MONITORING REPORT FORM (CDM-MR) *
Version 01 - in effect as of: 28/09/2010

CONTENTS

* as contained within the document entitled "Guidelines for completing the monitoring report form (CDM-MR)" (EB 54 meeting report, annex 34).

MONITORING REPORT
Version 1 – 29/03/2012

Repowering Small Hydro Plants (SHP) in the State of São Paulo, Brazil
Project 0489
First Monitoring Period Covering 01/01/2010 – 23/08/2011

SECTION A. General description of the project activity

A.1. Brief description of the project activity:

1. Purpose of the project activity and the measures taken to reduce greenhouse gas emissions

This project encompasses the upgrade of CPFL's SHPPs in the State of São Paulo, south-eastern of Brazil. In this region, all major hydropower potential have long been tapped, along with most of the smaller ones as well. Expanding generation in the region brings the advantage of increasing energy supply in the country's richest region with lower transmission losses and thus avoiding hydropower plants in the Amazon region. The plants were built in the early 1900s and have been running basically with the original turbines and generators. As they were extending their lifetime, CPFL sought options to repower them.

All the plants were originally built between 1910 and 1930 when turbine-generator efficiency was significantly lower than today. The additional electricity is produced by the plants without any modifications in their respective existing reservoirs and, thus, the generation occurs without the addition of any negative environmental impacts. The project activity helps meeting the country's demand and increases the renewable share in the Brazilian electricity grid.

2. Brief description of the installed technology and equipments

The SHPPs Esmeril, Dourados, São Joaquim, Gavião Peixoto, Chibarro and Capão Preto were repowered between 2000 and 2006. The repowering of these six power plants increased their total installed capacity from 25.6 MW to 35.93 MW, adding more than 86 GWh per year to the Brazilian grid.

All the repowering projects kept the same reservoir area and were authorized to run with the same head, thus operating with no additional environmental impacts. The whole gain is an efficiency upgrade by using modern electricity generation technology. In four of the plants, the additional electricity is gained with fewer turbines than before. One of the plants already operated with only one turbine, and the sixth power plant had its two turbines replaced by two new ones.

The equipments installed in the project are the same as the ones mentioned in the registered PDD[1], at Section A.4 as described in the following table:

[1]Available at:
http://cdm.unfccc.int/filestorage/D/B/Y/DBYOJWPT7026K3UHICVX1AZRF9N5Q4/PDD%20Revalidation%200489%20v3.pdf?t=MWx8bHRieHFjfDAVbbgrWaNMGCcBZ2hvzKJA

SHP	Startup	Equipment	Type	Flow Rate (m^3/s)	Equipment	Generator Capacity (MW)	Generator Voltage (kV)
Esmeril	1912	Turbine 1	Francis	1.12	Generator	0.58	2.2
		Turbine 2	Francis	1.12	Generator	0.58	2.2
		Turbine 3	Francis	1.86	Generator	0.61	2.2
	2003	**Turbine 1**	**Francis**	**4.88**	**Generator**	**2.5**	**2.2**
		Turbine 2	**Francis**	**4.88**	**Generator**	**2.5**	**2.2**
Dourados	1926	Turbine 1	Francis	33.00	Generator	6.4	6.3
	2002	**Turbine 1**	**Francis**	**44.00**	**Generator**	**10.80**	**6.9**
São Joaquim	1911	Turbine 1	Francis	7.35	Generator	0.84	2.2
		Turbine 2	Francis	7.35	Generator	0.84	1.05
		Turbine 3	Francis	16.2	Generator	1.92	2.2
		Turbine 4	Francis	15.89	Generator	1.92	2.2
	2002	**Turbine 1**	**Kaplan**	**17.5**	**Generator**	**2.79**	**6.9**
		Turbine 2	**Kaplan**	**17.5**	**Generator**	**2.79**	**6.9**
		Turbine 3	**Kaplan**	**17.5**	**Generator**	**2.79**	**6.9**
Gavião Peixoto	1913	Turbine 1	Francis	6.00	Generator	0.7	6.5
		Turbine 2	Francis	6.00	Generator	0.7	6.5
		Turbine 3	Francis	6.00	Generator	0.98	6.3
		Turbine 4	Francis	13.2	Generator	1.73	6.5
	2007	**Turbine 1**	**Francis**	**15.00**	**Generator**	**2.43**	**6.9**
		Turbine 2	**Francis**	**15.00**	**Generator**	**2.43**	**6.9**
Chibarro	1912	Turbine 1	Francis	2.09	Generator	1.21	2.2
		Turbine 2	Francis	2.06	Generator	1.08	2.2
	2007	**Turbine 1**	**Francis**	**2.2**	**Generator**	**3.3**	**2.2**
		Turbine 2	**Francis**	**2.2**	**Generator**	**3.3**	**2.2**
Capão Preto	1911	Turbine 1	Francis	2.06	Generator	1.76	2.2
		Turbine 2	Francis	3.2	Generator	1.76	2.2
		Turbine 3	Francis	3.6	Generator	2.00	2.2
	2008	**Turbine 1**	**Francis**	**2.2**	**Generator**	**2.00**	**2.2**
		Turbine 2	**Francis**	**3.6**	**Generator**	**2.3**	**2.2**

Table 1 - Project Equipments Description

3. Relevant dates for the project activity

SHPP	REPOWERING	COMMISIONING	CONTINUED OPERATION*
Esmeril	March, 2002	January, 2003	2003 – 2033, 21 years remaining
Dourados	November, 2000	July, 2002	2002 – 2032, 20 years remaining
São Joaquim	March, 2001	July, 2002	2002 – 2032, 20 years remaining
Gavião Peixoto	December, 2005	June, 2007	2007 – 2037, 25 years remaining
Chibarro	December, 2006	December, 2007	2007 – 2037, 25 years remaining
Capão Preto	November, 2006	February, 2008	2008 – 2038, 26 years remaining

* As stated in the PDD, the project activity had a lifetime of 30 years.

Table 2 – Relevant dates for the project activity

Project's registration date on CDM: 15/12/2006

Project's crediting period renewal on CDM: 09/10/2011

4. Total emission reductions achieved in this monitoring period

Emission reductions: 25,190 tCO_2e

A.2. Project Participants

Host Parties (Involved indirectly)

COUNTRY	AUTHORIZED PARTICIPANT
Brazil	CPFL Geração de Energia S.A.
Brazil	C-Trade Comercializadora de Carbono Ltda
Brazil	Lumina Engenharia e Consultoria Ltda

Other Parties Involved

COUNTRY	AUTHORIZED PARTICIPANT
United Kingdom of Great Britain and Northern Ireland	Cantor Fitzgerald Europe

Table 3 – Project Participants

A.3. Location of the project activity:

The project activity is located in the South-eastern region of Brazil, on the State of São Paulo, in the cities of Patrocínio Paulista, Nuporanga, Guará, Gavião Peixoto, Araraquara and São Carlos. Their respective geographical coordinates are described below:

SHP	Code	Location		City	River	Basin
		Longitude (W)	Latitude (S)			
Esmeril	USES	20º50'23''	47º18'07''	Patrocínio Paulista	Esmeril	Sapucaí Mirim
Dourados	USDO	20º38'37''	48º40'07''	Nuporanga	Sapucaí	Sapucaí Mirim
São Joaquim	USJO	20º34'25''	47º46'58''	Guará	Sapucaí Mirim	Sapucaí Mirim
Gavião Peixoto	USPE	21º50'53''	47º42'20''	Gavião Peixoto	Jacaré-Guaçu	Tietê
Chibarro	USCH	21º53'17''	48º08'50''	Araraquara	Chibarro	Tietê
Capão Preto	USCP	21º53'54''	47º47'04''	São Carlos	Conxim, Negros, Itaúna, Quilombos	Mogi-Guaçú

Table 4 – List of SHPs covered by this project

A.4. Technical description of the project

The following table shows the additional electricity and the projected amount of energy to be generated by each power plant:

SHPPs	Previous Capacity (MW)	Project Capacity (MW)	Additional Capacity (MW)
Esmeril	1.76	5.00	3.24
Dourados	6.40	10.80	4.40
São Joaquim	5.52	8.37	2.85
Gavião Peixoto	4.12	4.86	0.74
Chibarro	2.29	2.60	0.31
Capão Preto	5.52	4.30	(1.22)
TOTAL	**25.61**	**35.93**	**10.32**

Table 5 – SHPs Installed Capacity

The modifications in each plant considered in the project activity are described below:

- **SHPP Esmeril**
  - A set of three old turbo-generators were replaced by two new ones, with 2.5 MW of installed capacity each.
  - Old penstocks were replaced with a new one.
  - The canal section was broadened in 3.00 m maintaining previous characteristics of velocity and rugosity coefficient, doubling its capacity.
  - The new machinery was installed in the same place as the previous ones.
  - Basic reinforcement of foundations and structure of the powerhouse were carried out.

- **SHPP Dourados**
  - An old turbo-generator was replaced by a new one more efficient.
  - The buildings, adduction channel and penstocks suffered no modifications.

- **SHPP São Joaquim**
  - Four older turbo-generators were replaced by three new ones, adding 2.85 MW to the plant, presenting now a total nominal capacity of 8.37MW (with 3 generators of 2.79MW each), but is authorized by ANEEL2 to operate at 8.05MW. There is a document (Ofício 827-2009-SFG-ANEEL, dated 16/09/2009) that regularizes this difference. This was done in order to have a reserve between the operational capacity and the maximum capacity, being an engineering consideration during the early project phase
  - The buildings, adduction channel and penstocks suffered no modifications.

- **SHPP Gavião Peixoto**
  - The older set of turbo-generators will be replaced by a new 4.86 MW set, adding 0.74 MW to the plant.
  - The new machines will be installed in the same place as the older ones.
  - Basic reinforcement of foundations and structure of the powerhouse will be carried out.
  - The buildings and adduction channel will suffer no modifications.

[2] ANEEL Resolution N° 469, of October 31st, 2001

- **SHPP Chibarro**
  - Replacement of the older 1.21 MW and 1.08 MW turbo-generators by two new of 1.3 MW each.
  - The water adduction channel will be broadened.
  - Basic reinforcement of foundations and structure of the powerhouse will be carried out.
  - No changes will be carried out to the remaining facilities.

- **SHPP Capão Preto**
  - The two older 1.76 MW and 2 MW turbo-generators will be replaced by a 2 MW and 2.3 MW.
  - The junction of the existing penstocks will be revised in order to reduce head losses.

The table below lists the main physical characteristics of the SHPPs reservoirs, which will remain the same and not be modified by the project activity:

SHPP	Reservoir Area (km^2)
Esmeril	0.28
Dourados	0.54
São Joaquim	0.84
Gavião Peixoto	0.077
Chibarro	0.0108
Capão Preto*	2.50

*Capão Preto has four small reservoirs with the following flooded areas (km^2): R1 0.46; R2 1.00; R3 0.01; R4 1.03.

Table 6 – Reservoirs' Main Physical Characteristics

Please see section C for the line diagram of the project activity.

A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity:

- Baseline methodology ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1;
- Monitoring methodology ACM0002 – "Consolidated baseline methodology for grid-connected electricity generation from renewable sources", version 12.1;
- "Tool to calculate an emission factor for an electricity system", version 2.

A.6. Registration date of the project activity:

15/12/2006

A.7. Crediting period of the project activity and related information (start date and choice of crediting period):

Crediting period: 01/01/2010 – 31/12/2016 (Renewable).

There were no post-registration modifications regarding the crediting periods' starting date.

A.8. Name of responsible person(s)/entity(ies):

The monitoring report was compiled by:

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SECTION B. Implementation of the project activity

B.1. Implementation status of the project activity

1. Starting date of operation of the project activity

SHPP	Operation start after repowering
Esmeril	January, 2003
Dourados	July, 2002
São Joaquim	July, 2002
Gavião Peixoto	June, 2007
Chibarro	December, 2007
Capão Preto	February, 2008

Table 7 – Projects' starting date after repowering

2. Information regarding the actual operation of the project activity during this monitoring period

No significant special events or situations (for example overhaul times, downtimes of equipment, exchange of equipment, etc.) have occurred in the actual operation of the project activity during this monitoring which could have an impact on the applicability of the methodology ACM0002. The power plants went through regular maintenance on the period analyzed in the monitoring report.

3. Events or situations that occurred during the monitoring period, which may impact the applicability of the methodology, and how the issues resulting from these events or situations are being addressed

No events have been identified in this monitoring period that affects the applicability of the methodology.

B.2. Revision of the monitoring plan

The monitoring plan was not revised and no revision is pending.

B.3. Request for deviation applied to this monitoring period

No request for deviation was applied during this monitoring period.

B.4. Notification or request of approval of changes

No notification or request of approval of changes has been made.

SECTION C. Description of the monitoring system

Electricity generation is the core business of CPFL and, therefore all measurements comply with national regulations for the electric sector that describe the technical specifications of measuring, reporting and storing data.

Electricity Data Monitoring System – ZFA-F

The electrical energy generation data collection is made automatically with the utilization of the ZFA-F Remote Reading System and stored in the Data Base. This information is utilized by the COG Engineer to generate the Energy Production Report, used for the GHG monitoring report.

There is a procedure # 4,987, version 1.1, for the operation of the ZFA system, which includes a process flow diagram, describing the entire process from gathering raw data to reporting totals, including the process for validating the readings.

For each hydro plant there is one main electricity-meter in use. A second (back-up) electricity-meter is installed in each hydro plant, to be used in case of meter failures. Every five minutes the generated energy is integrated and recorded. Every hour, the integrated generation information is transmitted, via Satellite, to the Server. Every month a reading from the ZFA Data Base, with information collected from the ZFA-F remote reading system is made by the COG Engineer and sent to Lumina Engenharia e Consultoria Ltda., to be used in the monitoring report. The same information is collected by the CPFL's Director of Energy Sales and Purchasing and sent to CCEE. Energy is invoiced based on this information.

2) Line diagram

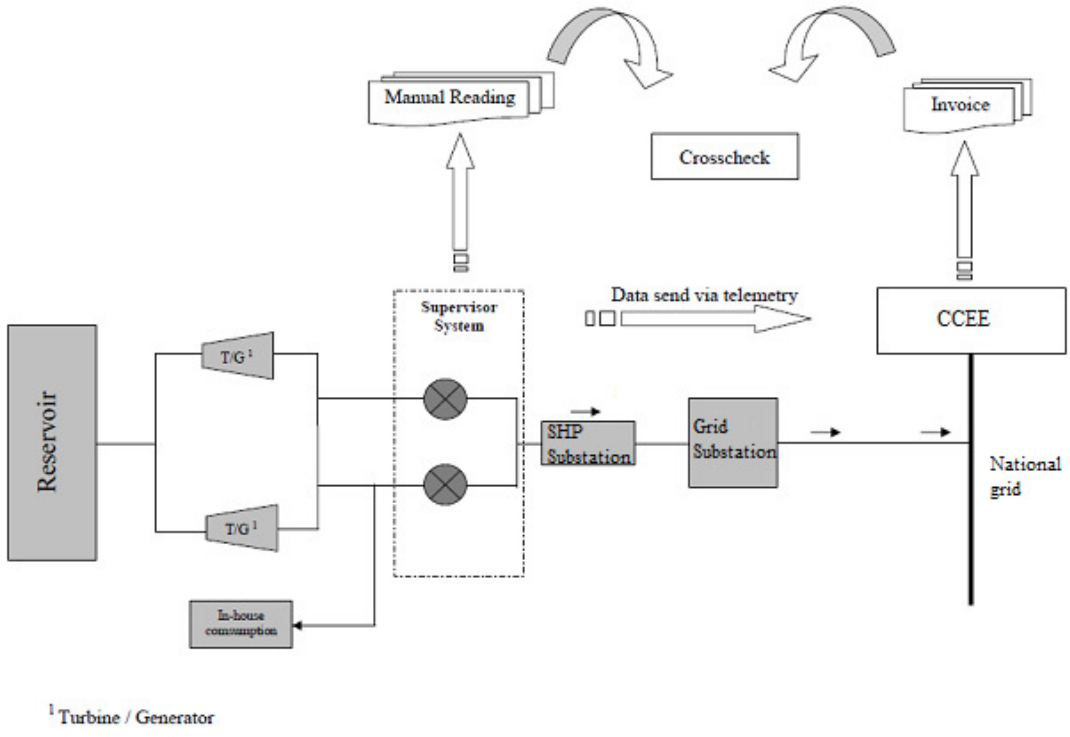

Figure 1 – Project's line diagram

SECTION D. Data and parameters

D.1. Data and parameters determined at registration and not monitored during the monitoring period, including default values and factors

Data / Parameter:	**$EG_{historical}$**
Data unit:	MWh/yr
Description:	Annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data used:	Project activity site
Value(s) :	**$EG_{Historical}$** / **MWh** **Esmeril** 7,261.5 **Dourados** 44,912.5 **São Joaquim** 30,408.7 **Gavião Peixoto** 22,185.7 **Chibarro** 9,523.4 **Capão Preto** 13,388.7 **Total** 120,419.1
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations. This parameter is used to calculate de Certified Emission Reductions of the project activity.
Additional comment:	This value will not be altered.

Data / Parameter:	**$\sigma_{historical}$**
Data unit:	MWh/yr
Description:	Standard deviation of the annual average historical net electricity generation delivered to the grid by the existing renewable energy plant that was operated at the project site prior to the implementation of the project activity
Source of data used:	Calculated from data used to establish $EG_{historical}$
Value(s) :	**Standard Deviation Historical (σ)** **SHPP** / **MWh** **Esmeril** 107.9 **Dourados** 520.6 **São Joaquim** 338.9 **Gavião Peixoto** 200.4 **Chibarro** 173.7 **Capão Preto** 415.9 **TOTAL** 1,649.4
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations. This parameter is used to calculate the Certified Emission Reductions of the project activity.
Additional comment:	This value will not be altered.

Data / Parameter:	$DATE_{BaselineRetrofit}$
Data unit:	date
Description:	Point in time when the existing equipment would need to be replaced in the absence of the project activity
Source of data used:	Project activity site
Value(s) :	**SHPP** / $DATE_{BaselineRetrofit}$ **Esmeril** Nov/2027 **Dourados** Nov/2027 **São Joaquim** Nov/2027 **Gavião Peixoto** Nov/2027 **Chibarro** Nov/2027 **Capão Preto** Nov/2027
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Additional comment:	-

Data / Parameter:	CAP_{BL}
Data unit:	W
Description:	Installed capacity of the hydro power plant before the implementation of the project activity
Source of data used:	Project site
Value(s) :	Please, see table 5 in section A.4.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Additional comment:	This value will not be altered.

Data / Parameter:	A_{BL}
Data unit:	m²
Description:	Area of the reservoir measured in the surface of the water, before the implementation of the project activity, when the reservoir is full.
Source of data used:	Project site
Value(s) :	Please, see table 6 in section A.4.
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Additional comment:	This value will not be altered.

Data / Parameter:	w_{OM}
Data unit:	%
Description:	Operating margin weight
Source of data used:	"Tool to calculate the emission factor for an electricity system"
Value(s) :	25
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations.
Additional comment:	-

Data / Parameter:	w_{BM}
Data unit:	%
Description:	Build margin weight
Source of data used:	"Tool to calculate the emission factor for an electricity system"
Value(s) :	75
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Additional comment:	-

D.2. Data and parameters monitored

Data / Parameter:	$EG_{facility,y}$
Data unit:	MWh/yr
Description:	Quantity of net electricity generation supplied by the project plant/unit to the grid in year *y*
Measured /Calculated /Default:	Measured
Source of data:	Electricity meter records
Value(s) of monitored parameter:	111,977
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emissions calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	• **SHP Esmeril** Main meter Sr. number 40.071.230-0 Back-up meter Sr. number 40.071.228-8 Penult calibration date: 18/08/2008 Last calibration date: 14/10/2010 2 years frequency: No. The meter calibration was delayed in two months. Next calibration: until 14/10/2012. • **SHP Dourados** Main meter Sr. number 40092314-9 Back-up meter Sr. number 40092315-7 Penult calibration date: 04/08/2009 Last calibration date: 21/11/2011 2 years frequency: No. The meter calibration was delayed in three months. Next calibration: until 21/11/2013. • **SHP Capão Preto** Main meter Sr. number 40086175-5 Back-up meter Sr. Number 40086176-3 Penult calibration date: 29/12/2009 Last calibration date: 24/05/2011 2 years frequency: Yes. The meter calibration was done seven months earlier. Next calibration: until 24/05/2013.

	• **SHP Chibarro** Main meter Sr. number 40.071.225-3 Back-up meter Sr. number 40.071.226-1 Penult calibration date: 18/12/2009 Last calibration date: 16/05/2011 2 years frequency: Yes. The meter calibration was done seven months earlier. Next calibration: 16/05/2013. • **SHP São Joaquim** Main meter Sr. number 40.071.231-8 Back-up meter Sr. number 40.071.229-6 Penult calibration date: 14/08/2008 Last calibration date: 06/10/2010 2 years frequency: No. The meter calibration was delayed in two months. Next calibration: 06/10/2012 • **SHP Gavião Peixoto** Main meter Sr. number 40.060.768-9 Back-up meter Sr. number 40.060.769-7 Penult calibration date: 28/12/2009 Last calibration date: 06/02/2012 2 years frequency: No. The meter calibration was delayed in almost two months. Next calibration: 06/02/2014
Measuring/ Reading/ Recording frequency:	Continuous measurement, monthly recording.
Calculation method (if applicable):	n/a
QA/QC procedures applied:	Meters are calibrated according to the relevant national standard. Data measured by the meters are cross checked with CCEE's data.

Data / Parameter:	**$EF_{grid,CM,y}$**
Data unit:	tCO_2/MWh
Description:	Combined margin CO_2 emission factor for grid connected power generation in year y calculated using the latest version of the "Tool to calculate the emission factor for an electricity system"
Measured /Calculated /Default:	Calculated
Source of data:	Brazilian DNA (MCT)
Value(s) of monitored parameter:	0.2250
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if	The parameter is calculated ex-post as per the dispatch data analysis

applicable):	OM described in the "Tool to calculate the emission factor for an electricity system".
QA/QC procedures applied:	Ex-post emission factor will be calculated by Project Participants with the Brazilian DNA data, as per the Dispatch data analysis OM method described in the "Tool to calculate the emission factor for an electricity system".

Data / Parameter:	**$EF_{grid,OM,y}$**
Data unit:	tCO_2/MWh
Description:	Emission factor operating margin
Measured /Calculated /Default:	Calculated
Source of data:	Brazilian DNA (MCT)
Value(s) of monitored parameter:	0.4786
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	The parameter is calculated ex-post as per the dispatch data analysis OM described in the "Tool to calculate the emission factor for an electricity system".
QA/QC procedures applied:	Ex-post emission factor will be calculated by Project Participants with the Brazilian DNA data, as per the Dispatch data analysis OM method described in the "Tool to calculate the emission factor for an electricity system".

Data / Parameter:	**$EF_{grid,BM,y}$**
Data unit:	tCO_2/MWh
Description:	0.1404
Measured /Calculated /Default:	Calculated
Source of data:	Brazilian DNA (MCT)
Value(s) of monitored parameter:	0.1404
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if	The parameter is calculated ex-post as per the dispatch data analysis

applicable):	OM described in the "Tool to calculate the emission factor for an electricity system".
QA/QC procedures applied:	Ex-post emission factor will be calculated by Project Participants with the Brazilian DNA data, as per the Dispatch data analysis OM method described in the "Tool to calculate the emission factor for an electricity system".

Data / Parameter:	**Cap_{PJ}**
Data unit:	W
Description:	Installed capacity of the hydro power plant after the implementation of the project activity
Measured /Calculated /Default:	Measured
Source of data:	Project site
Value(s) of monitored parameter:	Please, see table 5 in section A.4
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	As seen on board equipment.
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

Data / Parameter:	**A_{PJ}**
Data unit:	m^2
Description:	Area of the reservoir measured in the surface of the water, after the implementation of the project activity, when the reservoir is full.
Measured /Calculated /Default:	Measured
Source of data:	Project site
Value(s) of monitored parameter:	Not applicable
Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)	Baseline emission calculations
Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)	-
Measuring/ Reading/ Recording frequency:	-
Calculation method (if applicable):	-
QA/QC procedures applied:	-

SECTION E. Emission reductions calculation

E.1. Baseline emissions calculation

$BE_y = EF_y * EG_y$

Where:

BE_y	Baseline emission in year (y), (tCO_2e);
EF_y	CO_2 emission factor of grid defined ex-ante (tCO_22/MWh);
EG_y	Electricity supplied to the grid by the project in year (y), (MWh)

The emission factor was calculated according to the description on Section B.6.1 of the registered PDD, considering the Brazilian DNA last published emission factor values as follows:

BUILD MARGIN - 2010
Average Emission Factor (tCO_2/MWh)
0.1404

Average Montlhy Emission Factor Operating Margin (tCO2/MWh) - 2010											
Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
0.2111	**0.2798**	**0.2428**	**0.2379**	**0.3405**	**0.4809**	**0.4347**	**0.6848**	**0.7306**	**0.732**	**0.7341**	**0.6348**

* Average of the operating margin of the emission factor in 2010 = 0.4786

Table 8 – Last published emission factors
Source: Brazilian DNA[3]

Thus, the project's emission factor is:

$EF_y = [(0.1404 * 0.75) + (0.4786 * 0.25)]$

$EF_y = (0.1053 + 0.1196)$

$EF_y = 0.2250$

E.2. Project emissions calculation

As per methodology and PDD, project emissions are not to be accounted.

E.3. Leakage calculation

As per methodology and PDD, leakage emissions are not to be accounted.

[3] Available at: http://www.mct.gov.br/index.php/content/view/72764.html

E.4. Emission reductions calculation / table

	SYMBOL	AMOUNT	UNIT	FORMULA
Total Net Electricity Generation	EG_y	111,977	MWh	--
Grid Emission Factor	EF_y	0.2250	tCO_2e/MWh	--
Total Baseline emissions	BE_y	25,190	tCO2e	$BE_y = EF_y * EG_y$
Total Project emissions	PE_y	0	tCO2e	--
Total Leakage emissions	LE_y	0	tCO2e	--
Total Emissions Reductions	ER_y	25,190	tCO2e	$ER_y = BE_y - PE_y - LE_y$

Table 9 – Emission Reductions Calculation

Total days on the monitored period = 600 days

E.5. Comparison of actual emission reductions with estimates in the CDM-PDD

Item	Values applied in ex-ante calculation of the registered CDM-PDD	Actual values reached during the monitoring period
Emission reductions (tCO_2e)	30,572	25,190

Table 10 – Project's Emission Reductions

E.6. Remarks on difference from estimated value in the PDD

This monitoring period covers a 19 month and 23 days period (from 01/01/2010 to 23/08/2011). According to the registered PDD, the annual emission reduction estimated ex-ante is 18,583 tCO_2e. Thus, the emission reductions achieved by the project activity in this monitoring period are 17.60% lower than the value estimated ex-ante in the registered PDD. The actual electricity production was 16.30% lower than the estimated in the PDD (81,327 MWh/year). This lower electricity generation thus reduced the actual emission reductions achieved.