Benaiciai Wind Power Project

2nd Monitoring Report

Monitoring period: 1 January 2008 to 31 December 2008

Version 2.1

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Prepared by:

ENVIRONMENTAL INVESTMENT GROUP

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Introduction

The purpose of this monitoring report is to calculate Greenhouse gas (GHG) emission reductions achieved by the Joint Implementation (JI) project Benaiciai Wind Power Project during the period from 1 January 2008 to 31 December 2008.

1. General project activity information

1.1. Title of the project activity

Benaiciai Wind Power Project

UNFCCC Joint Implementation (JI) reference number 0034

1.2. Short description of the project

The Project included installation of 6 wind power plants, each having a maximum capacity of 2.75 MW, and a transformer substation, at the Benaiciai wind power park, which is located in Kretinga district of Lithuania near villages Benaiciai and Zineliai. The total installed capacity is 16.5 MW. The wind power plants installed are of V-100 type, produced by Danish company Vestas.

The project generates electricity and supplies it to the national grid. The project reduces greenhouse gas emissions by partially substituting power production in other power plants in Lithuania that run on fossil fuel. The project also reduces emissions of other pollutants arising from burning of fossil fuel, such as SO_2 and NO_x. In addition, implementation of this project helps promoting renewable energy resources and stimulates their use.

Figure 1. Location of Benaiciai wind power park

Benaiciai wind power park project is developed by:

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1.3. Monitoring period

1 January 2008 – 31 December 2008

1.4. Implementation of the project

Table 1. Main milestones in project implementation

Milestone	Date
UNFCCC JI procedures:	
Project Design Document submitted to Accredited Independent Entity	27 October 2006
Letter of Approval from the Lithuanian Ministry of Environment as a legal and authorised representative of the Government of Lithuania received	4 July 2007
Final determination of the JI project	2 June 2008
Construction and operation of wind power park:	
Wind power park starts operating	11 December 2006

Benaiciai wind power project was developed by UAB Achema Hidrostotys. In April 2008, UAB Achema Hidrostotys was renamed into UAB Renerga. A letter from the Lithuanian Ministry of Environment was issued on 29 April 2008, which confirms that all the statements of the Letter of Approval concerning the Benaiciai wind power JI project are applicable to UAB Renerga.

1.5. Monitoring methodology applied

Monitoring plan for the Benaiciai wind power project was developed based on the CDM ACM0002 "Consolidated methodology for grid-connected electricity generation from renewable sources" version 6 but the plan was adapted to suit situation in the Lithuanian energy grid.

2. Monitoring activities implemented

2.1. Monitoring equipment and calibration procedures

Automatic energy meters were installed by AB Lietuvos Energija, national grid operator which buys electricity from the wind power park. The meters belong to AB Lietuvos Energija. They were manufactured by UAB Elgama, which also maintains them. They are calibrated once every 8 years.

Table 2. Monitoring equipment technical data

Position No.	T-101D	T-101 *(before breakdown)*	T-101 *(new)*
Meter type	EPQM 312.01.534	EPQS 113.09.04	EPQS 113.09.04
Product No.	109160	289183	508171
Check date	5 June 2006	29 September 2005	21 August 2007
Breakdowns and other events	No	Meter breakdown on 10 October 2008. Broken meter replaced with a new one on 14 October 2008.	No

2.2. Data collection

2.2.1. Fixed values

Parameter	**Default value**	**Description**
EF_{LE}	0.626 tCO_2/MWh	Emission factor for power production at Lietuvos Elektrine

Emission factor for electricity production at AB Lietuvos Elektrine (Lithuanian Power Plant) (EF_{LE}) was estimated ex-ante, based on production of electric and thermal power, fuel consumption and production efficiency in AB Lietuvos Elektrine during a 4-year period from 2002 to 2005. In the integrated power network in Lithuania, AB Lietuvos Elektrine is the marginal plant: when the generators of electric power supply all quota and over-quota power to the integrated grid, the rest of the power demand is covered by the power produced at AB Lietuvos Elektrine. Therefore any additional power supply to the grid that comes from other sources displaces electricity generated at AB Lietuvos Elektrine.

The emission factor calculated based on fuel consumption from 2002 to 2005 is considered conservative, as AB Lietuvos Elektrine has been preparing to use higher share of orimulsion and decrease the share of natural gas, in an attempt to reduce dependence on single supplier of gas, Russia. An environmental upgrading project has been implemented at the power plant so that emissions of SO_2 and NO_x from burning of orimulsion would comply with the EU regulations. Lithuanian National Allocation Plan for 2008-2012 prepared under the EU Emissions Trading Scheme (http://ec.europa.eu/environment/climat/pdf/nap_lithuania_final.pdf, in Lithuanian language) states that it is anticipated that the average share of orimulsion will rise from 16.0% during 2002-2005 to 60.1% during 2008-2012. Even if a high share of 60.1% is not achieved, there is a definite trend of increase. As orimulsion has a higher CO_2 emission factor than natural gas, its higher share in the fuel mix drives up the combined emission factor for AB Lietuvos Elektrine.

2.2.2. Data on GHG emissions by sources of the project activity

The Project activity does not result in greenhouse gas emissions. Energy taken from the grid for the operation of the wind power park is subtracted from the energy supplied to the grid for the estimation of emission reductions (see data on the baseline below and Annex I).

2.2.3. Data on GHG emissions by sources of the baseline

Table 3. Information on key parameter monitored

Data / Parameter:	P_{WPP}
Data unit	MWh
Value of data	See Table 4 and Annex I
Description	Annual net power supply to the grid from Benaiciai[1] wind power park
Source of data	Onsite power metering device and monthly power dispatch confirmation documents
Description of measurement methods and procedures applied	A commercial onsite power metering device measures power supplied to the grid and power taken from the grid for the park's internal purposes. Recorded data is stored in the memory of the metering device. The data is also automatically transferred via internet to AB Lietuvos Energija, which keeps records in their databases. Once a month, power dispatch confirmation documents, which list electricity bought from UAB Renerga and AB Lietuvos Energija, are signed between UAB Renerga and AB Lietuvos Energija. Energy for on-site use is taken from the grid when the park is not operational, i.e. UAB Renerga buys electricity from AB Lietuvos Energija Energy taken from the grid has to be subtracted from the energy supplied to the grid to get net electricity supplied to the grid, which will displace power production in AB Lietuvos Elektrine. Monthly values of net hourly electricity supply to the grid are given in the table below, and data, that it is based on, is given in Annex I.

Table 4. Data on net hourly electricity supplied by Benaiciai wind power park to the grid in 2008:

Month	Net hourly electricity supplied to the grid, MWh
January	6,862.824
February	5,751.240
March	3,300.834
April	1,888.898
May	1,533.804
June	2,610.581
July	2,148.427
August	3,840.260
September	1,995.775
October	5,384.445
November	5,047.483
December	3,166.453
Total over the monitoring period	**43,531.024**

2.2.4. Data on leakage

No sources of leakage have been identified.

[1] Laukzemes wind power-station – as a power producer in the integrated power network in Lithuania

2.3. Special event log

Automatic energy meter breakdown occurred in T-101 position on 10 October 2008. Broken meter was replaced with a new one on 14 October 2008. Energy supply was not stopped. According to 20 October 2008 Act On Accounting Of Consumed Electric Energy (In Case Of Metering Device Breakdown) No. 08-192 accounting of electricity stood from 10 October 2008 07:55 to 14 October 2008 12:42 due to automatic energy meter breakdown and consumed electric energy in this period was calculated based on 10-14 October 2008 readings of redundant meter in position T-101D.

3. Quality assurance and quality control measures

Power supplied to the grid and taken from the grid is monitored by a commercial power metering device. The power metering device is calibrated. It is sealed and therefore operator of the wind power park is not able to intervene in the measurements. Once a month, an inspector from AB Lietuvos Energija together with the representative from UAB Renerga checks the readings of the power metering device and writes down supplied power and taken power quantity on the dispatch confirmation document which is then signed by both parties. Data for the purpose of calculating emission reductions is taken from these documents. As electricity supplied to the grid is the main parameter for both UAB Renerga and the buyer of electricity, additional quality assurance and quality control procedures are not necessary.

4. Calculation of GHG emission reductions

4.1. Formulae used

The general equation for calculating emission reductions is as follows:

$$ER = BE - (PE + L) \quad (1)$$

Where:
ER – Emission reductions, tCO_2e
BE – Baseline emissions, tCO_2e
PE – Project activity emissions, tCO_2e
L – Leakage, tCO_2e

Baseline emissions are calculated using the following formula:

$$BE = P_{WPP} * EF_{LE} \quad (2)$$

Where:
BE – project's baseline emissions, tCO_2e
P_{WPP} – net hourly power supplied to the grid from Benaiciai wind power park, MWh
EF_{LE} – emission factor for power production at AB Lietuvos Elektrine, determined ex ante (0.626 tCO_2/MWh)

There are no project activity emissions. Mostly renewable electricity generated on-site is used for on-site energy demand. When wind power plant does not work it uses energy from the grid but this electricity is taken into account in monitoring net hourly electricity supply to the grid and is reflected in the values of monthly net power supply to the grid. Therefore:

$$PE = 0 \quad (3)$$

No sources of leakage are identified:

$L = 0$ (4)

Therefore emission reductions are calculated as baseline emissions:

$ER = BE$ (5)

4.2. GHG emission reductions

4.2.1. Project activity emissions

$PE = 0$

4.2.2. Baseline emissions

Baseline emissions are calculated using formula (2), based on monitored values on monthly net hourly electricity supply to the grid:

Month	Net hourly electricity supply to the grid, MWh	Emission reductions, tCO_2e
January	6,862.824	4,296.128
February	5,751.240	3,600.276
March	3,300.834	2,066.322
April	1,888.898	1,182.450
May	1,533.804	960.161
June	2,610.581	1,634.224
July	2,148.427	1,344.915
August	3,840.260	2,404.003
September	1,995.775	1,249.355
October	5,384.445	3,370.663
November	5,047.483	3,159.724
December	3,166.453	1,982.200
Total over the monitoring period	**43,531.024**	**27,250.421**

4.2.3. Leakage emissions

$L = 0$

4.2.4. Summary of emission reductions over the monitoring period

Variable	Value, tCO_2e
Project emissions	0
Baseline emissions	27,250
Leakage	0
Emission reductions	**27,250**

Annex I

Data on net hourly electricity supply to the grid, in MWh:

Month	Electricity bought from UAB Renerga, MWh	Electricity bought from AB Lietuvos Energija, MWh	Net hourly electricity supplied to the grid, MWh
	A	B	A-B*
January	6,863.464	0.640	6,862.824
February	5,752.741	1.501	5,751.240
March	3,307.802	6.968	3,300.834
April	1,903.762	14.864	1,888.898
May	1,546.152	12.348	1,533.804
June	2,617.066	6.485	2,610.581
July	2,155.839	7.412	2,148.427
August	3,845.580	5.320	3,840.260
September	2,007.722	11.947	1,995.775
October	5,387.580	3.135	5,384.445
November	5,054.610	7.127	5,047.483
December	3,174.080	7.627	3,166.453
Total over the monitoring period	**43,616.398**	**85.374**	**43,531.024**

* - Energy taken from the grid for on-site use has to be subtracted from the energy supplied to the grid in order to get net electricity supplied to the grid, which replaces electricity generated in AB Lietuvos Elektrine