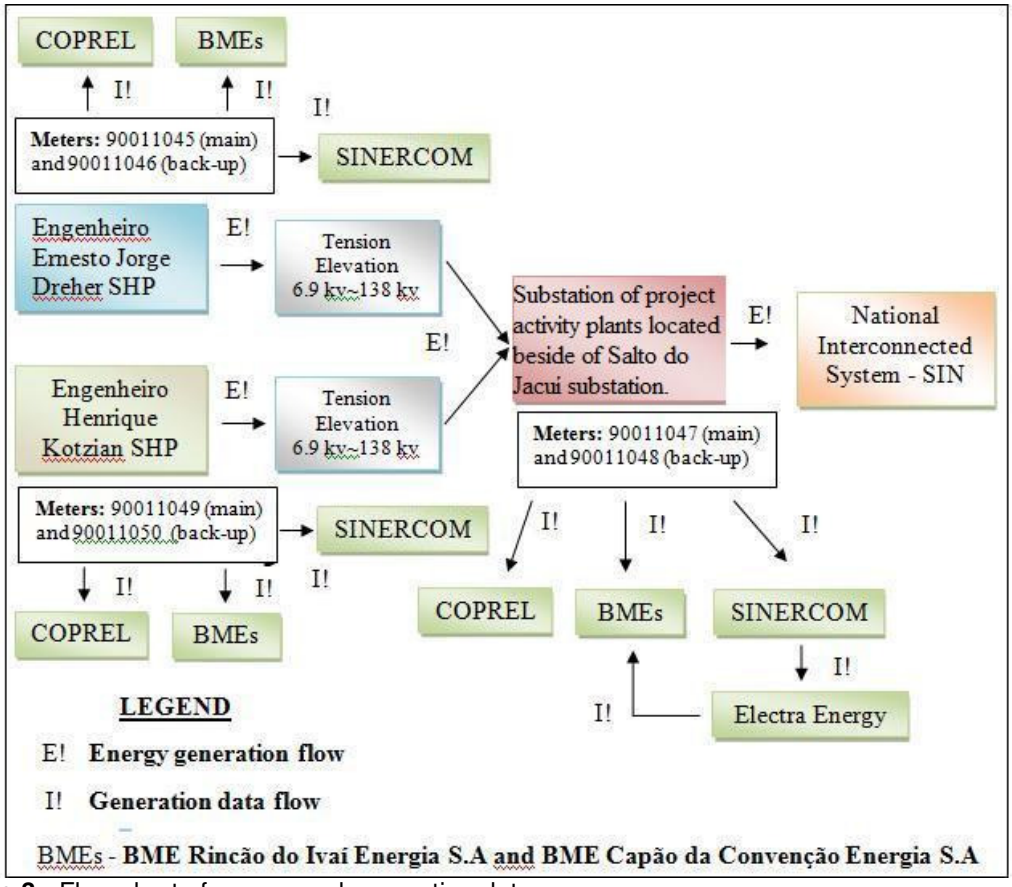


Figure 3 : Flow chart of energy and generation data.

"The data stored in the meters are collected by the Energy Data Collecting System – *SCDE* (from Portuguese *Sistema de Coleta de Dados de Energia Elétrica*) of the CCEE, remotely and automatically, through direct access to the agent meters or intermediated for the agent through its Meter Collecting Unit – UCM." For this system is guaranteed the data inviolability. After the calibration, it is sealed for safety.

Using the information collected by the three pairs of meters, CCEE provides the generation reports correspondent to each plant, used to energy trading.

These reports are accessed by Electra Energy (the agent engaged to trade the energy generated), who provide to project owners a copy of the measurement data to intern control.

Therefore, CCEE is responsible for the monthly readings and keeping the records of the energy dispatched. If any problem happens at the local meter level, the reading lecture corresponding to the amount of energy during the time of the problem will not be lost because of the safety of online readings performed by CCEE.

Data monitoring:

The readings of meters are used to calculate emission reductions. The monitoring steps are as follow:

(1) The data will be measured continuously and recorded monthly;

(2) Spreadsheets containing the electricity dispatched to the grid are generated; CCEE data measured (from CCEE databank – SINERCOM - third part) are used to cross check the monitored data;
(3) The project owner provides the generation measurement data and the SINERCOM (restricted access website) generation spreadsheets to the DOE, so it can check the authenticity of declared information.
(4) The emission reductions, and any project emissions (if applicable), should be managed by the project manager responsible at Carbotrader;

Quality control:

(1) Calibration of meters:

The calibration of meters shall be conducted at least every two years by a qualified organization that must comply with national standards (determined by ONS Grid Procedures[2]) and industrial regulations to ensure the system accuracy. After calibration, the meters are sealed for safety and the calibration certificates are archived with other monitoring records. The class of accuracy of the equipment that will be used in the project activity is under the national standards (class 0.2) stated in "*Grid Procedures*" from the National Grid Operator: Module 12, submodule12.2[3].

(2) Emergency treatment

In case of unavailability of measures from any point of measurement, due to maintenance, commissioning or for any other reason, will be used the methodology to estimate data as the item 14.3 of the Procedure of Energy Commercialization PdC ME.01[4].

Data Management:

All the project activity issues regarding the SHP construction will be treated by the responsible Managers / Directors from BME Rincão do Ivaí and BME Capão da Convenção.

The monitoring data will be stored during the project's duration. In this case this means 10 years (one period duration) plus 2 years after it ends according to the methodology. If the project is renewed for another two periods, the data will be stored for 30 years plus 2 years, making up a total of 32 monitoring years.

All data gathered in the monitoring range is electronically filed and will be kept for at least 2 years after the last crediting period. The emission reductions to be generated are calculated regularly by the project proponents and kept for the verification phase.

2) Emission Factors - $EF_{grid,CM,y}$, $EF_{grid,OM-DD,y}$ and $EF_{grid,BM,y}$:

The CO_2 emission factors related to this report ($EF_{grid,CM,y}$, $EF_{grid,OM-DD,y}$ and $EF_{grid,BM,y}$) are the values correspondent to the years of 2009 and 2010, and are made available by the Brazilian DNA. It can be viewed at DNA website (www.mct.gov.br/clima).

3) Installed capacity – Cap_{PJ}:

The installed capacity of the hydro power plant after the implementation of the project activity will be monitored yearly through one of the following options:
- Technical specifications on the installed equipments;
- Installed plaques in the equipments;

[2] http://www.ons.org.br/procedimentos/modulo_12.aspx

[3] http://www.ons.org.br/download/procedimentos/modulos/Modulo_12/Submodulo%2012.2_Rev_1.0.pdf

[4] http://www.ccee.org.br/cceeinterdsm/v/index.jsp?vgnextoid=67778d3ef9a3c010VgnVCM1000005e01010aRCRD

- Factsheets.

In Brazil, the installed capacity of hydropower plants is determined and authorized by the competent regulatory agency. Furthermore, any modification must also be authorized and made available to the public. Thus, any new authorization to increase the installed capacity of the plants will be monitored. It will be used to installed capacity, which is also a recognized standard, to assure the project technical characteristics.

It is also important to highlight that according the ANEEL resolution number 407, issued on 19th October 2000, if the present/real installed capacity is greater than +/- 5 % of the authorized (granted) installed capacity, a revision of the authorized installed capacity should be requested. This revision must not be requested by both Engenheiro Ernesto Jorge Dreher SHP and Engenheiro Henrique Kotzian SHP managers because the increment in their capacities were only 0.44% and 1.76% respectively, so no revision or communication action should be done according to the mentioned ANEEL resolution.

4) Area of the reservoir – A_{PJ}:

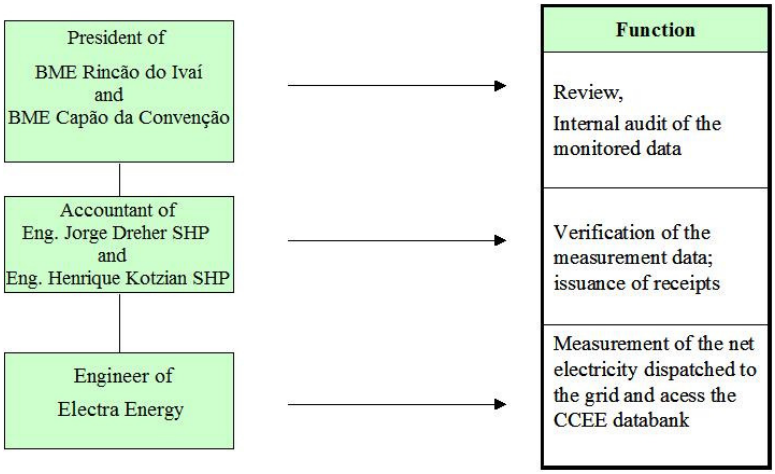
The area of the reservoir is measured yearly in the surface of the water, after the implementation of the project activity, when the reservoir is full.

Measures from topographical surveys, maps, satellite pictures, etc. Also, the reservoir area can be determined depending on the reservoir level, because hydroelectric plants dispatched by ONS have to monitor their reservoir level. The data used for this purpose can be used to determine the reservoir area and will be also a measurement procedure to be considered to the project activity.

5) Authority and Responsibility:

The BME Rincão do Ivaí Energia S.A. and BME Capão da Convenção Energia S.A. are responsible for the maintenance and calibration of the monitoring equipments, compliance to operational requirements and corrective actions related to the functionality of Engenheiro Ernesto Jorge Dreher SHP and Engenheiro Henrique Kotzian SHP respectively. Moreover, the companies have authority and responsibility for registration, monitoring, and measurements as well as managing all the issues related to the project activity and to organize staff training to use appropriated techniques in those procedures.

The overall responsibility for monitoring the project as well as the implementation of the monitoring plan is in line with the premises of the Verified Carbon Standard and is run by agents listed below:



The baseline project emissions and Emissions Reductions calculations are performed by Carbotrader Assessoria e Consultoria em Energia Ltda which should report the results in a proper way to the entities related with the VCS process.

4 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

4.1 Baseline Emissions

Table 3: Baseline Emissions of project activity by vintage and total.

Year	Eng. Ernesto Jorge Dreher SHP	Eng. Henrique Kotzian SHP	EG_{total} (MWh)	BE (tCO_2e)
2009	49,732.32	-	49,732.32	6,647.00
2010	77,313.37	19,059.60	96,372.96	33,088.00
				TOTAL 39,735.00

4.2 Project Emissions

According to the methodology ACM0002 Version 12.1.0, for hydro power project activities that result in new reservoirs, if power density of project is greater than 10W/m^2, project emissions (*PE)* are null.

The power densities of the project activity are calculated as follows:

$$PD = \frac{Cap_{PJ} - Cap_{BL}}{A_{PJ} - A_{BL}}$$

Where:

PD Power density of the project activity, in W/m^2.
Cap_{PJ} Installed capacity of the hydro power plant after the implementation of the project activity (W).
Cap_{BL} Installed capacity of the hydro power plant before the implementation of the project activity (W). For new hydro power plants, this value is zero.
A_{PJ} Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full (m^2).
A_{BL} Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full (m^2). For new reservoirs, this value is zero.

For Engenheiro Ernesto Jorge Dreher SHP, the *PD* value is:

$$PD = \frac{17{,}950{,}000 - 0}{830{,}000 - 0} = 21.63 \text{ W/m}^2$$

For Engenheiro Henrique Kotzian SHP, the *PD* value is:

$$PD = \frac{13{,}230{,}000 - 0}{660{,}000 - 0} = 20.05 \text{ W/m}^2$$

Since the Power densities of project activity power plants are greater than 10 W/m^2, there are no project emissions.

4.3 Leakage

There is no leakage released from project activity.

4.4 Summary of GHG Emission Reductions and Removals

Year	Annual emission reductions in tonnes of CO_2e
Jul/2009 onwards	6,647.00
2010	33,088.00
Total reduced over the first crediting period	**39,735.00**

5 ADDITIONAL INFORMATION

The raw data of all monitored parameters were presented in a separated worksheet.