

**MONITORING REPORT FORM (CDM-MR)**  
**Version 01 - in effect as of: DD/MM/YYYY****CONTENTS**

- A. General description of the project activity
  - A.1. Brief description of the project activity
  - A.2. Project participants
  - A.3. Location of the project activity
  - A.4. Technical description of the project
  - A.5. Title, reference and version of the baseline and monitoring methodology applied to the project activity
  - A.6. Registration date of the project activity
  - A.7. Crediting period of the project activity and related information
  - A.8. Name of responsible person(s)/entity(ies)
- B. Implementation of the project activity
  - B.1. Implementation status of the project activity
  - B.2. Revision of the monitoring plan
  - B.3. Request for deviation applied to this monitoring period
  - B.4. Notification or request of approval of changes
- C. Description of the monitoring system
- D. Data and parameters monitored
  - D.1. Data and parameters used to calculate baseline emissions
  - D.2. Data and parameters used to calculate project emissions
  - D.3. Data and parameters used to calculate leakage emissions
  - D.4. Other relevant data and parameters
- E. Emission reductions calculation
  - E.1. Baseline emissions calculation
  - E.2. Project emissions calculation
  - E.3. Leakage calculation
  - E.4. Emission reductions calculation
  - E.5. Comparison of actual emission reductions with estimates in the registered CDM-PDD
  - E.6. Remarks on difference from estimated value



**MONITORING REPORT**  
**Version 01, 20/07/2010**  
**Incomex Hydroelectric Project**  
**Project 0968**  
**4<sup>th</sup> Monitoring period 01/10/2009 – 30/06/2010**

**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:

The Incomex Hydroelectric Project (hereafter, the Project) developed by Incomex – Indústria, Comércio e Exportação Ltda. together with Cassol, as proponents and operators of the project, consists of a bundle of three small run-of-river hydroelectric projects. The units are connected to Rondônia-Acre isolated electricity system, which is located in Rondônia State, north region of Brazil. They are located in very remote areas, and bring electricity to develop these areas socially and economically.

2. Brief description of the installed technology and equipments:

All 3 hydro units use Brazilian turbines of the Francis model (Hydraulic reactor turbine in which the flow exits the turbine blades in a radial direction), produced by Hidráulicas S/A – HISA; The Project is a Renewable electricity generation project for a grid (run-of-river hydro power plants). Total installed capacity for 3 energy units is 14.5 MW<sup>1</sup>.

3. Relevant dates for the project activity:

**Table 1 - Start of operation dates.**

| Monte Belo |               |
|------------|---------------|
| Monte Belo | February 2001 |
| Cabixi II  | August 2002   |
| Rio Branco | February 2005 |

4. Total emission reductions achieved in this monitoring period:

76,443 tCO<sub>2</sub>e

**A.2. Project Participants**

**Host Parties:** Brazil, involved indirectly; **Authorized Participants:** Incomex – Indústria, Comércio e Exportação Ltda. & Grupo Cassol Energia.

<sup>1</sup> The capacities of the units are given according to the ANEEL records that can be seen at <http://www.aneel.gov.br/aplicacoes/capacidadebrasil/UsinaListaSelecao.asp>.



**Other Parties Involved:** United Kingdom of Great Britain and Northern Ireland, involved indirectly; Authorized Participants: EcoSecurities Ltd. Switzerland, involved indirectly; Authorized Participants: EcoSecurities Group Plc.

#### A.3. Location of the project activity:

- Small Hydropower Plant (SHP) Rio Branco – located in the Branco river – 11°54'35"S and 62°10'49"W in the municipality of Alta Floresta d'Oeste, Rondônia State (RO), north region of Brazil.
- Small Hydro power Plant (SHP) Monte Belo – located in the Saldanha river – 11°57'08.2"S and 62°10'58.7"W, in the municipality of Alta Floresta d'Oeste, Rondônia State (RO), north region of Brazil.
- Small Hydro power Plant (SHP) Cabixi II – located in the Lambari river – 13°01'20.0" S and 60°08'01.7"W, in the municipality of Comodoro, Mato Grosso State (MT), mid-west region of Brazil.

#### A.4. Technical description of the project

It is a Renewable electricity generation project for a grid (run-of-river hydro power plants). Total installed capacity for 3 energy units is 14.5 MW. The Project conforms to the small projects Type 1.D since the nominal installed capacity of the Project is below the 15 MW threshold and the plants will sell their generated electricity to the grid.

Small Hydro run-of-river projects consist of the use of water, either from storage in small holding ponds or directly from the river, to generate electricity. The water's gravitational power is used to move the turbine and by doing so generates electric power. It is a clean and renewable source of energy that has minimum impact on the environment.

All 3 hydro units will use Brazilian turbines of the Francis model (Hydraulic reactor turbine in which the flow exits the turbine blades in a radial direction), produced by Hidráulicas S/A – HISA; that turbine is widely used among water turbines, and its performance can be calculated by comparing the output energy to the energy supplied (see tables below). The expected average load factor of the turbines is approximately 65%.

**Table 2 - Monte Belo Plant main characteristics.**

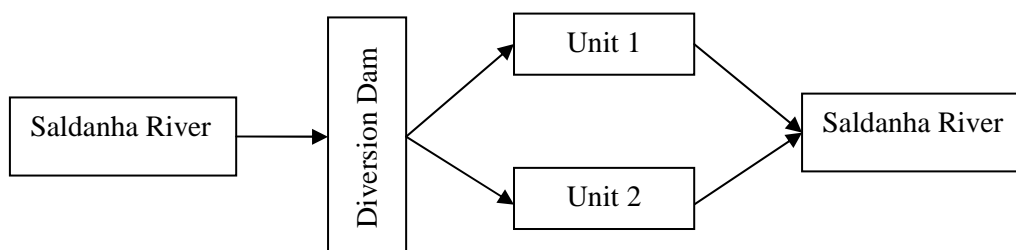
| Monte Belo         |           |
|--------------------|-----------|
| Installed Capacity | 4.8 MW    |
| Turbine            | 2 Francis |
| Efficiency         | 92 %      |

**Table 3 - Cabixi II Plant main characteristics.**

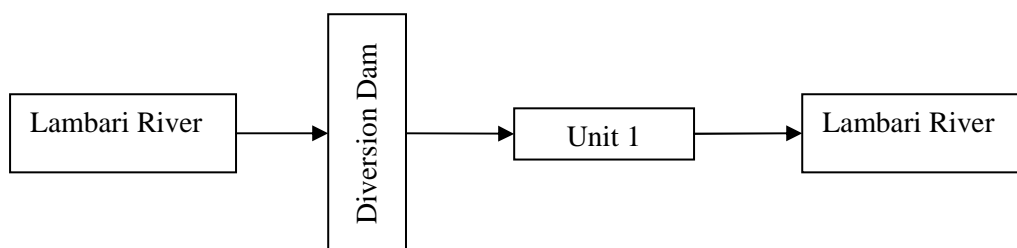
| Cabixi II  |           |
|------------|-----------|
| Power      | 2.8 MW    |
| Turbine    | 1 Francis |
| Efficiency | 92%       |

**Table 4 - Rio Branco Plant main characteristics.**

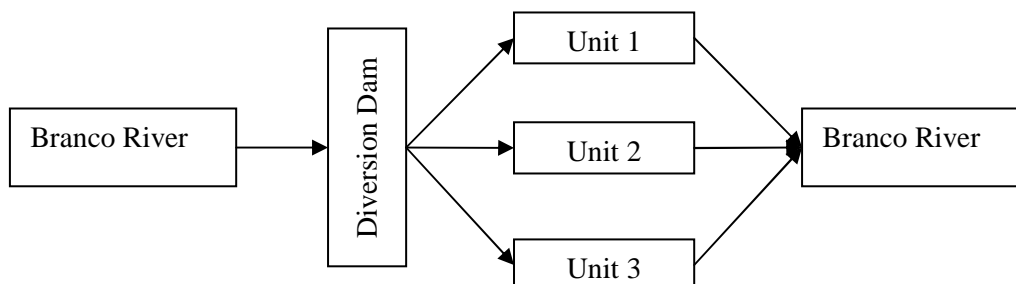
| Rio Branco |           |
|------------|-----------|
| Power      | 6.9 MW    |
| Turbine    | 3 Francis |
| Efficiency | 94 %      |



**Figure 1 - Monte Belo layout**



**Figure 2 - Cabixi II layout**



**Figure 3 - Rio Branco layout**

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



AMS I.D - Grid connected renewable electricity generation - Version 13

**A.6. Registration date of the project activity:**

Project registered on 27/04/2007 and renewed on 23/10/2009.

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

01 Feb 08 - 31 Jan 15 (renewable). There was no post-registration change to the start date of the crediting period.

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

|                          |               |                                      |                                |
|--------------------------|---------------|--------------------------------------|--------------------------------|
| Mr. Leandro Noel         | EcoSecurities | Project Manager<br>Verification Lead | Leandro.noel@ecosecurities.com |
| Mrs. Jessica Wade-Murphy | EcoSecurities | Technical Reviewer                   | Jessica.wade@ecosecurities.com |

Address: Rua Lauro Muller, 116/4304, Rio de Janeiro, Brazil

Telephone: +552125464150

Email: Leandro.noel@ecosecurities.com

**SECTION B. Implementation of the project activity****B.1. Implementation status of the project activity**

1) Starting date of operation:

- SHP Monte Belo: February 2001
- SHP Cabixi II: August 2002
- SHP Rio Branco: February 2005

All the three units are fully operational.

2) Actual operation of the project activity during this monitoring period:

There were no special events during the monitoring period. No equipment was exchanged or overhauled. During the dry season, due to lack of water, one turbine is stopped at SHP Monte Belo and one turbine is stopped at SHP Rio Branco.

3) Events affecting the applicability of the methodology:

No events occurred that affected 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**

Although the Project is a bundle of three hydroelectric plants, the monitoring system is the same for the three plants.

**1) Data collection procedures**

**Data generation:** In each of the three power plants (Rio Branco, Cabixi II and Monte Belo) there is a main cumulative meter that records the electricity exported to the grid. These meters are installed, owned and maintained by CERON (Centrais Elétricas de Rondônia S/A – the grid operator). **Data recording:** Readings are taken monthly by both CERON and Cassol (Project participant and operator of the plants). **Data aggregation:** The net power output per month is summed over the monitoring period. **Calculation:** see section D.2. and section E. Output per month is the difference between the cumulative values on the power meters, i.e. the difference between the readings of each consecutive month is the amount supplied to the grid in the respective month. Net power supplied to the grid times the emission factor are emission reductions. **Reporting:** The monthly electricity supplied to grid data will be recorded on site log sheets. At the end of each month the monitoring data from each site will be transferred to electronic files and reported to EcoSecurities (working also as back-up).

**2) Organizational structure, roles and responsibilities**

A CDM manager has been appointed and trained who is responsible for the CDM monitoring system. The check of monthly recording of power meters falls under the responsibility of the site manager. The amount of electricity generated in each month is signed off by the two parties, Project Developer and Grid Company. After the sign off the invoice is generated and the receipts are used to cross check monthly recorded power output. Relevant roles and responsibility have been defined to fully implement data collection, archiving and data quality assurance and quality control etc. The organizational structure chart is as follows:

**3) Emergency procedures for the monitoring system**

The site manager will notify the grid company in case there is doubt about the correct functioning of the meters mentioned in the monitoring plan. In that case, the grid company and the operator will check and where necessary replace the meters. If the problem can be solved quickly, no CERs are claimed for the period during which the meters were not functioning correctly. If the problem cannot be solved quickly the grid company and the operator estimate the power delivered to the grid using the gross

electricity generation readings taken from the equipment panel, by the plant operator, discounting estimated electricity losses.

4) Line diagrams

The line diagrams of the plants, with relevant measuring points, are presented in the figures below. The generators are represented by the letter “G” and the turbines by the letter “T”.

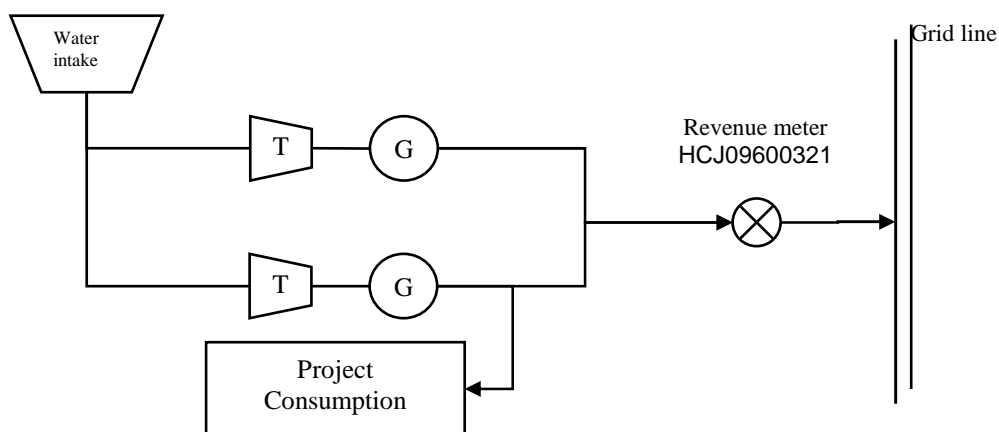


Figure 4 – SHP Monte Belo Line diagram

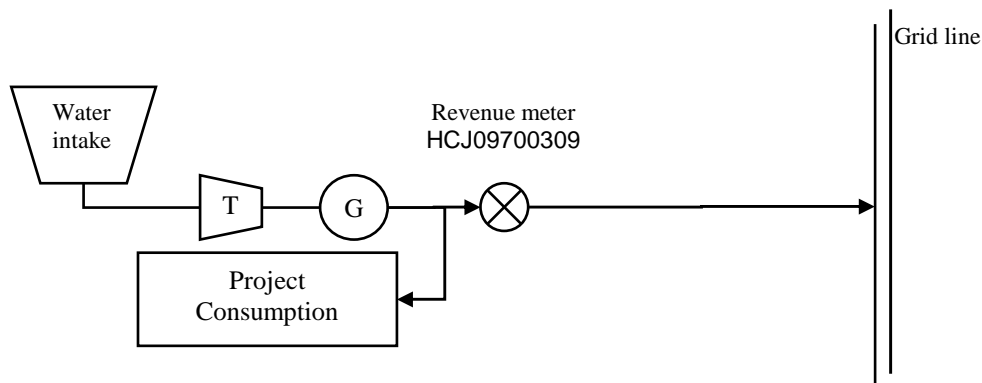


Figure 5 – SHP Cabixi II Line diagram

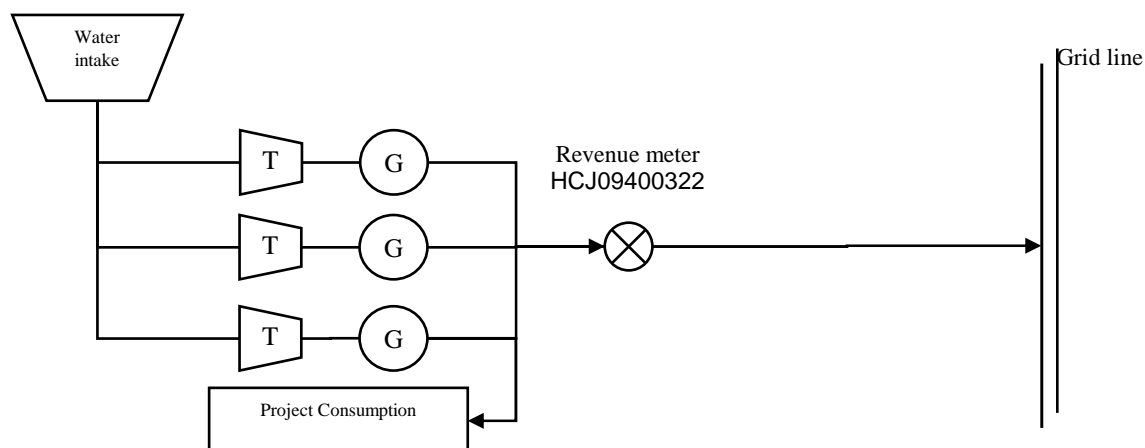


Figure 6 - SHP Rio Branco Line Diagram

## 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

|   |  |
|---|--|
| <b>Data / Parameter:</b>  | $EF_{Grid,BM,y}$   |
| <b>Data unit:</b>   | tCO <sub>2</sub> /MWh  |
| <b>Description:</b>   | Build Margin emission factor   |
| <b>Source of data used:</b>   | Calculated according to the procedure outlined in B.6.1 of the validated PDD |
| <b>Value(s) :</b>   | 1.0479   |
| <b>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</b> | Baseline   |
| <b>Additional comment:</b>  |  |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | $w_{BM}$  |
| <b>Data unit:</b>   | %   |
| <b>Description:</b>   | Weighting of build margin emissions factor                        |
| <b>Source of data used:</b>   | “Tool to calculate the emission factor for an electricity system” |
| <b>Value(s) :</b>   | 0.75  |
| <b>Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)</b> | Baseline  |





|                     |  |
|---------------------|--|
| Additional comment: |  |
|---------------------|--|

|  |   |
|--|---|
| <b>Data / Parameter:</b>   | $w_{OM}$  |
| Data unit:   | %   |
| Description:   | Weighting of operation margin emissions factor                    |
| Source of data used:   | “Tool to calculate the emission factor for an electricity system” |
| Value(s) :   | 0.25  |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline  |
| Additional comment:  |   |

**D.2. Data and parameters monitored**

|   |   |               |          |                |          |                |          |       |          |
|---|---|---------------|----------|----------------|----------|----------------|----------|-------|----------|
| <b>Data / Parameter:</b>  | <b>EG<sub>v</sub></b>   |               |          |                |          |                |          |       |          |
| Data unit:  | MWh/year  |               |          |                |          |                |          |       |          |
| Description:  | Annual net electricity supplied to the grid, per plant  |               |          |                |          |                |          |       |          |
| Measured /Calculated /Default:  | Measured  |               |          |                |          |                |          |       |          |
| Source of data:   | Power meters. Measured jointly by CERON and project developer   |               |          |                |          |                |          |       |          |
| Value(s) of monitored parameter:  | <table border="1"> <tr> <td>SHP Cabixi II</td><td>12736.48</td></tr> <tr> <td>SHP Monte Belo</td><td>25165.00</td></tr> <tr> <td>SHP Rio Branco</td><td>36948.00</td></tr> <tr> <td>Total</td><td>74849.48</td></tr> </table> | SHP Cabixi II | 12736.48 | SHP Monte Belo | 25165.00 | SHP Rio Branco | 36948.00 | Total | 74849.48 |
| SHP Cabixi II   | 12736.48  |               |          |                |          |                |          |       |          |
| SHP Monte Belo  | 25165.00  |               |          |                |          |                |          |       |          |
| SHP Rio Branco  | 36948.00  |               |          |                |          |                |          |       |          |
| Total   | 74849.48  |               |          |                |          |                |          |       |          |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)                                | Baseline emissions  |               |          |                |          |                |          |       |          |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | See Table 5 below for detailed information about the meters.  |               |          |                |          |                |          |       |          |
| Measuring/ Reading/ Recording frequency:  | Continuous measurement, monthly recording.  |               |          |                |          |                |          |       |          |
| Calculation method (if applicable):   | N/A   |               |          |                |          |                |          |       |          |
| QA/QC procedures applied:   | The accuracy of the meters will be assured by the grid operator (i.e. CERON), as the meters were installed by them and remain their property.   |               |          |                |          |                |          |       |          |
| Any comment:  | Data will be archived at least for two years after crediting period or the last issuance of CERs, whichever occurs later.   |               |          |                |          |                |          |       |          |

**Table 5 - Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity)**

| Location       | Meter Type                          | Serial Number | Last Calibration | Calibration frequency (years) |
|----------------|-------------------------------------|---------------|------------------|-------------------------------|
| SHP Cabixi II  | ELSTER Alpha<br>A3RBR<br>Class 0.2% | H CJ09700309  | 13/02/09         | 3                             |
| SHP Monte Belo | ELSTER Alpha<br>A3RBR<br>Class 0.2% | H CJ09600321  | 17/02/09         | 3                             |
| SHP Rio Branco | ELSTER Alpha<br>A3RBR<br>Class 0.2% | H CJ09400322  | 13/02/09         | 3                             |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | <b>EF<sub>grid,CM,y</sub></b>   |
| Data unit:  | tCO <sub>2</sub> /MWh   |
| Description:  | Baseline Emission Factor  |
| Measured /Calculated /Default:  | Calculated  |
| Source of data:   | Calculated ex post as the average of EF <sub>grid,OM,y</sub> (determined ex post) and EF <sub>grid,BM,y</sub> (determined ex ante)  |
| Value(s) of monitored parameter:  | 1.0213  |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)                                | Baseline emissions  |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | Not applicable, as this data is calculated based on OM and BM.  |
| Measuring/ Reading/ Recording frequency:  |   |
| Calculation method (if applicable):   | The Baseline Emission Factor calculation consists of the combination of operating margin (OM) and build margin (BM) according to the procedures prescribed in the "Tool to calculate the emission factor for an electricity system and AMS-I.D. |
| QA/QC procedures applied:   | Not applicable, as this data is calculated based on OM and BM.  |
| Any comment:  |   |

|                                |  |
|--------------------------------|--|
| <b>Data / Parameter:</b>       | <b>EF<sub>grid,OMsimple,y</sub></b>  |
| Data unit:                     | tCO <sub>2</sub> /MWh  |
| Description:                   | Operating Margin Emission Factor   |
| Measured /Calculated /Default: | Calculated   |
| Source of data:                | Calculated ex post from EG <sub>m,y</sub> , FC <sub>i,m,y</sub> , EF <sub>CO2,i,y</sub> and NCV <sub>i,y</sub> |



|   |  |
|---|--|
| Value(s) of monitored parameter:  | 0.9415   |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)                                | Baseline emissions   |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | The Operating Margin Factor calculation was performed according to option (a) of the “Tool to calculate the emission factor for an electricity system”. Data are acquired by governmental companies that control the electricity grid.   |
| Measuring/ Reading/ Recording frequency:  | Data are acquired yearly by governmental companies that control the electricity grid.  |
| Calculation method (if applicable):   | The Operating Margin Factor calculation was performed according to option (a) of the “Tool to calculate the emission factor for an electricity system”. Data are acquired by governmental companies that control the electricity grid.   |
| QA/QC procedures applied:   | The governmental companies responsible for the collection of data are also responsible for guaranteeing the quality of data. The calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality.  |
| Any comment:  | <p>This data was calculated ex-post using the most recent year of data available. For Brazilian isolated electricity grids, the governmental companies responsible for the data are difficult to reach and data is not regularly published.</p> <p>If at any time of the crediting period, the grid configuration changes, the OM will be calculated for the electric system that best represents the Project baseline.</p> <p>The most recent data available is the data used in the renewed PDD calculation.</p> |

|  |  |
|--|--|
| <b>Data / Parameter:</b>   | <b><math>FC_{i,m,y}</math></b>   |
| Data unit:   | Tonnes   |
| Description:   | Amount of fossil fuel type i consumed by power plant / unit m in year y  |
| Measured /Calculated /Default:   | Measured   |
| Source of data:  | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a> |
| Value(s) of monitored parameter:   | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a> |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emissions   |
| Monitoring equipment (type,  | Data are acquired by governmental companies that control the   |



|   |   |
|---|---|
| accuracy class, serial number, calibration frequency, date of last calibration, validity) | electricity grid.   |
| Measuring/ Reading/ Recording frequency:  | Data are acquired yearly by governmental companies that control the electricity grid.   |
| Calculation method (if applicable):   |   |
| QA/QC procedures applied:   | The governmental companies responsible for the collection of data are also responsible for guaranteeing the quality of data. The calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality. |
| Any comment:  | The most recent data available is the data used in the renewed PDD calculation.   |

|   |   |
|---|---|
| <b>Data / Parameter:</b>  | <b>NCV<sub>i,y</sub></b>  |
| Data unit:  | GJ/tonnes   |
| Description:  | Net calorific value (energy content) of fossil fuel type i in year y  |
| Measured /Calculated /Default:  | Measured  |
| Source of data:   | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a>                      |
| Value(s) of monitored parameter:  | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a>                      |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)                                | Baseline emissions  |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | Data are acquired by governmental companies that control the electricity grid.  |
| Measuring/ Reading/ Recording frequency:  | Data are acquired yearly by governmental companies that control the electricity grid.   |
| Calculation method (if applicable):   |   |
| QA/QC procedures applied:   | The governmental companies responsible for the collection of data are also responsible for guaranteeing the quality of data. The calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality. |
| Any comment:  | The most recent data available is the data used in the renewed PDD calculation.   |

|                          |                         |
|--------------------------|-------------------------|
| <b>Data / Parameter:</b> | <b>EG<sub>m,y</sub></b> |
| Data unit:               | MWh                     |



|   |   |
|---|---|
| Description:  | Net electricity generated and delivered to the grid by power plant / unit m in year y   |
| Measured /Calculated /Default:  | Measured  |
| Source of data:   | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a>                      |
| Value(s) of monitored parameter:  | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a>                      |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations)                                | Baseline emissions  |
| Monitoring equipment (type, accuracy class, serial number, calibration frequency, date of last calibration, validity) | Data are acquired by governmental companies that control the electricity grid.  |
| Measuring/ Reading/ Recording frequency:  | Data are acquired yearly by governmental companies that control the electricity grid.   |
| Calculation method (if applicable):   |   |
| QA/QC procedures applied:   | The governmental companies responsible for the collection of data are also responsible for guaranteeing the quality of data. The calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality. |
| Any comment:  | The most recent data available is the data used in the renewed PDD calculation.   |

|  |  |
|--|--|
| <b>Data / Parameter:</b>   | <b>EF<sub>CO<sub>2</sub>,i,y</sub></b>   |
| Data unit:   | tCO <sub>2</sub> /GJ   |
| Description:   | CO <sub>2</sub> emission factor of fossil fuel type i in year y  |
| Measured /Calculated /Default:   | Measured   |
| Source of data:  | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a> |
| Value(s) of monitored parameter:   | See Annex 3 of the approved PDD available at <a href="http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M">http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M</a> |
| Indicate what the data are used for (Baseline/ Project/ Leakage emission calculations) | Baseline emissions   |
| Monitoring equipment (type, accuracy class, serial number, calibration                 | Data are acquired by governmental companies that control the electricity grid.   |



|  |   |
|--|---|
| frequency, date of last calibration, validity) |   |
| Measuring/ Reading/ Recording frequency:       | Data are acquired yearly by governmental companies that control the electricity grid.   |
| Calculation method (if applicable):            |   |
| QA/QC procedures applied:                      | The governmental companies responsible for the collection of data are also responsible for guaranteeing the quality of data. The calculation will be verified by the DOE, or another competent party, in order to assure and guarantee quality. |
| Any comment:                                   | The most recent data available is the data used in the renewed PDD calculation.   |

**SECTION E. Emission reductions calculation****E.1. Baseline emissions calculation**

| Calculation of baseline emissions | Symbol                  | Amount    | Unit                   | Formula  |
|-----------------------------------|-------------------------|-----------|------------------------|--|
| Electricity supplied to the grid  | EG <sub>y</sub>         | 74,849.48 | MWh                    | N/A  |
| Emission factor                   | EF <sub>grid,CM,y</sub> | 1.0213    | tCO <sub>2</sub> e/MWh | Please see the formulae provided on the section of the approved PDD <sup>2</sup> |
| Total Baseline emissions          | BE <sub>y</sub>         | 76,443    | tCO <sub>2</sub> e     | BE <sub>y</sub> =EF <sub>grid,CM,y</sub> *EG <sub>y</sub>                        |

**E.2. Project emissions calculation**

| Calculation of project emissions | Symbol          | Amount | Unit                | Formula | Remarks |
|----------------------------------|-----------------|--------|---------------------|---------|---------|
| Total project emissions          | PE <sub>y</sub> | 0      | tCO <sub>2</sub> eq | N/A     | 1       |

*Remarks*

As per methodology and PDD.

**E.3. Leakage calculation**

| Calculation of leakage emissions | Symbol | Amount | Unit                | Formula | Remarks |
|----------------------------------|--------|--------|---------------------|---------|---------|
| Total leakage emissions          | Ly     | 0      | tCO <sub>2</sub> eq | N/A     | 1       |

*Remarks*

As per methodology and PDD.

**E.4. Emission reductions calculation / table**

| Calculation of emissions reductions | Symbol | Amount | Unit | Formula |
|-------------------------------------|--------|--------|------|---------|
|-------------------------------------|--------|--------|------|---------|

<sup>2</sup> <http://cdm.unfccc.int/UserManagement/FileStorage/VSZ7WP54OC8XLQFKIAYJE239HN1G6M>



|                            |        |        |                    |                                |
|----------------------------|--------|--------|--------------------|--------------------------------|
| Total Baseline emissions   | $BE_y$ | 76,443 | tCO <sub>2</sub> e | $BE_y = EF_{grid,CM,y} * EG_y$ |
| Total Project emissions    | $PE_y$ | 0      | tCO <sub>2</sub> e |                                |
| Total Leakage emissions    | $LE_y$ | 0      | tCO <sub>2</sub> e |                                |
| Total Emissions Reductions | $ER_y$ | 76,443 | tCO <sub>2</sub> e | $ER_y = BE_y - PE_y - LE_y$    |

Remarks:

y = 272 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 <sub>2</sub> e) | 64,283 <sup>3</sup>   | 76,443   |

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

The emission reductions over the monitoring period are higher than forecasted in the PDD.

It is noted that the estimated value in the PDD was determined using a year average figure which did not consider the seasonality of the weather in the project's location.

Data from ANA<sup>4</sup> (National Agency of Water) corroborates this information of the rainy season. According to the monitoring of this agency, the maximum historical water levels in the region are registered from December to April.

The months with the electricity generation slightly higher than the installed capacity are during the high rain season, when there is more water and the company could supply additional electricity to the grid. Although it was possible to generate a higher amount of electricity during a couple months out of the year, the equipment cannot maintain this performance all the time. Temporary high generation is possible but not advisable.

In conclusion, the explanation for the higher generation of the Project is the high rainy season observed in the region during the monitoring period.

<sup>3</sup> The value applied in the ex-ante calculation of the registered CDM-PDD is 86,262 tCO<sub>2</sub>e per year (365 days). The amount presented was calculated for a 272 days period.

<sup>4</sup> [http://www.ana.gov.br/GestaoRecHidricos/UsosMultiplos/BoletinsMonitoramento/amazonialegal/pdf/boletimAM/15558000\\_Cheia.pdf](http://www.ana.gov.br/GestaoRecHidricos/UsosMultiplos/BoletinsMonitoramento/amazonialegal/pdf/boletimAM/15558000_Cheia.pdf)



## History of the document

| Version  | Date                           | Nature of revision |
|--|--------------------------------|--------------------|
| 01   | EB 54, Annex 34<br>28 May 2010 | Initial adoption.  |
| <b>Decision Class:</b> Regulatory<br><b>Document Type:</b> Guideline, Form<br><b>Business Function:</b> Issuance |                                |                    |