

**CLEAN DEVELOPMENT MECHANISM  
MONITORING REPORT**

# **Pesqueiro Energia Small Hydroelectric Project**

(CDM Registration Reference Number 0242)

**Monitored Period:  
01 April 2006 to 29 February 2008**

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### Section A. General description of project activity

#### A.1. Title of the project activity

Pesqueiro Energia Small Hydroelectric Project (hereafter referred to as “*Pesqueiro Project*”).

Version of the document: 1

Date of the document: 04/03/2008

Monitoring Report based on the PDD Version Number: 3B, from 03/Jan/2006

#### A.2. Description of the project activity

The primary objective of the *Pesqueiro Project* is to help meet Brazil’s rising demand for energy due to economic growth and to improve the supply of electricity, while contributing to the environmental, social and economic sustainability by increasing renewable energy’s share of the total Brazilian (and the Latin America and the Caribbean region’s) electricity consumption.

The *Pesqueiro Project* is located in the south of Brazil, where the largest coal reserves are located as well as the biggest amount of thermo power plants using this fuel. The project consists of a small-hydro power plant (12.44 MW) located on the Jaguariaíva River, in the city of Jaguariaíva, state of Paraná. Jaguariaíva is a city with 33,837 inhabitants (IBGE, 2004) located next to the agricultural region of Ponta Grossa.

Pesqueiro Energia S.A. is a special purpose company (SPC) which includes a run-of-river small hydro power plant and a very small reservoir (0.33 km<sup>2</sup>) with minor environmental impact. The entrepreneurship is a joint venture owned by three agricultural cooperatives. These agricultural cooperatives control three smaller cooperatives created specifically to commercialize the electricity generated by the power plant. These three controlled cooperatives specialize in agricultural electrification have 2,500 km in transmission lines and commercialize more than 100,000 MWh per year. The number of associates is approximately 3,000 and the number of customers is more than 7,000. *Pesqueiro Project* delivers, since January 2003, about 80,000 MWh/year (with an estimated minimum capacity factor of 75%) to the South-Southeast-Midwest interconnected grid.

This monitoring report corresponds to the second verification of Pesqueiro Small Hydroelectric Plant. The first verification covered the period from 27<sup>th</sup> January 2003 to 31<sup>st</sup> March 2006 and 136,727 CERs were issued on 13<sup>th</sup> July 2006.

#### A.3. Pesqueiro Energia Monitoring Report

The GHG emissions reduction during the period from April 2006 to December 2007 was achieved through the dispatched electricity generated by Pesqueiro Small Hydroelectric Plant that displaced a mix of electricity generation in the Brazilian South-Southeast-Midwest interconnected grid.

The Monitoring Report is based on the electricity delivered to the grid by Pesqueiro Small hydro Plant. The amount of energy delivered is monitored by the energy producer, through Electra Comercializadora de Energia, which represents the seller, as well as by CCEE – Câmara Comercializadora de Energia Elétrica, that controls all electricity delivered to the grid and assures, for the buyer, that the electricity generated is delivered to the grid.

Calculation of the emissions reduction is based on validated and registered parameters fixed in the PDD and justified during the validation. The baseline emission factor for small-scale project activities for the Brazilian South-Southeast-Midwest grid is 0.5258 tCO<sub>2</sub>e/MWh.

|  |
|--|
| <b>A.4. Period of the monitoring report and amount of monitored emissions reductions</b> |
|--|

Period of the monitoring report: 01/Apr/2006 – 29/Feb/2008

Amount of monitored emissions reductions: 59,115 tCO<sub>2</sub>

|  |
|--|
| <b>A.5. Date of completing the monitoring report</b> |
|--|

The date of completing the monitoring report was 04/Mar/2008.

|                                   |
|-----------------------------------|
| <b>A.6. Personnel Responsible</b> |
|-----------------------------------|

Project Manager – Rosmir Cesar de Oliveira (Pesqueiro Energia S.A.)

Project Monitoring – Osmar Nesi (Electra Comercializadora de Energia Ltda.)

Monitoring Report – Fernando de Souza Machado (Ecoinvest Assessoria Ltda.)

### Section B. Monitoring methodology and plan

#### B.1. Name and reference of approved monitoring methodology applied to the project activity

**AMS I.D** - Renewable electricity generation for a grid.

**Type I** - Renewable Energy Projects

#### B.2. Justification of the choice of the methodology and why it is applicable to the project activity:

This Monitoring Plan has been chosen as it is suggested in the option (a) of Type I, Category D of CDM small-scale project activity categories contained in Appendix B of the simplified M&P for CDM small-scale project activity and applies to electricity capacity additions from small-scale run-of-river hydro power plants.

## B.3. Data to be monitored:

| ID number | Data type  | Data variable | Data unit             | Measured (m), calculated (c) or estimated (e) | Recording frequency                          | Proportion of monitored data | How will the data be archived? (electronic/ paper) | For how long is archived data to be kept?    | Comment  |
|-----------|--|---------------|-----------------------|---|--|------------------------------|--|--|--|
| 1         | Electricity generation of the Project delivered to grid      | $EG_y$        | MWh                   | m   | 15 minutes measurement and Monthly Recording | 100%                         | Electronic and paper                               | During the credit period and two years after | The electricity delivered to the grid is monitored both by the project owner (seller) and the energy buyer. A Brazilian government entity, CCEE – Câmara Comercializadora de Energia Elétrica - controls and monitors the electricity available on the national interconnected grid. The amount of electricity delivered to the grid by the project activity is available on CCEE's web-site |
| 2         | CO <sub>2</sub> emission factor of the grid                  | $EF_y$        | tCO <sub>2</sub> /MWh | c   | At the validation                            | 0%                           | Electronic   | During the credit period and two years after | Data will be archived according to internal procedures.  |
| 3         | CO <sub>2</sub> Operating Margin emission factor of the grid | $EF_{OM,y}$   | tCO <sub>2</sub> /MWh | c   | At the validation                            | 0%                           | Electronic   | During the credit period and two years after |  |
| 4         | CO <sub>2</sub> Build Margin emission factor of the grid     | $EF_{BM,y}$   | tCO <sub>2</sub> /MWh | c   | At the validation                            | 0%                           | Electronic   | During the credit period and two years after |  |

## Section C. Monitored data

According to option (a) of Type I, Category D of CDM small-scale project activity categories contained in Appendix B of the simplified M&P for CDM small-scale project activity, monitoring shall consist of metering the electricity generated by the renewable technology. At the project validation, the calculation of the CO<sub>2</sub> emission factor of the grid as well as the CO<sub>2</sub> Operating Margin and the CO<sub>2</sub> Build Margin emission factors of the grid were also required. However, these data should be checked only once, at the validation.

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

GHG emissions by the project activity are zero

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

#### Pesqueiro Energia S.A

|              | Year             |                  |                  |
|--------------|------------------|------------------|------------------|
|              | 2006             | 2007             | 2008             |
| Month        | Generation (MWh) | Generation (MWh) | Generation (MWh) |
| January      | -                | 7,312            | 4,524            |
| February     | -                | 5,462            | 6,470            |
| March        | -                | 6,812            | -                |
| April        | 4,665            | 5,077            | -                |
| May          | 3,423            | 6,117            | -                |
| June         | 3,048            | 4,556            | -                |
| July         | 3,206            | 6,004            | -                |
| August       | 2,718            | 5,319            | -                |
| September    | 4,785            | 3,677            | -                |
| October      | 6,020            | 3,284            | -                |
| November     | 4,337            | 5,697            | -                |
| December     | 5,096            | 4,820            | -                |
| <b>Total</b> | <b>37,298</b>    | <b>64,137</b>    | <b>10,994</b>    |

**Table 1 – Electricity generation delivered to grid by Pesqueiro Small Hydro Plant**  
(Sources: CCEE – Câmara de Comercialização de Energia Elétrica, Electra Comercializadora de Energia Ltda.)

| SSC Emission factors for the Brazilian South-Southeast-Midwest interconnected grid |  |                                  |
|--|--|----------------------------------|
| Small-scale baseline (without imports)   | OM (tCO <sub>2</sub> e/MWh)                    | Total generation (MWh)           |
| 2002   | 0,9304   | 276.731.024                      |
| 2003   | 0,9680   | 295.666.969                      |
| 2004   | 0,9431   | 301.422.617                      |
|  | Average OM (2002-2004, tCO <sub>2</sub> e/MWh) | Total = 873.820.610              |
|  | 0,9472   | BM 2004 (tCO <sub>2</sub> e/MWh) |
|  | OM*0.5+BM*0.5 (tCO <sub>2</sub> e/MWh)         | 0,1045                           |
|  | 0,5258   |                                  |

Table 2 – CO<sub>2</sub> emission factor of the grid/ CO<sub>2</sub> Operating Margin emission factor of the grid/ CO<sub>2</sub> Build Margin emission factor of the grid

## Section D. Calculation of GHG emission by sources

The Monitoring Report applies the *ex ante* validated emission factor for Small Scale project activities for the Brazilian South-Southeast-Midwest interconnected grid. As shown in the table above, the CO<sub>2</sub> emission factor of the grid is 0.5258 tCO<sub>2</sub>e/MWh

### D.1 Describe the formulae used to calculate emissions reductions

The emission reductions by the project activity ( $ER_y$ ) during a given period of year  $y$  are the product of the baseline emissions factor ( $EF_y$ , in tCO<sub>2</sub>e/MWh) times the electricity supplied by the project to the grid at the same period of year  $y$  ( $EG_y$ , in MWh), as follows:

$$ER_y = EF_y \cdot EG_y \quad \text{Equation 1}$$

### D.2 Tables providing values obtained when applying formulae above

#### Pesqueiro Energia S.A

| Year  | Electricity Generation (MWh) | Baseline Emission Factor (tCO <sub>2</sub> e/MWh) | Emissions Reduction (tCO <sub>2</sub> e) |
|---|------------------------------|---|--|
| <b>2006</b><br>(01/Apr/2006 to 31/Dec/2006) | 37,298                       | 0.5258  | 19,611                                   |
| <b>2007</b><br>(01/Jan/2007 to 31/Mar/2007) | 64,137                       | 0.5258  | 33,723                                   |
| <b>2008</b><br>(01/Jan/2008 to 29/Feb/2008) | 10,994                       | 0.5258  | 5,781                                    |

|                                 |               |
|---------------------------------|---------------|
| <b>Total (tCO<sub>2</sub>e)</b> | <b>59,115</b> |
|---------------------------------|---------------|



## Annexes

### Annex 1 - Contact information

|                  |  |
|------------------|--|
| Organization:    | Pesqueiro Energia S. A.  |
| Street/P.O. Box: | Rua das Flores, 382  |
| City:            | Castro   |
| State/Region:    | PR   |
| Postfix/ZIP:     | 84166-980  |
| Country:         | Brazil   |
| Salutation:      | Mr.  |
| Last name:       | Oliveira   |
| Middle name:     | César  |
| First name:      | Rosmir   |
| Telephone:       | +55 (42) 3234-1134   |
| E-Mail:          | <a href="mailto:rosmir@eletrorural.com.br">rosmir@eletrorural.com.br</a> |

|                  |  |
|------------------|--|
| Organization:    | Ecoinvest Assessoria Ltda.   |
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| City:            | São Paulo  |
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| Country:         | Brazil   |
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