

Rudaiciai wind power park project

MONITORING REPORT

**for the monitoring period from
01/01/2010 until 31/12/2010**

V.03

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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 SO₂ and NO_x.

2 Description

Rudaiciai wind power park project has been constructed in western part of Lithuania, Kretinga district, near villages of Kiauleikiai, 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:

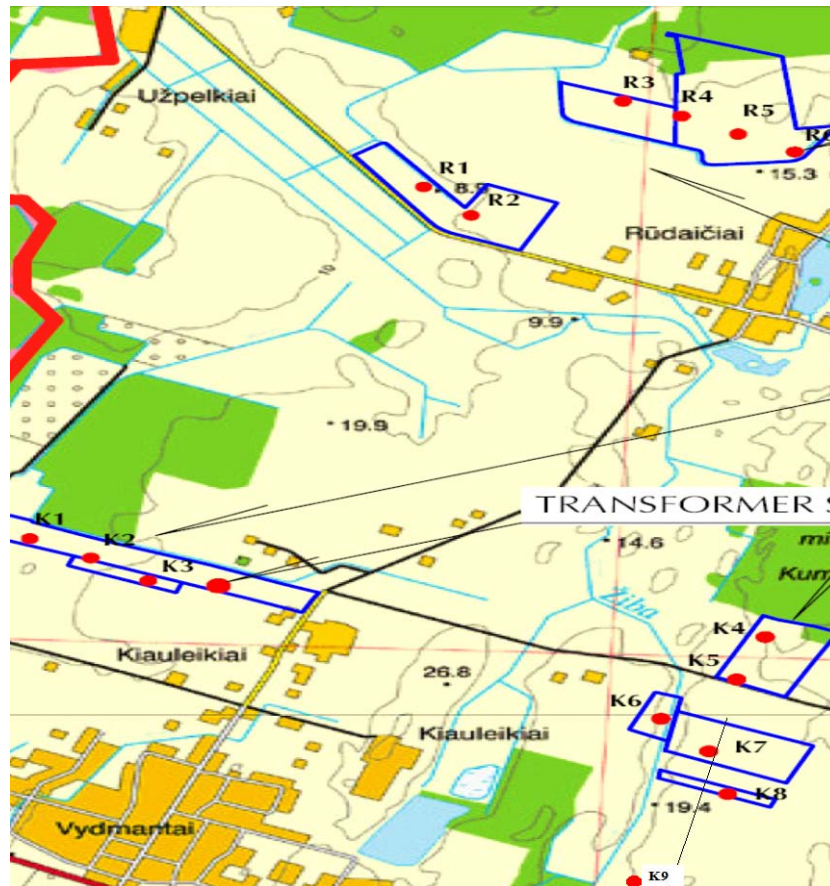


Figure 2. Locations of wind turbines

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.

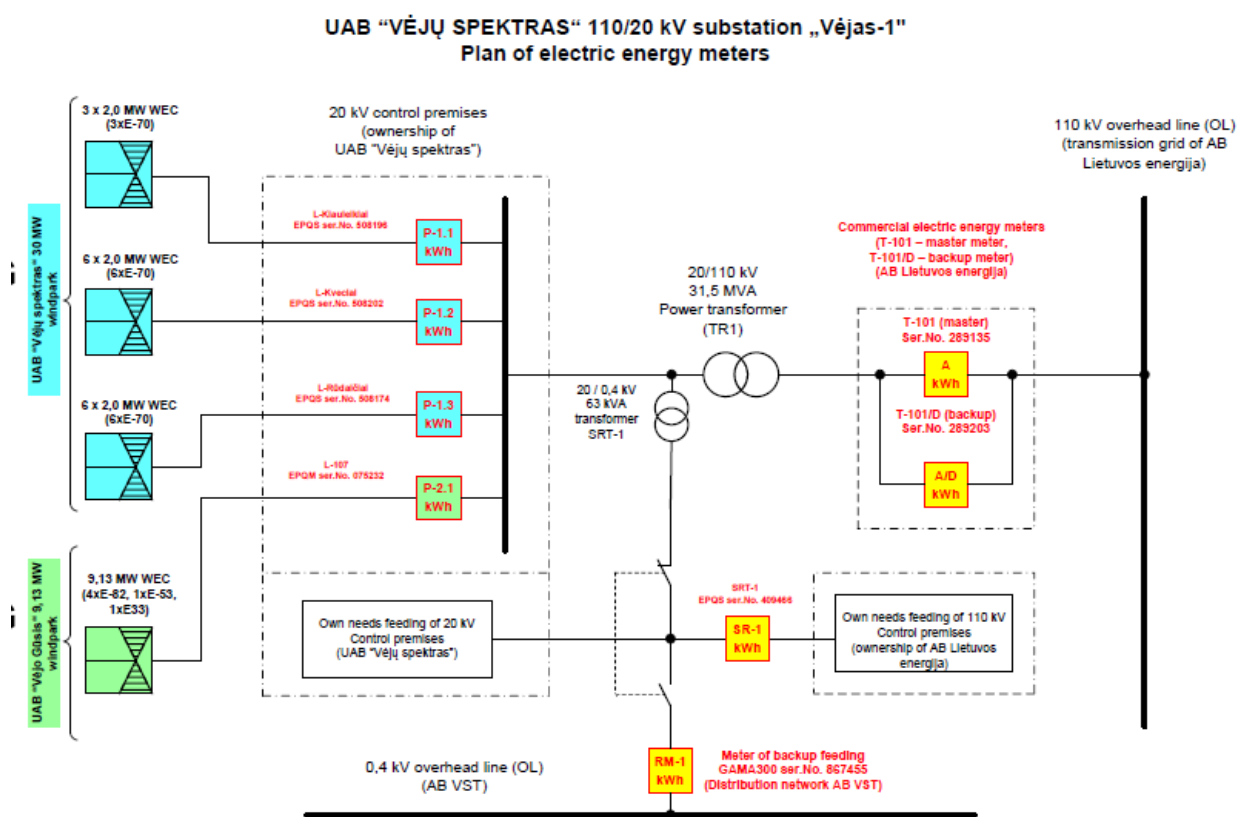


Figure 3. Positions of electric energy meters

All commercial electric energy meters are installed in substation territory.

Electric energy meter on diagram	T-101	T-101/D	AB VST backup (until 13-10-2010) *	AB VST backup (since 13-10-2010) *
Producer	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
Serial No.	289135	289203	282688	867455
Type	EPO5 113.09.04	EPO5 113.09.04	EMT 132.16.6	EMT 132.16.6
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*220/380V; 5 (80)A;
Class	0.5s	0.5s	1.0	1.0

Electric energy meter on diagram	LN KIAULEIKIAI	LN KVECIAI	LN RUDAICIAI	L-107 (until 27-03-2010) **	L-107 (since 29-03-2010) **
Producer	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
Serial No.	508196	508202	508174	649218	75232
Type	EPO5 113.09.04	EPO5 113.09.04	EPO5 113.09.04	EPO5 113.21.29	EPO5 113.21.29
Measurement limits	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	3*57,7/110V; 1(1,25)A
Class	0.5s	0.5s	0.5s	0,2s	0,2s

Table 2. Technical parameters of the electric energy meters

* AB VST backup electric energy meter was changed on 13th of October, 2010 by AB VST.

** The electric energy meter L-107 has broke down at 22.00 on 27th of March, 2010 and was changed to the new one by AB Lietuvos energija at 10.30 on 29th of March, 2010. The electricity supplied through this meter during the break period was calculated by data of technical accounting points (VJ-1.LN KIAULEIKIAI), (VJ-1.LN KVECIAI), (VJ-1.LN RUDAICIAI) and commercial accounting point (VJ-1.T-101) of 27th March and 29th March, 2010 by AB Lietuvos energija in accordance with the article no. 96.4 of the Rules of Electric Energy Supply and Use approved by the Minister of Economy on 07-10-2005 (see Note no. 10-12 Regarding Settlement For Electric Used (in case of accounting meters breakdown) dd 29-03-2010; Job Task 10-93 dd 29-03-2010).

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 LITGRID AB - the power dispatch grid operator and UAB Veju spektras. The representative of LITGRID AB, representative of *UAB Vejo gusis* and 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 all 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 Veju 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.

Due to the connection of Liepyne wind park to *UAB Veju spektras* transformer station in December 2009, the Monitoring plan described in PDD sections D2, D3 was updated (see Annex 1).

CO2 emission reduction calculation of year 2010 is performed by *UAB Vėjų spektras*, in January 2011. 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 01/01/2010 to 31/12/2010:

Table 3. Power supplied to the grid (balance) in the year 2010

2010	MWh
January	4.792,337
February	3.443,812
March	5.618,656
April	3.387,366
May	3.429,575
June	3.100,852
July	2.013,915
August	3.651,753
September	6.491,517
October	6.615,329
November	6.357,408
December	5.604,469
TOTAL	54.506,989

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 tCO₂/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, tCO₂

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_{LE} – emission factor for power production at Lietuvos elektrine, 0.626 tCO₂/MWh

The results of emission reduction calculation are presented below:

Table 4. Emission reductions in year 2010

2010	t CO_{2e}
January	3.000
February	2.156
March	3.517
April	2.120
May	2.147
June	1.941
July	1.261
August	2.286
September	4.064
October	4.141
November	3.980
December	3.508
TOTAL	34.121

ANNEX 1

SECTION D. Monitoring plan

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitoring:

The over-all Quality Management Manual was put together in the end of 2008 (after initial verification) and finalized in January 2009. However the individual procedures existed before and were followed by the personnel.

The responsibilities and roles for monitoring and reporting are stated in detail in the following Quality Assurance procedures:

- KP-GM-01: Power Production-Consumption Document Signature Procedure with LITGRID AB
- KP-GM-02: Supported Power Production Document Signature Procedure with LITGRID AB
- KP-GM-04: Power Production-Consumption Document Signature Procedure with VST AB
- KP-GM-05: CO2 Emission Reduction Calculation

The procedures are being updated depending on situation changes.

D.3. Please describe the operational and management structure that the project operator will apply in implementing the monitoring plan:

The following management structure is in place:

Director - managing the company.

Project Manager - supervision of the project.

Site Manager - daily supervision of the site.

Business coordinator - daily office work, documentation, paper work, cash flows.

Chief accountant - accounting.

Maintenance of wind power park is done by Enercon GmbH under agreement with *UAB Veju spektras*.

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 LITGRID AB - the power dispatch grid operator and *UAB Veju spektras*. The representative of LITGRID AB, representative of *UAB Veju gusis* and 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 all 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 Producer 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, i.e. according to the total data of the 4 control meters (P-1.1., P-1.2. and P-1.3 meters are used for Rudaiciai wind park; and P-2.1. for Liepyne wind park) 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.

Other monitored factors are collected and CO₂ reductions are calculated as well as the Monitoring report is prepared by an employee in charge of *UAB Veju Spektras* in January each year.

Power dispatch documents are archived at *UAB Veju spektras* for later reference for the proof of the monitoring results. *AB Lietuvos energija* is responsible for the calibration of the commercial power metering device.