

# **Rudaiciai wind power park project**

## **MONITORING REPORT**

**for the monitoring period from  
01/01/2009 until 31/12/2009**

**V.02**

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## **Table of Contents**

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>Description</b>	<b>3</b>
<b>3</b>	<b>Power production</b>	<b>6</b>
<b>4</b>	<b>Emission reductions</b>	<b>7</b>

# 1 Introduction

Rudaiciai wind power park project has been developed by *UAB Veju spektras*, a Lithuanian wind power company. 15 wind turbines with the total capacity of 30MW (2MW x 15) have been installed throughout 2006-2007 in the western part of Lithuania.

Project Design Document (PDD) including baseline and monitoring plan has been prepared by engineering consulting company *UAB COWI Baltic*. The Letters of Approvals (LoA) have been issued by the Ministry of the Environment of the Republic of Lithuania on 05.04.2007 and by the designated focal point of Netherlands SenterNovem on 16.05.2007.

Rudaiciai wind power park project has been approved by an accredited independent entity (AEI) and has been granted final determination. PDD is available on the UNFCCC website under project reference number 0025.

The project reduces greenhouse gas emissions by partially substituting power production in other power plants of Lithuania that run on fossil fuel. In addition, the implementation of this project helps to promote renewable energy and improve environmental conditions in the country. Not only the greenhouse gas emissions are reduced, but also other pollutants, arising from burning of fossil fuel such as SO<sub>2</sub> and NO<sub>x</sub>.

## 2 Description

Rudaiciai wind power park project has been constructed in western part of Lithuania, Kretinga district, near villages of Kiauleikiiai, Kveciai and Rudaiciai. The location of the project is presented in Figure 1:



Figure 1. Location of the project

Locations of wind turbines are presented in Figure 2:

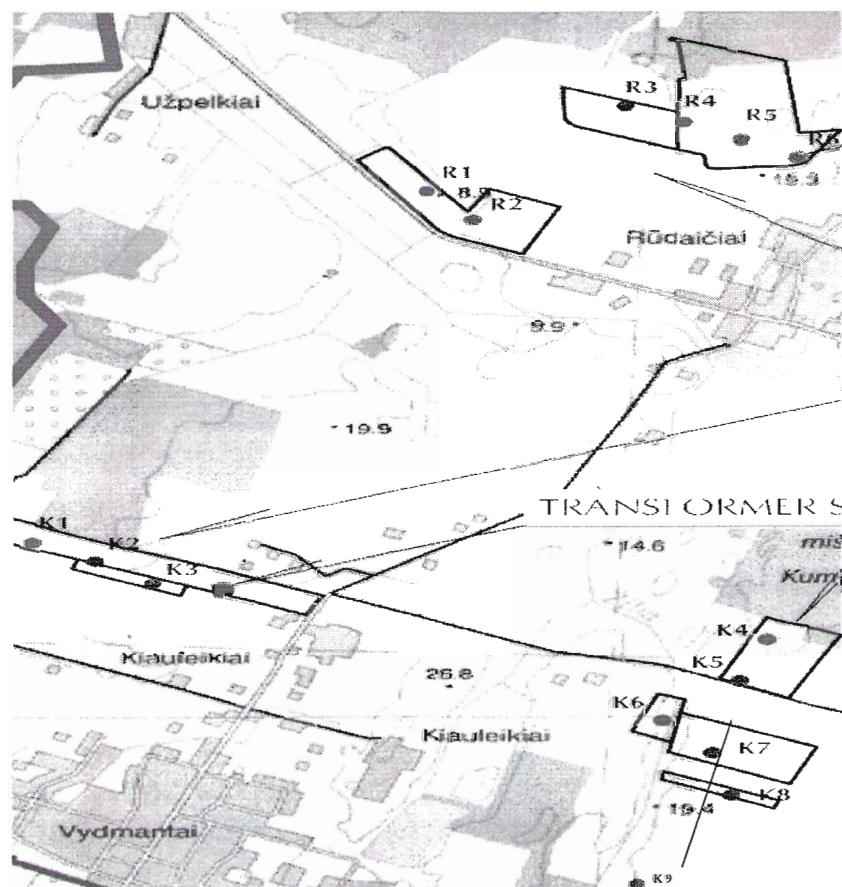


Figure 2. Locations of wind turbines

The wind power park project encompasses installation of 15 Enercon E-70 wind turbines of 2MW, comprising 30MW in total.

Table 1. Technical parameters of the wind power plants

Type of wind turbine	Enercon E-70
Capacity	2000 kW
Rotor diameter	71 m
Direction of rotor's rotation	Clockwise
Number of rotor blades	3
Height of tower	85.4m
Total height of wind power plant	120.5m
Diameter of the tower	2.0-3.9m
Cut-in speed	2.5 m/s

The wind power park is connected to 110 kV power line. A transformer substation with incoming voltage of 20 kV, outgoing voltage of 110 kV and 31.5 MVA capacity has been installed for this purpose.

Rudaiciai wind power park started operating in October 2006. Wind turbines were installed and started operating gradually. Installation was finished in February 2007.

Maintenance of the wind power park is performed by Enercon GmbH.

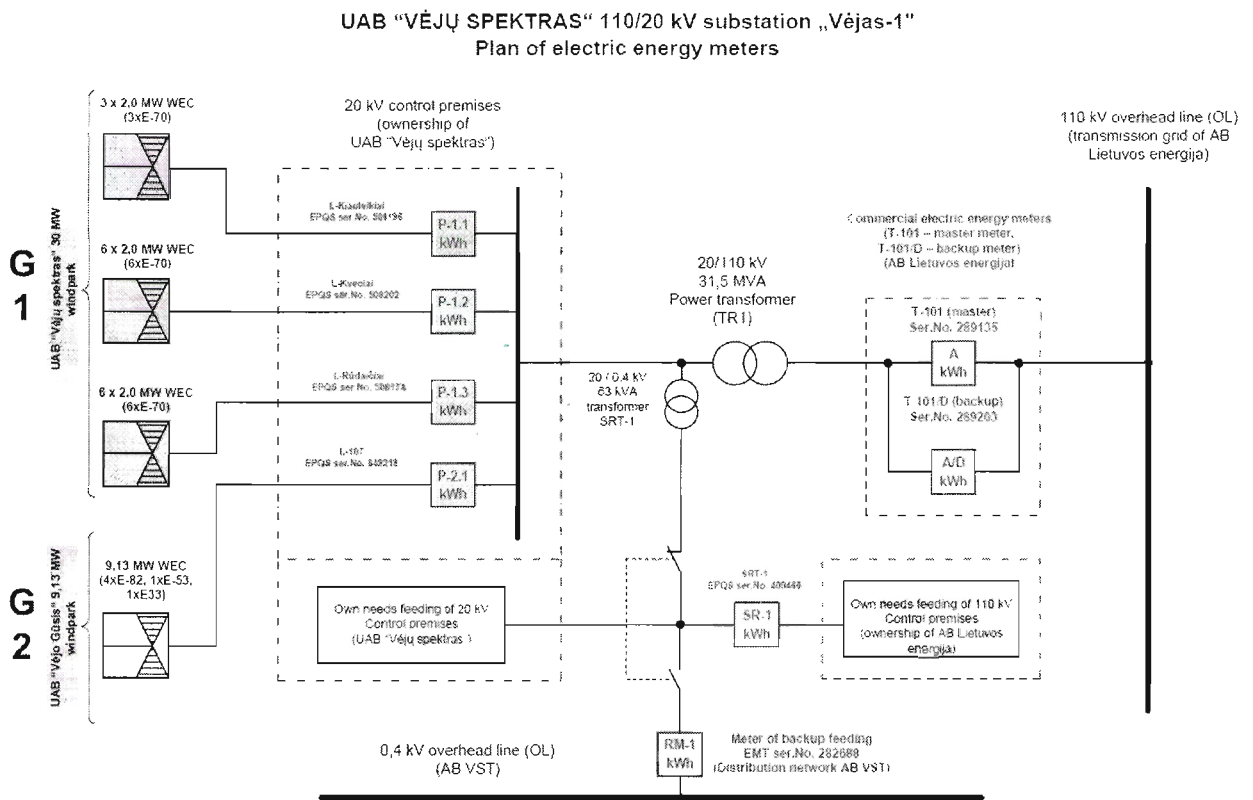


Figure 3. Positions of electric energy meters

All commercial electric energy meters are installed in substation territory.

Electric energy meter on diagram	T-101	T-101/D	E-1	LN KIAULEIKIAI	LN KVECIAI	LN RUDAICIAI	L-107 (since December 2009)
Producer	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)	Elgama-Elektronika Ltd. (Lithuania)
Item description	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy	Electronic multitariff meter of electric energy
Serial No.	289135	289203	282688	508196	508202	508174	649218
Type	EPOS 113.09.04	EPOS 113.09.04	EMT 132.16.6	EPOS 113.09.04	EPOS 113.09.04	EPOS 113.09.04	EPOS 113.21.29
Measurement limits	3*57,7/110V; 1(1,25)A	3*57,7/110V; 1(1,25)A	3*220/380V; 5 (80)A	3*57,7/110V; 1(1,25)A	3*57,7/110V; 1(1,25)A	3*57,7/110V; 1(1,25)A	3*57,7/110V; 1(1,25)A
Class	0.5s	0.5s	1.0	0.5s	0.5s	0.5s	0.2s
Metrological test certificate No.	0139844	0139845	0139846	0139843	0139840	0139842	139869
Metrological test notation	PM-1039597-26.2002	PM-1039597-26.2002	PM-110395970-15.2004	PM-1039597-11.2006	PM-1039597-11.2006	PM-1039597-11.2006	PM-1039597-11.2009
Metrological test date	2005.09.29	2005.09.29	2005.09.06	2007.08.22	2007.08.22	2007.08.22	2008.12.11

Table 2. Technical parameters of the electric energy meters

### 3 Power production

The monitoring of power production is performed by an employee in charge and approved by the director of *UAB Veju spektras*. Monitoring of power production is combined with the commercial accounting of the produced power. Commercial accounting is used to settle the contractual obligations between AB Lietuvos energija - the power dispatch grid operator and *UAB Veju spektras*. The representative of AB Lietuvos energija and a representative of *UAB Veju spektras* sign the monthly power dispatch confirmation form stating the data from the commercial power metering device within 10 days after the end of a month. After power dispatch document is signed by both parties, a representative of *UAB Veju spektras* writes down the figures of dispatched power into the monitoring sheet.

New 9,13 MW wind park Liepyne operated by *UAB Vejo gusis* was connected to the transmission grid through *UAB Veju spektras* transformer station in December 2009. Since then the main commercial meter T-101 is used to account the amount of power produced and consumed jointly for RUDAICIAI and LIEPYNE wind power parks (the producers). The amount of power produced and consumed by each company is calculated and divided by special algorithm set in the Electric Energy Purchase-Sales Agreement with AB Lietuvos energija No. 104-10, dated February 26, 2010 (appendix No.4), i.e. according to the total data of the 4 control meters the proportion (%) of each producer is calculated; then according to these proportions the power production and consumption data of the main commercial meter T-101 is divided between the producers.

CO<sub>2</sub> emission reduction calculation of year 2009 is performed by *UAB Vėjų spektras*, in January 2010. Power production data quality is assured by AB Lietuvos energija who is responsible for the calibration of the commercial power metering devices.

Power dispatch documents are archived at UAB Veju spektras for later reference as a proof of the monitoring results. The following data was collected and saved during the monitoring period from 01/01/2009 to 31/12/2009:

*Table 3. Power supplied to the grid (balance) in the year 2009*

<b>2009</b>	<b>MWh</b>
January	<b>5.714,400</b>
February	<b>3.639,947</b>
March	<b>3.658,870</b>
April	<b>3.243,753</b>
May	<b>4.577,959</b>
June	<b>4.435,359</b>
July	<b>3.589,829</b>
August	<b>4.107,466</b>
September	<b>6.211,974</b>
October	<b>6.109,106</b>
November	<b>7.539,235</b>
December	<b>4.591,640</b>
<b>TOTAL</b>	<b>57.419,538</b>

## 4 Emission reductions

Baseline is described in detail in Rudaiciai wind power park project design document (PDD). The project has been approved by an accredited independent entity (AEI) and has been granted the final determination. PDD is available on the UNFCCC website under project reference number 0025.

An estimated baseline emission factor is - 0.626 tCO<sub>2</sub>/MWh.

According to the monitoring plan of the project, emission reductions are calculated in the following way:

$$E_R = P_{WPP} \times EF_{LE}$$

Where:

$E_R$  – annual emission reductions, tCO<sub>2</sub>

$P_{WPP}$  – Net annual power production at Rudaiciai wind power park.  $P_{WPP}$  is the difference between produced and consumed power at Rudaiciai wind power park in MWh.



EF<sub>LE</sub> – emission factor for power production at Lietuvos elektrine, 0.626 tCO<sub>2</sub>/MWh

The results of emission reduction calculation are presented below:

*Table 4. Emission reductions in year 2009*

<b>2009</b>	<b>t CO<sub>2e</sub></b>
January	<b>3.577</b>
February	<b>2.279</b>
March	<b>2.290</b>
April	<b>2.031</b>
May	<b>2.866</b>
June	<b>2.777</b>
July	<b>2.247</b>
August	<b>2.571</b>
September	<b>3.889</b>
October	<b>3.824</b>
November	<b>4.720</b>
December	<b>2.874</b>
<b>TOTAL</b>	<b>35.945</b>