JOINT IMPLEMENTATION PROJECT DESIGN DOCUMENT FORM
Version 01 - in effect as of: 15 June 2006

CONTENTS

SECTION A. General description of the project

A.1. Title of the project:

Rudaiciai Wind Power Park Project
Version: PDD 05
Date: April 2008

A.2. Description of the project:

Rudaiciai wind power park joint implementation (JI) project is prepared under the initiative of *UAB Veju spektras.* It is foreseen to install 15 wind power plants with the total capacity of 30MW (2MW x 15) in the western part of Lithuania. The Wind power park, in a conservative approach, will generate about 73.8 GWh of electric power per year.

The project will reduce 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 will help to promote renewable energy resources, stimulate their use and improve environmental quality in the country. Not only the greenhouse gas emissions will be reduced, but also other pollutants, arising from burning of fossil fuel such as SO_2 and NO_x.

Lithuania's National Energy Strategy states that up to 7% of all electric power, produced in Lithuania, shall be produced using renewable energy resources by 2010. Use of renewable resources is promoted in Lithuania, but still it is often to expensive and not always financially efficient, to be utilised. Rudaiciai wind power park project is expected to obtain additional income from Emission Reduction Units (ERU) and in such a way improve the viability and financial efficiency of the project.

Project objectives:

- Reduction of anthropogenic greenhouse gas emissions;
- Reduction of other pollutants such as SO_2 and NO_x;
- Promotion of wind power utilisation in Lithuania;
- Creation of new jobs.

A.3. Project participants:

A Joint Implementation project is participated by investing party and a host party. In Rudaiciai wind power park project Lithuania is participating as the host party while the Netherlands is the investing party. SIA "E kvotas", a company based in Latvia intends to purchase Emission Reduction Units (ERU), designated to the projectInformation on parties, participating in wind power plant project, is provided in Table 1.

Table 1 Parties, participating in JI project

Countries/Parties involved	Legal entities, participating in the project	Please indicate, if the Party involved wishes to be considered as project participant (Yes/No)
Lithuania (Host party)	UAB Veju spektras	No

the Netherlands (Investing party)	SIA E kvotas	No

The owner of Rudaiciai wind power park project is *UAB Veju spektras*. This enterprise was established particularly for implementation of this wind power park project. Main business of the enterprise is production of electric power. The enterprise is located in Kretinga (Dvaro st. 4a) in the western part of Lithuania. Investing party of the project is being represented by SIA "E kvotas", settled in Rezekne, Latvia (Rigas str. 1).

A.4. Technical description of the project:

A.4.1. Location of the project:

Project will be implemented in western part of Lithuania, Kretinga district, near villages of Kiauleikiai, Kveciai and Rudaiciai (Figure 1).

Figure 1 Location of Rudaiciai wind power park

A.4.1.1. Host Party(ies):

Lithuania

A.4.1.2. Region/State/Province etc.:

Klaipeda county

A.4.1.3. City/Town/Community etc.:

Kretinga district

A.4.1.4. Detail of physical location, including information allowing the unique identification of the project (maximum one page):

Planned location of Rudaiciai wind power park is in Kretinga district in the territory of villages Kiauleikiai, Kveciai and Rudaiciai. Territory of the park (2.44 ha) is leased under the long term agreement. One wind power plant occupies 0.1375 ha and transformer substation occupies 0.38 ha.

Detailed layout of wind power plants in the territory is shown in Figure 2.
The project site is situated in the territory of the seacoast. It is the Lithuania's windiest area with, highest wind speeds and windy days prevailing. Characteristics of wind take a significant role in installation of wind power park, especially in selection of the location. Referring to long term meteorological data and measurements of wind speed and strength, chosen location is well suited for project implementation.

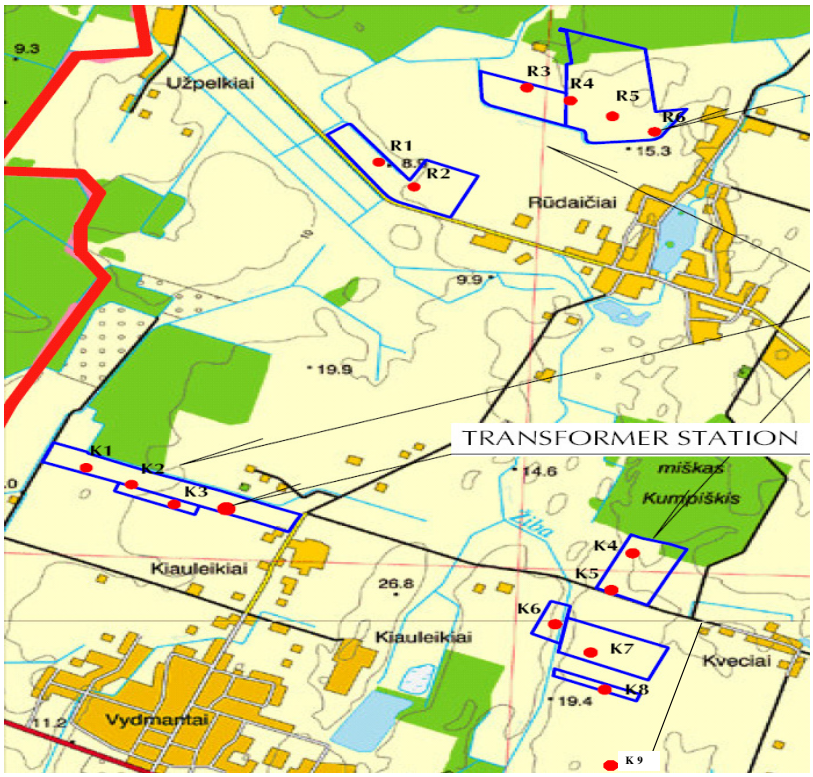

Figure 2 Detailed layout of Rudaiciai wind power park

Detailed layout of wind power plants is based on careful one year study of wind speed and pressure, conducted by German company Enercom GmbH. Wind parameters were measured at heights of 85, 66 and 42 meters. For long term forecasting, ten years data from Palanga meteorological station was used.

A.4.2. Technology(ies) to be employed, or measures, operations or actions to be implemented by the project:

It is planned to install 15 Enercon E-70 type wind turbines manufactured by German company Enercon GmbH. Technical data of the turbines is presented in Table 2.

Table 2 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 will generate about 74 GWh electric power per year. The wind power plant produces noise of 45 dBA in 300 m radius around the plant, which is equal to permissible level in residential environment at night-time and 11% lower than allowable level in working environment. Noise level is determined in pursuance to Lithuanian Hygiene Code HN 33-2003 "Acoustic Noise. Allowable Levels in the Residential and Working Environment. General Requirements for Noise Measurements".

It is planned to install a transformer substation with incoming voltage of 20kV, outgoing voltage of 110 kV and 31.5 MVA capacity.

Wind power plants will be manufactured, supplied, installed, adjusted and set into action by Enercon GmbH. Enercon will also perform maintenance of the wind power park for 12 years period after commissioning.

A project implementation schedule is presented in Table 3.

Table 3 Project implementation schedule

Project implementation	Working days provided	Deadlines
Wind power park project	283	Dec 01, 2006
Building roads to substations	35	May 05, 2006
Construction works	116	May 12, 2006
Establishment	143	Sep 15, 2006
Transportation of wind power plants	46	Sep 19, 2006
Installation of wind power plants	77	Nov 15, 2006
Installation of substations	149	May 29, 2006
Laying down the power cables	93	Sep 13, 2006

Project implementation	Working days provided	Deadlines
Final works	1	Dec 01, 2006

For construction of wind power plants it is necessary to obtain appropriate permits. Currently all required permits are obtained (Table 4).

Table 4 permits

No.	License	Obtained	Valid till:
1.	License to increase power production capacity	14 June 2004	14 July 2006 (can be extend the term for 6 month)
2.	Detailed plan to build 15 wind power plants and a transformer substation	Prepared 24 August, 2004 Came into effect 15 September 2004	
3.	Construction license to build 15 wind power plants and a transformer substation	8 September 2005	15 Sepetmebr 2005

Wind power production forecast was performed by Enercon. The results are presented in Table 5
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Table 5 Results of Enercon's micrositing. Projected annual power production in MWh.

Power Production (MWh/y)	No correlation	Old Correlation	New correlation
Rudaiciai	36,171	42,234	41,783
Kveciai	37,156	43,266	42,724
Kiauleikiai	19,269	22,398	21,653
TOTAL	92,596	107,897	106,159

Palanga meteorological station data suggests that wind speeds were gradually decreasing over the past years. The results of the independent expert from EMD International, who had evaluated Enercon's micrositing, show that the pessimistic forecast would not go below 70% of the forecasted value (Per Nielsen, EMD International, March-2005). EMD forecasted values are presented in Table 6.

Table 6 EMD International Rudaiciai WPP production forecast

Power Production (MWh/y)	Basic scenario, MWh	Pessimistic scenario, MWh
Rudaiciai	32,555	28,894
Kveciai	31,603	27,918
Kiauleikiai	17,405	15,420
TOTAL	**81,563**	**72,232**

As a conservative approach 73,852 MWh/year power production will be used for power production forecast for Rudaiciai project.

A.4.3. Brief explanation of how the anthropogenic emissions of greenhouse gases by sources are to be reduced by the proposed JI project, including why the emission reductions would

not occur in the absence of the proposed project, taking into account national and/or sectoral policies and circumstances:

Usage of renewable energy resources for electric power production reduces GHG emissions that are emitted when using fossil fuel. Electric power, generated and supplied to national power grid, by wind power plants reduces production of other power plants in Lithuania. *UAB Veju spektras* - the owner of Rudaiciai wind power park, has signed the contract with *AB Lietuvos energija* for the supply of electric power, produced by the wind power park, to the power grid.

The Lithuanian electric power network is being operated by *AB Lietuvos energija*. Foremost, they purchase power quotas (on basis of the prior signed contracts) from electric power producers. The producers may also supply electric power, exceeding the quotas, at lower price. The difference in national demand for the electric power and total production thereof (quotas and over-quotas) is being covered by power produced by Lietuvos elektrine. Thus, if the implementation of this project fails, the estimated electric power would be produced by Lietuvos elektrine, using fossil fuel – natural gas, heavy fuel oil and Orimulsion. It was calculated that Lietuvos elektrine, by generating 1MWh of electric power, contributes to the pollution of atmosphere with 0.626 tones of CO_2 (data of 2002-2005).

Measurements, conducted by Enercon GmbH in 2004, indicate that Rudaiciai wind power park will generate 73.85GWh of electric power per year. Applying baseline ratio 0.626 tCO_2/MWh_e (see A.4.3.1.Estimated amount of emission reductions over the crediting period), CO_2 reduction per year is equal to 46.231 tCO_2. Total reduction of CO_2 in period of 5 years (2008-2012) is 231.157 tCO_2.
In order to build wind power park, a project developer had to win a tender for installed capacity licence in one of the 6 zones in western part of Lithuania. Each zone has a limit for installed power capacity – that is announced in a tender.

The feed-in-tariff scheme for green power production in Lithuania is established by the Regulation on promotion of electric power produced from renewable energy sources, approved by the Lithuanian government's decision No. 1474 on 5th December 2001. The regulation obliges the grid operator to purchase all green power from licensed grid connected producers at feed-in-tariffs set by the decision No.7 of the National Price and Energy Control Commission approved on 11th February 2002. The feed-in-tariff for wind power is set at 0.22 Lt/MWh (0.064 EUR/MWh). The decision also states that the feed-in-tariff can be differentiated by the agreement between a producer and the grid operator.
After the introduction of power spot market in Lithuania, the difference of power spot price and the feed-in-tariff will be compensated for green power producers. The regulation envisages that the feed-in-tariff scheme will be replaced by green certificate scheme in 2021, hence the feed-in-tariffs are valid until 2021.

A.4.3.1. Estimated amount of emission reductions over the crediting period:

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Table 7 Estimated emission reductions

	Years
Crediting period	**5 (2008-2012)**
Year	**Estimate of annual emission reductions in tonnes of CO_2 equivalent**
2008	46,231
2009	46,231

2010	46,231
2011	46,231
2012	46,231
Total estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	231,157
Annual average of estimated emission reductions over the crediting period (tonnes of CO_2 equivalent)	46,231

As the project started operating before 2008, Early credits are generated from January 2007 to December 2007 and are claimed as AAU's, subject to the verification by an Accredited Independent Entity and a decision by Lithuanian DFP.

A.5. Project approval by the Parties involved:

Rudaiciai wind power park JI project idea was given preliminary approval (Letter of Endorsement) on May 31, 2006 by the Communication No (10-5)-D8-4653 of Ministry of Environment of the Republic of Lithuania. The evaluation of the Project Idea Note was made in consideration of provisions settled out in the regulation for JI project implementation in Lithuania, approved by the ordinance No D1-183 of the Minister of Environment of the Republic of Lithuania on April 1, 2006 (Official Gazette, 2005 No 50-1671). Also the assents from the Ministry of Economy of the Republic of Lithuania and the Lithuanian Environmental Investment Fund were taken into consideration in the decision making procedure.

In the Communication No (27.4-51)-3-2219 of April 12, 2006 on Joint Implementation Project, the Ministry of Economy of Lithuania has made its conclusions upon the implementation of Rudaiciai wind power park project. The communication states that the concept of the wind power park project is in compliance with:

- ✓ Conditions set out in Article 13 of JI Project Allocation Rules, approved by the Order No D1-183 of the Minister of Environment of the Republic of Lithuania of April 1, 2005 (Official Gazette, 2005 No 50-1671);

- ✓ Criteria of the projects eligible to underlying joint implementation, listed in Strategic Guidelines for Implementation of Joint Implementation Mechanism set force under Kyoto Protocol to the United Nations Frameworks Convention on Climate Change and approved by the Order No D1-279/4-193 of the Minister of Environment and the Minister of Economy of the Republic of Lithuania of May 19, 2004 (Official Gazette, 2004 No 86-3146);

- ✓ Provisions of National Energy Strategy, concerning the Procedures for Promotion of Manufacture and Purchase of Renewable Energy Resources, approved by Seimas of the Republic of Lithuania by Resolution No IX-113 of October 10, 2002 (Official Gazette, 2004 No 9-228).

By the same Communication Ministry of Economy informs that in accordance to provisions of the Procedures for Promotion of Production and Purchase of electricity produced from Renewable and

Waste Energy Resources (Official Gazette, 2004 No 9-228), permits to enhance electric power production capacity by installing wind power plants are issued in result of tendering. In 2004 *UAB Veju spektras* was invited to tender, organised in respected to the enhancement of electric power production capacity by installing wind power plants in area No 3, and was awarded. On a basis of the results of tendering Ministry of Economy has issued a permit No LP-0055 to *UAB Veju spektras* to enhance electric power production capacity.

SECTION B. Baseline

B.1. Description and justification of the baseline chosen:

Baseline is the amount of GHG that would be emitted to the atmosphere during the crediting period of the project, i.e. in 2008-2012, in case the project was not implemented.

BASREC Regional Handbook on Procedures for Joint Implementation in the Baltic Sea Region (Version 2 – June 2006) indicates tree methods of baseline approach:

1. Existing actual or historical greenhouse gas (GHG) emissions, as applicable;
2. Emissions from a technology that represents an economically attractive course of action, taking into account barriers to investment;
3. Average emissions of similar projects undertaken in the previous 5 years, in similar social, environmental and technological circumstances, and whose performance is in the top 20 per cent of their category.

In Rudaiciai wind power project baseline is calculated referring to historic data as this method is best suited for Lithuanian power market. Approved CDM ACM0002 methodology is not used for the baseline calculation due to the following reasons:

1. Lietuvos Elektrine, power plant with the second largest installed capacity in Lithuania (after Ignalina nuclear power plant –INPP) is operating on the power gird as a marginal plant. It covers all power demand which is remaining after all other power producers have supplied their quota power to the grid. Hence, by simply including all these power plants operating on the grid (excl. INPP) would bias the Operating Margin emissions factor.

2. There is an overcapacity of installed power in Lithuania, so only very few new power plants are built. Because of that, it is impossible to calculate properly the Built Margin emissions factor.

Taking into consideration the specifics of the Lithuanian power market, the methodology based on historical data was developed in mid 2006 by a consulting company *Ekostrategija*. The methodology is described below. Detailed baseline justification is presented in Annex 2.

GHG emissions from production of electric power depend on type of fuel used and the efficiency of installations in which fuel is combusted. Thus, for baseline calculation it is important to know, which power plants will reduce production due to the supply of additional electric power, generated in a JI project. This can be easily determined, knowing the structure of Lithuanian power network. When the manufacturers of electric power supply all quota power to integrated Lithuanian power grid, the rest of power demand is covered by power produced in Lietuvos elektrine. Taking this into consideration, we can say that in case of additional power supply to the grid, the production will be reduced in Lietuvos elektrine. Therefore, in order to calculate GHG emission reductions, resulting from implementation of JI projects related to production of electric power, it is necessary to know the amount of CO_2 released to the atmosphere while producing 1MWh of electric power in Lietuvos elektrine.

For determination of the baseline we use fuel consumption and production efficiency data provided by AB Lietuvos elektrine as well as production of electric and thermal power in Lietuvos elektrine in 2002-2005 (Table 8). For evaluation of the emission reductions we also use forecasts of power production in Rudaiciai power park, provided by *UAB Veju spektras*.

Table 8 Energy production and fuel consumption in Lietuvos elektrine

Year	Electric power produced (MWh)	Thermal power produced (MWh)	Natural gas (1000nm3)	Fuel oil (t)	Orimulsion (t)
2002	736,604	202,060	199,104	7,355	52,534
2003	723,858	195,553	225,813	5,241	21,238
2004	745,372	212,399	207,690	2,750	55,501
2005	1,072,814	199,383	280,559	1,815	86,160

The amount of fuel consumed is transferred to oil equivalents using such factors: natural gas – 0.800 toe/1000nm3, fuel oil – 0.955 toe/t, orimulsion – 0.660 toe/t (Table 9).

Table 9 Fuel consumption at Lietuvos elektrine, expressed in oil equivalents

Year	Natural gas (toe)	Fuel oil (toe)	Orimulsion (toe)
2002	159,289	7,025	34,675
2003	180,657	5,005	14,018
2004	166,158	2,626	36,633
2005	224,455	1,733	56,869

Hereafter, we calculate the percentage of each type of fuel, being consumed in every year (Table 10).

Table 10 Proportion of fuels consumed at Lietuvos elektrine

Year	Natural gas (%)	Fuel oil (%)	Orimulsion (%)
2002	79.25%	3.49%	17.25%
2003	90.47%	2.51%	7.02%
2004	80.89%	1.28%	17.83%
2005	79.30%	0.61%	20.09%

According to calorific values of fuel (based on Fuel and Energy Balancing Technique, approved by the Order No DĮ-228 of Managing Director of Department of Statistics to the Government of the Republic of Lithuania of November 24, 2004 (Official Gazette 2004, No172-6363), CO_2 emission factors are estimated for fuel, expressed in tones of oil equivalents (Table 11).

Table 11 CO_2 emission factors

Natural gas	Fuel oil	Orimulsion
1.8960531 tCO2/1000 nm3	3.1028478 tCO2/t	2.2268399 tCO2/t
0.8000287 toe/1000 nm3	0.9550656 toe/t	0.6600416 toe/t

Natural gas	Fuel oil	Orimulsion
2.3699814 tCO_2/toe (EF_{Gas})	3.2488322 tCO_2/toe (EF_{HFO})	3.3737873 tCO_2/toe (EF_{Orm})

Total annual amount of CO_2 emitted by Lietuvos Elektrine is calculated by multiplying the amount of each type of fuel consumed annually (expressed in toe) by the corresponding emission factor tCO_2/toe (Table 12).

$T_{CO2} = (F_{Gas} \times EF_{Gas}) + (F_{HFO} \times EF_{HFO}) + (F_{Orm} \times EF_{Orm})$

T_{CO2} - total annual amount of CO_2 emitted by Lietuvos elektrine;
F_{Gas} – annual consumption of Natural gas at Lietuvos elektrine, 1000 m^3
F_{HFO} – annual consumption of Heavy Fuel Oil at Lietuvos elektrine, tonnes
F_{Orm} – annual consumption of Orimulsion at Lietuvos elektrine, tonnes
EF_{Gas} - CO_2 emission factor for Natural gas, tCO_2/toe
EF_{HFO} - CO_2 emission factor for Heavy fuel oil, tCO_2/toe
EF_{Orm} - CO_2 emission factor for Orimulsion, tCO_2/toe

Table 12 shows the emissions from each type of fuel at Lietuvos elektrine.

Table 12 Fuel specific CO_2 emissions at Lietuvos elektine

Year	Natural gas, tCO_2	Fuel oil, tCO_2	Orimulsion, tCO_2	**Total: tCO_2**
2002	377,512	22,821	116,985	517,318
2003	428,153	16,262	47,294	491,709
2004	393,791	8,533	123,592	525,916
2005	531,955	5,632	191,865	729,451

Amount of CO_2 emissions, released while producing thermal power in Lietuvos elektrine, is calculated as follows:

$$H_{CO2} = \sum \frac{H_{LE}}{E_h \cdot K_{toe}} \cdot R_{\%} \cdot K_{tCO2/toe};$$

H_{CO2} – CO_2 emissions, generated while producing thermal power;
H_{LE} – Annual amount of thermal power produced;
E_h - Average efficiency of thermal power production in Lithuania.(In 2002-2005 average thermal power production efficiency rate among power production units, participating in EU ETS trading scheme, was 84.7%);
K_{toe} – Coefficient for transfer of thermal power to conditional fuel (toe - tones of oil equivalents). It is equal to 11.63;
$R_{\%}$ - Percentage of each type of fuel within the annual fuel consumption;
$K_{tCO2/toe}$ – Emission factor for one unit of conditional fuel (tne - tones of oil equivalents) of different fuel types.

Results of measurements are presented in Table 13.

Table 13 Emissions attributable to thermal power production at Lietuvos elektrine

	Natural gas, tCO_2	Fuel oil, tCO_2	Orimulsion, tCO_2	CO_2 emissions (t)
2002	38,528	2,329	11,939	52,796
2003	42,566	1,617	4,702	48,885
2004	41,335	896	12,973	55,204
2005	38,039	403	13,720	52,161

CO_2 emissions released for production of electric power are calculated by deducting the amount of CO_2 attributable to heat production from the total CO_2 amount released by Lietuvos elektrine.

$P_{CO2} = T_{CO2} - H_{CO2}$

P_{CO2} – annual CO_2 emissions attributable to power production at Lietuvos elektrine, tCO_2
T_{CO2} - total annual amount of CO_2 emitted by Lietuvos elektrine;
H_{CO2} – annual CO_2 emissions attributable to heat production at Lietuvos elektrine, tCO_2

To calculate emissions factor, CO_2 emissions attributable to power production were divided by annual power production. The results are presented in Table 14.

Table 14 Emissions attributable to power production at Lietuvos elektrine

Year	Power production, MWh	Emissions, t CO2	$tCO2/MWh_e$
2002	736,604	464,522	0.631
2003	723,858	442,824	0.612
2004	745,372	470,712	0.632
2005	1,072,814	677,290	0.631
Average	819,662	513,837	0.626

To evaluate the correctness of the results obtained, we compared them to the results obtained and provided by *AB Lietuvos elektrine*. Calculations made by the technicians of *AB Lietuvos elektrine* gave such results: 0.667 tCO_2/MWh_e for 2005 and 0.726 tCO_2/MWh_e for the period before 2012 forecast.

To evaluate our results even further, we have considered the data for consumption of conditional fuel per 1 MWh of heat energy produced, presented by *AB Lietuvos elektrine*. These figures were obtained by using an internal enterprise's methodology and are presented in Table 15.

Table 15 Consumption of conditional fuel to produce 1 MWh of heat energy at Lietuvos elektrine

Year	tce/MWh_e
2002	0.136
2003	0.141
2004	0.141
2005	0.140

Fuel consumption was transferred to the efficiency of thermal power production (Table 16).

Table 16 Efficiency of thermal power production at Lietuvos elektrine

Year	Efficiency of thermal power production
2002	90.5%
2003	87.1%
2004	87.1%
2005	87.6%
Average	**88.1%**

As it can be seen from the table, the average thermal power production efficiency rate in Lietuvos elektrine is 88%. If using thermal power production efficiency rate of 88% in our formula, CO_2 baseline factor would be equal to 0.629 tCO_2/MWh_e.

Considering the results of our calculation and ones presented by *AB Lietuvos elektrine* it is possible to draw the conclusion that using emissions factor of 0.626 tCO_2/MWh_e (described previously) would represent a conservative approach to the baseline as it would result in fewer CO_2 reductions compared to the one calculated by *AB Lietuvos elektrine* methodology.

Lithuania's National allocation plan for 2005-2007 forecasts an increase in Orimulsion share from 20% (56.9 Ktoe) in 2005 to 40% by 2008 in the fuel mix of Lietuvos elektrine. The forecasted increase in the Orimulsion share, would definitely increase baseline emissions factor. Hence, the current emissions factor - 0.626 tCO_2/MWh_e is considered to be conservative and will be used to calculate CO_2 reductions from Rudaiciai wind power project.

B.2. Description of how the anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the JI project:

Calculation of baseline is presented in Section B.1. Table 14 shows that production of additional 1 MWh of electric power reduces emissions to the environment in average by 0.626 tCO_2. It is foreseen to produce 73.85 GWh of electric power per year from the Rudaiciai wind power project, thus every year CO_2 emissions will be reduced by 46,231 tonnes.

JI project's additionally indicates the GHG reduction after implementation of JI project in comparison to the baseline. Usually financial efficiency of JI projects is low, thus ERUs help to promote their development and implementation. This economic promotion also reduces project's payback time. The CDM Tool for the demonstration and assessment of additionality (version 02) is used to demonstrate the additionality of Rudaiciai project.

Step 0. Preliminary screening based on the starting date of the project activity

Not applicable as a crediting period starts only after the project registration.

Step 1. Identification of alternatives to the project activity consistent with current laws and regulations

Sub-step 1a. Define alternatives to the project activity:

A) Proposed project activity not undertaken as a JI project activity;

B) Continuation of the current situation (no project activity or other alternatives undertaken);
In this alternative, power is produced in existing and new cogeneration power plants.

Sub-step 1b. Enforcement of applicable laws and regulations:

The existing legal and regulatory requirements in Lithuania are in favour of alternative B - continuation of the current situation and is not in favour of alternative A - proposed project activity not undertaken as a JI project activity. The regulation on supporting renewable energy does not promote wind power enough to make it financially attractive (Sub-step 2c).

Step 2. Investment analysis

Sub-step 2a. Determine appropriate analysis method

Simple cost analysis (option I) is not applicable for the project as the income from ERU's are not the only source of revenues for the project.

Benchmark analysis (option II) is not applicable either as no investment benchmarks for power sector exist in Lithuania. The power market in Lithuania is still partly regulated. Power producers are given quotas to deliver power at a certain price. Over-quota power is delivered at the market price (lower than the quota price). Both, quota and the market price differ on a case by case basis.

The *investment comparison analysis (option III)* will be used for this project as it is the only applicable method.

Sub-step 2b. – Option II. Apply investment comparison analysis

IRR(Internal rate of return), as one of the most common financial indicators will be used for investment comparison analysis.

Sub-step 2c. Calculation and comparison of financial indicators

IRR for Rudaiciai wind power park project is estimated to be 9.45 %[1] (the feed in tariff of 0.22 Lt/KWh was used for estimations according to existing regulation for supporting renewable energy). Average IRR for new natural gas based cogeneration power plants is similar - 8-10%. However, EU structural funds are available for new cogeneration plants but not for wind power projects in Lithuania. With the EU structural support IRR of new cogeneration plants jumps up to around 15%[2]. This fact makes cogeneration option more attractive for the investors compared to the wind power.

Additional revenues from ERU sales increase IRR of Rudaiciai project up to 9.90% (ERU price considered to be €6/tCO_2e).).

Sub-step 2d. Sensitivity analysis

[1] Project financial calculation tables

[2] IRR calculation for cogeneration plant in Panevezys

IRR sensitivity to power production and ERU price is analyzed. As conservative production level is used, only positive sensitivity margin is applied. The results are presented in tables below:

Production Margin	0%	5%	10%	15%	20%	25%	30%
Production, MWh	73,852	77,545	81,237	84,930	88,622	92,315	96,008
IRR (incl ERUs)	9.90%	10.80%	11.69%	12.55%	13.41%	14.25%	15.08%

Margin	0%	5%	10%	15%	20%	25%	30%
ERU price, EUR	6	6.3	6.6	6.9	7.2	7.5	7.8
IRR (incl ERUs)	9.90%	9.92%	9.94%	9.96%	9.98%	10.00%	10.02%

As it can be seen from the sensitivity analysis, IRR is much more sensitive to power production than to ERU price. More optimistic power production forecasts are prevented due to actual power production at a single wind power plant in Vydmantai, situated 3km away from the Rudaiciai wind power park site (A4.2)

Step 3. Barrier analysis

Sub-step 3a. Identify barriers that would prevent the implementation of type of the proposed project activity:

Investment barriers

- Lithuania's recent economic growth has led to stricter terms for foreign financial assistance, so no bilateral financial support from other EU countries are possible anymore. EU structural funds are not available for wind power projects in Lithuania either. Hence, there are no any investment subsidies available for wind power in Lithuania.

- The commercial scale wind power parks, according to the regulation, are allowed only in one of the six zones in the western part of Lithuania – Klaipeda and Kretinga regions. The price of land in these regions has increased very much during the past years. For the project developer it is very difficult to buy or lease a land in these regions at a reasonable price, which makes wind power business a less attractive option.

- Financial efficiency of the wind power projects has dropped due to significant increase in prices for construction materials, equipment and construction works in comparison to the initial estimate. This issue is applicable for both wind farms (Rudaiciai and Benaiciai). Prices of construction services and building materials were lower by in average 40 per cent at the initial project planning stage, compared to the prices at the projects' detailed planning stage. JI mechanism gave good opportunity to make a go decision after price increases, taking into consideration additional revenues from ERU.

- Tender rules for installed wind power capacity in dedicated zones, requires for a significant initial deposit. With the JI mechanism, a project developer is more confidential taking risks (e.g. limited construction time allowance) associated with sunk capital in form of the deposit.

- Purchase of electric power, produced during the life time of the project, is not guaranteed in a sense of the fact that until trading on hour basis comes into effect, *AB Lietuvos energija*, having signed the contract for the supply of electric power, can disconnect the wind power park from the power network in case of the system overload

Technological barriers

- There has been limited know-how on wind power available in Lithuania until recently. The project developer has also to provide education and capacity building for operational staff with the assistance of the plant suppliers in stages of operation, management and maintenance of a wind power park.

Sub-step 3 b. Show that the identified barriers would not prevent the implementation of at least one of the alternatives (except the proposed project activity):

- EU structural funds are available for new cogeneration power plants and for modernization of existing ones. It gives opportunity for subsidies up to 50%.
- Alternative B either does not require purchase/leasing of land in the western region of Lithuania.
- There is more know how available for cogeneration than for wind power in Lithuania

Step 4. Common practice analysis

Sub-step 4a. Analyze other activities similar to the proposed project activity:

Good evidence that the wind power projects have various barriers for implementation in Lithuania is the fact that, there were no operating wind farms on a commercial scale in Lithuania so far. The first two wind farms (Benaiciai and Rudaiciai) are developed as JI projects. It is also ascertained that wind power is one of the most expensive types of electricity generation. Even in new EU countries like Lithuania, governmental subsidies are necessary to enable commercial operation. These barriers prevent wind power projects from being implemented in Lithuania.

Sub-step 4b. Discuss any similar options that are occurring:

The only wind farm that was built as not a JI activity Lithuania (near Kretingale), is still not in operation, although it was built few years ago. Institutional and legal barriers prevented the wind farm from operation.

Step 5. Impact of JI registration

Sales of ERUs improve project's financial viability.

JI activity helps to attract equity and financing for the wind power projects, as investors are more confident with the project risks.

Baseline scenario

In accordance to the baseline scenario, electric power is produced only by Lietuvos elektrine. Forecasted production of electric power and CO_2 emissions are presented in Table 17.

Table 17 Forecasted power production and CO_2 emissions in 2008-2012 in baseline scenario

Year	Lietuvos elektrine	Rudaiciai wind power park

	Lietuvos elektrine		Rudaiciai wind power park	
	Production of electric power (MWh)	Emissions, tCO_2	Production of electric power (MWh)	Emissions, tCO_2
2008	1,831,000	1,146,206	0	0
2009	1,818,000	1,138,068	0	0
2010	1,549,000	969,674	0	0
2011	4,974,000	3,113,724	0	0
2012	5,730,000	3,586,980	0	0

Project scenario:

A part of electric power that in the case of baseline scenario is produced by Lietuvos elektrine, is produced and supplied to the power grid by Rudaiciai wind power park Table 18.

Table 18 Forecasted power production and CO_2 emissions in 2008-2012 in project scenario

Year	Lietuvos elektrine		Rudaiciai wind power park	
	Production of electric power (MWh)	Emissions, tCO_2	Production of electric power (MWh)	Emissions, tCO_2
2008	1,757,148	1,099,975	73,852	0
2009	1,744,148	1,091,837	73,852	0
2010	1,475,148	923,443	73,852	0
2011	4,900,148	3,067,493	73,852	0
2012	5,656,148	3,540,749	73,852	0

GHG emissions of baseline scenario will exceed the emissions of the project baseline scenario by 46.231tCO_2 per year due to the additionality of the project. During the period of 2008-2012 the difference between GHG emissions of baseline and project scenarios will be 231,157 tCO_2.

B.3. Description of how the definition of the project boundary is applied to the project:

The BASREC regional handbook describes project boundaries as theoretical boundaries, determining the scope of project's impact on GHG emissions. The sources of GHG involved in project boundaries represent the sources involved in baseline calculations.

The boundaries of the project are shown in Figure 3.

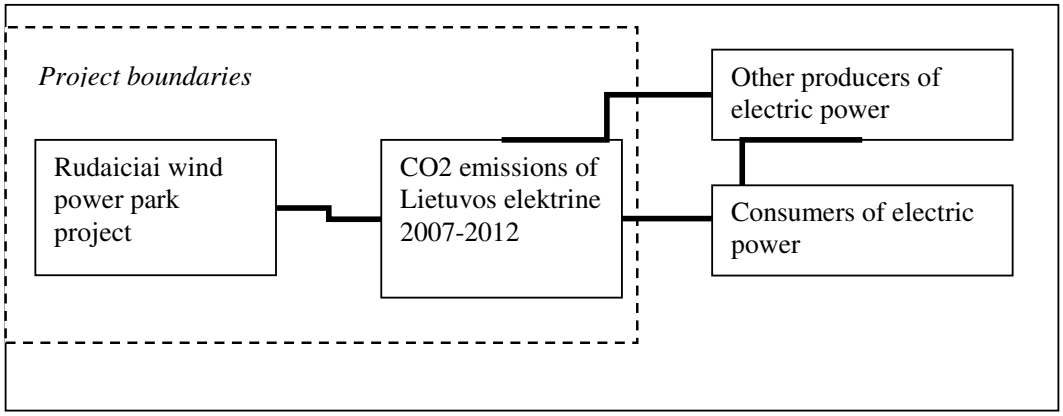

Figure 3 Project boundaries

Boundaries of Rudaiciai wind power park project encompass wind power park and Lietuvos elektrine. Other producers as well as consumers of electric power are not included into project boundary due to the structure of Lithuanian power grid (see section B1).

B.4. Further baseline information, including the date of baseline setting and the name(s) of the person(s)/entity(ies) setting the baseline:

Date of baseline setting: July, 2006.
Project organizer: *Ekostrategija*. Contact information is presented in Table 19 (see also Annex 1)

Table 19 Contact information of project organiser

Company name	*COWI Baltic*
Street	Lukiskiu
Building No	3
State/Region/City	Vilnius
Post code	LT-01108
Country	Lithuania
Telephone number	+370 5 2107610
Fax number	+370 5 2124777
E-mail	info@cowi.lt
Website	www.cowi.lt
Representative	Vaidotas Kuodys
Position	Project manager
Salutation	
Surname	Kuodys
Second name	-
First name	Vaidotas
Subdivision	-
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Fax number (direct)	+370 5 2124777
Mobile phone number	+370 655 04365
E-mail (personal)	vaku@cowi.com

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

Operation starts in January 2007.

C.2. Expected operational lifetime of the project:

20 years 0 months (2007-2027).

C.3. Length of the crediting period:

Crediting period of the project is 5 years – lasting from January 1, 2008 to December 31, 2012. In case of additional international treaties between the parties of Kyoto protocol are signed, the crediting period may be extended for additional 5 years, i.e. for the period of 2012-2017.

Early credits are generated from January 2007 to December 2007 and are claimed as AAU's, subject to the verification by an Accredited Independent Entity and a decision by the Lithuanian DFP.

SECTION D. Monitoring plan

D.1. Description of monitoring plan chosen:

The main requirements, being imposed on the monitoring plan, are pointed out in the Annex B of Chapter 6 of the Kyoto protocol (Decision 9/CMP.1, "Decisions adopted by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol"). The following points have to be considered in the monitoring plan:

- All the data necessary to the evaluation or the collection and storage of the data from all the sources of anthropogenic emissions and/or leakage. These data are being collected and stored during all the crediting period;
- The collection and storage of all the data necessary for the calculation of the baseline from all the anthropogenic sources and leakage during all the crediting period;
- The determination of all the potential sources, the collection of information about them and storage of it in case of increasing GHG emissions from the anthropogenic sources as well as leakage that have intense and significant impact on the project during its crediting period and that are outside the project boundaries. The project boundaries must involve all the sources and leakage of anthropogenic pollution under the maintenance of the participants of the project;
- The storage of the information about the state of environmental protection according to the requirements of the hosting country;
- The assurance of the quality of the monitoring and the procedures of control;
- The periodic calculation of the saved GHG, according to all the sources and leakage, if such are present.

The monitoring plan is attached as the Annex 3.

D.1.1. Option 1 – Monitoring of the emissions in the project scenario and the baseline scenario:

D.1.1.1. Data to be collected in order to monitor emissions from the project, and how these data will be archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

Wind power park itself does not emit any kind of pollutants. Some GHG emissions are released due to transportation of wind turbines and other equipment as well as from the construction works but these emissions are negligible compared to project emission reductions. Some CO_2 will be released to the atmosphere while performing the maintenance (transportation, etc.) of the wind turbines, however the amounts will be minute. Hence, according to BASREC Regional Handbook these GHG sources can be considered as insignificant and should not be taken into consideration.

D.1.1.2. Description of formulae used to estimate project emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

D.1.1.3. Relevant data necessary for determining the baseline of anthropogenic emissions of greenhouse gases by sources within the project boundary, and how such data will be collected and archived:

ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment
P_{WPP}	Net annual power production at Rudaiciai wind power park	Commercial onsite power output metering device	MWh	Measured	Monthly	100%	Electronic/paper	

D.1.1.4. Description of formulae used to estimate baseline emissions (for each gas, source etc.; emissions in units of CO_2 equivalent):

Baseline emissions will be monitored using the following formulae.

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

Where:
E_B - baseline emissions
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, 0.626tCO_2/MWh

$EF_{LE} = P_{CO2} / P_{LE}$

Where:
EF_{LE} - emission factor for power production at Lietuvos elektrine, tCO_2/MWh
P_{CO2} - Emissions attributable to power production at Lietuvos elektrine, tCO_2
P_{LE} - Annual power production at Lietuvos elektrine, MWh

For the formulae on how P_{CO2} is calculated, please refer to chapter B1.

D. 1.2. Option 2 – Direct monitoring of emission reductions from the project (values should be consistent with those in section E.):

D.1.2.1. Data to be collected in order to monitor emission reductions from the project, and how these data will be archived:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.2.2. Description of formulae used to calculate emission reductions from the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

D.1.3. Treatment of leakage in the monitoring plan:

Leakage does not occur.

D.1.3.1. If applicable, please describe the data and information that will be collected in order to monitor leakage effects of the project:								
ID number *(Please use numbers to ease cross-referencing to D.2.)*	Data variable	Source of data	Data unit	Measured (m), calculated (c), estimated (e)	Recording frequency	Proportion of data to be monitored	How will the data be archived? (electronic/ paper)	Comment

D.1.3.2. Description of formulae used to estimate leakage (for each gas, source etc.; emissions in units of CO_2 equivalent):

D.1.4. Description of formulae used to estimate emission reductions for the project (for each gas, source etc.; emissions/emission reductions in units of CO_2 equivalent):

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

Where:
E_R – project emission reductions
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, 0.626tCO_2/MWh

D.1.5. Where applicable, in accordance with procedures as required by the host Party, information on the collection and archiving of information on the environmental impacts of the project:

D.2. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored:		
Data *(Indicate table and ID number)*	Uncertainty level of data (high/medium/low)	Explain QA/QC procedures planned for these data, or why such procedures are not necessary.

P_{WPP} (D1.1.3)	*Low*	QA/QC procedures are not necessary as P_{WPP} *will be monitored via the commercial power metering device that is regularly calibrated.*

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 construction
Business coordinator - daily office work, documentation, paper work, cash flows.
Chief accountant - accounting.
Maintenance of wind power park is done by Enercon under agreement with *UAB Veju spektras*.

The monitoring report will be compiled by an engineer from *UAB Veju spektras*. The monitoring of power production will be performed by the director of *UAB Veju spektras*. Monitoring of power production will be combined with the commercial accounting of the produced power. Once a month, an inspector form *AB Lietuvos energija* together with a representative from *UAB Veju spektras* will check the commercial power metering device and will write down the dispatched power quantity on the dispatch confirmation document. After power dispatch document is signed by both parties, the director of *UAB Veju spektras* will write down the figure of dispatched power into the monitoring sheet. Other monitored factors will be collected and CO_2 reductions will be calculated by an engineer from *UAB Veju Spektras* in January each year.

For the quality assurance, a consulting company will be contracted to revise the monitoring reports. Revision will include verification of the data sources and calculations. Power dispatch documents will be 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.

D.4. Name of person(s)/entity(ies) establishing the monitoring plan:

Company name	*COWI Baltic*
Street	Lukiskiu
Building No	3
State/Region/City	Vilnius

Post code	LT-01108
Country	Lithuania
Telephone number	+370 5 2107610
Fax number	+370 5 2124777
E-mail	info@cowi.lt
Website	www.cowi.lt
Representative	Vaidotas Kuodys
Position	Project manager
Salutation	
Surname	Kuodys
Second name	-
First name	Vaidotas
Subdivision	-
Telephone number (direct)	+370 5 2191307
Fax number (direct)	+370 5 2124777
Mobile phone number	+370 655 04365
E-mail (personal)	vaku@cowi.com

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Project emissions are considered to be equal to 0

E.2. Estimated leakage:

Leakage is not present Ly = 0

E.3. The sum of E.1. and E.2.:

E1 + E2 = 0

E.4. Estimated baseline emissions:

$E_B = P_{WPP} \times EF_{LE}$ (variables explained in D.1.1.4)

P_{WPP} - 73852 MWh
EF_{LE} - 0.626 tCO_2/MWh

E_B - annual baseline emissions = 46,231 t CO2.

Calculation of EF_{LE} is presented in B1 and monitoring in D.1.1.4.

Total baseline emissions for 2008-2012 are 46,231 t CO_2 x 5 = 231,155 tCO_2.

E.5. Difference between E.4. and E.3. representing the emission reductions of the project:

Annual emission reductions - 46,231 t CO_2. Total emission reductions - 231,155 tCO_2.

E.6. Table providing values obtained when applying formulae above:

Table 20 Project emission reductions

Year	Estimated project emissions (tonnes of CO_2equivalent)	Estimated leakage(tonnes of CO_2equivalent)	Estimated baseline emissions (tonnes of CO_2equivalent)	Estimated emission reductions (tonnes of CO_2equivalent)
2008	0	0	46,231	46,231
2009	0	0	46,231	46,231
2010	0	0	46,231	46,231
2011	0	0	46,231	46,231
2012	0	0	46,231	46,231
Total	0	0	231,155	231,155

SECTION F. Environmental impacts

F.1. Documentation on the analysis of the environmental impacts of the project, including transboundary impacts, in accordance with procedures as determined by the host Party:

According to the Communications No (8.4.2.)-3-2183 and No (8.4.2.)-3-2184 of Klaipeda Regional Department of Environment of Lithuanian Ministry of Environment of October 8, 2003, the conclusion, concerning the environmental impact of the planned economic activity, was drawn that the environmental impact assessment (EIA) of the planned economic activity of *UAB Veju spektras* – installation and maintenance of wind power plants – is not required. The above stated conclusion was drawn because (the extract from the above mentioned documents):

- The planned economic activity is scheduled to execute in conditionally large territories, thus there is possibility to project the positioning of such wind power plants so that the maintenance of impact zones will not condition the residential environment and the requirements, set for the protection zones of the immovable culture valuables in special conditions of the usage of land and forest, would be met;

- There are no residential areas near the location of planned economic activity;

- National Energy Strategy approved by the resolution No.IX-1130 of Seimas of the Republic of Lithuania of October 10, 2002 (Official Gazette., 2002, No 99-4397) schedules, that aiming to the best use local resources, including wind energy, and at the same time to reduce the import of fuel and to establish new work places as well as to improve the state of environmental protection, the State will promote the implementation of the projects on use of wind, water and sun power and the experience of installation and maintenance will be collected;

- In the territory of planned economic activity it is not forbidden to install and maintain the equipment of planned economic activity.

Potential environmental impacts are described below.

Atmosphere

The project is considered to result not only in reduction of GHG but also in reduction of other pollutants such as SO_2 and NO_x. These pollutants are released to the atmosphere while generating electric power at Lietuvos elektrine. To calculate reductions of SO_2 and NO_x, the following formulas are used:

$E_{SO2} = P_{MWh} \times EF_{SO2}$

Where:
P_{MWh} - is the electric power produced in the park annually, MWh;
EF_{SO2} – is the emissions factor, defining how many tones of SO_2 is emitted to the atmosphere while producing 1 MWh of electric power.

$E_{NOx} = P_{MWh} \times EF_{NOx}$

Where:
P_{MWh} - is the electric power produced in the park annually, MWh;
EF_{NOx} - is the emissions factor, defining how many tones of NO_x emerge, while producing 1 MWh of electric power.

The results of projected SO_2 and NO_x reduction are given in Table 21.

Table 21 SO2 and NOx emission reductions

Pollutant	kg of pollutant/MWh	Amount of pollutant saved during the crediting period
SO_2	0.45	199.4 t
NO_x	0.95	420.9 t

Water

There are no open water pools within the project area. There is no risk to pollute the surface and/or ground water during the maintenance of the wind power park project. Water is not used for technological purposes in the wind power park so the wastewater will not be formed.

Surface run-off from the wind power park territory will be drained away. For this purpose, drainage systems are reconstructed within the project area.

Soil

There will not be any significant impact on soil. The project area mainly consists of farmlands. During the construction process, in the power plant fundament areas, road construction areas and cable laying areas the upper layer of the soil which is 0.2-0.3m thick, will be separated and stored apart from other soil layers. After construction works are finalised, the loam will be re-cultivated and planted according to projects plans in order to avoid soil erosion.

Flora / Fauna

Based on data of operating wind power plants, there is no evidence of the impact of wind power plants on biological diversity. Hence, measures to recreate environmental biodiversity are not necessary.

There are no envisaged tree cuttings or relocation in the project area. A grass-plot will be set in the area.

There are no wild animal accumulation, feeding, mating, wintering of migration points in the project area that should be protected.

Impacts on birds

Rudaiciai wind power park is far away from bird migration routes. The probability of birds colliding with the wind power plants is very low. Therefore the impacts on birds are considered negligible. A study from the Danish Ministry of the Environment states that high voltage power lines is much greater danger to birds than the wind turbines themselves.

According to results of the studies performed by Danish and German scientists – wind power plants have no impacts on migration routes of birds. The studies in ES show that the risk of bird collisions with wind power plants is much smaller compared to the risks of bird collision with high voltage air power lines, cars, skyscraper, glass facades of buildings. After long term observations, the conclusions were drawn that birds have changed their migration routes according to new obstructions evolved on their

way. The research also shows that wind power parks have smaller impacts on birds than the tall single buildings (source: www.iblumweltplanung.de)

Impacts on animals

Noise, shadow and blinking effects and landscape fragmentation effect made by wind power park can disturb natural wildlife. However, Rudaiciai wind power park is surrounded by farmlands and rural areas situated away from wild animal habitats. Hence, the impact on wild animals is considered negligible.

Protected areas

There are no protected areas within or nearby the project site. There are no protected species of flora or fauna within or close to the project site. Among other sources, such data was verified at the State Service for Protected Areas under the Ministry of Environment (www.vstt.lt).

All nearest protected areas are within sufficient range away from the project site:

Pajuris regional park (about 14 km);
Kartenale zoological reservation (about 17 km);
Salantos regional park (about 22 km);
Kursiu Nerija regional park (about 26 km);
Margininkai botanical-zoological reservation (about 22 km);
Sudenai zoological reservation (about 34 km);
Svancele meadow botanical-zoological reservation (about 50 km);
Zemaitija national park (about 40 km).

Cultural heritage

Before starting excavation works, the area was explored for archaeological objects in line with the Cultural heritage law of Lithuania. No valuable excavations were found in the project area.

Waste

Waste in wind power park is minimal. No oil lubricants are used in Enercon turbines as there are no gear box in the construction. Any spare parts that are substituted with new ones during the operation and maintenance period of wind power park will be removed from the project site and recycled by the maintenance service provider.

Physical impact

Electromagnetic field

Electromagnetic field is formed around high voltage air power lines, at the transformer substations and other open power installations. Electromagnetic field is measured by the intensity of electric field (E, V/m) and by the intensity of magnetic field (H, A/m). Permissible intensity of electric field in residential (building) areas is up to 1kV/m without limitations for allowed exposure time and up to 5 kV/m in “green” zones (parks, gardens etc.) without limitation for exposure time (HN 104: 2000).

The potential sources of electromagnetic field in wind power park (generators and transformers) are generating low voltage and up to 100kW power capacity. The intensity of electric and magnetic fields are lower than the permissible level for residential areas (1kV/m). Electro-technical equipment of wind power plants are mounted in 90m height from the surface in the metal, connected to earth baskets, which perform as electromagnetic shields. Zone of electromagnetic impact is not present in wind power park territory or in neighbouring areas.

Noise

The sanitary zone with the radius of 300 m, was set around wind power plants according to the requirements. Maximum allowed noise level in the residential areas is 45dB at the night time and 50dB at the daytime. Estimations of the Rudaiciai wind power park project noise level gave the following results depending on the distance from wind power plants: 100m – 50dB, 290m -45, 440m-40dB, 660m-35dB. After installing the wind-power plants the compulsory monitoring of the noise level will be undertaken.
The closest living area is 350-400m away from the wind power park.

Visual impact

Wind power plants make landscape more urbanized. However , if the right planning concept is used – a visual impact can be minimised. The positioning of wind power plants is made optimal to integrate it into the landscape. The towers of wind power plants are painted into bright grey colour which will fade them in the sky background.
Also, wind power plants, like all tall buildings cast shadow on the neighbouring areas when the sun is visible. It also causes a blinking effect due to rotation of wind turbine wings. The shadowing effect is not relevant for the project. According to the preliminary calculations – shadows will be cast not more than 290m from the wind power plants. Bearing in mind that the closest living areas are 350-400 meters away – the shading effect is not considered as an impact.

F.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to supporting documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The environmental impacts are nor considered as significant.

SECTION G. Stakeholders' comments

G.1. Information on stakeholders' comments on the project, as appropriate:

While preparing the detailed plans, compulsory public consideration procedures were undertaken where all stakeholders may participate. Compulsory written agreements of residents in surrounding areas were obtained during the process of detailed planning and technical project preparation process. Stakeholders have not expressed any objections.

The following steps were made during the stakeholder process:

Table 22 Stakeholders process

04-02-2004	Enquiries sent to VI Registru centras (Center of registries) and

	department of spatial planning of Kretinga region for records of land owners within the territory of projected wind power park.
06-02-2004	Beginning of preparation of project's detailed plan is announced in newspaper „Pajurio naujienos".
	Received written consents from 35 land owners having property in the sanitary zone (consent to perform no construction activities of residential space in the sanitary zone).
23-03-2004	Announcement of the last stage of public consideration of the project detailed plan in the newspaper „Pajurio naujienos". Introduced to public from 02-04-2004 to 23-04-2004.
23-04-2004	Detailed plan project consideration in Kretinga municipality. 9 participants attended. Minutes and public consideration report were published.
17-08-2004	Detailed plan agreed with Administration of civil aviation.
21-07-2004	Detailed plan agreed with Air Force.
17-08- 2004	Protocol of hygiene examination of the project documentation prepared by Klaipeda centre of public health (Visuomenes sveikatos centras).
11-08-2004	Consent for development of the project conditions and project's conformity to the documentation of the urban planning, awarded by the Permanent commission for construction at the Kretinga municipality administration
23-07-2004	Conclusion of the Klaipeda regional department for environmental protection regarding the approval of the suggested solutions of detailed plan.
23-08-2004	Verification act of territory planning document of Klaipeda county head. Positive report. Verification act of the urban planning documents by the head of Klaipeda county administration. Conclusion positive.
26-08-2004	Decision of the council of Kretinga municipality regarding the approval of the detailed plan.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

BASELINE INFORMATION

Table 23 Fuel consumption, energy production and CO_2 emissions data for Lietuvos elektrine

Year	Power production, MWh	Heat production, MWh	Natural gas, nm3	Fuel oil, t	Orimulsion,t	CO2 emissions, using fossil fuel	CO2 emissions, resulting from heat production	CO2 emissions, resulting from power	Emissions factortCO2/MWhe
2002	736,604	202,060	199,104,000	7,355	52,534	517,318	52,796	464,522	0.631
2003	723,858	195,553	225,813,000	5,241	21,238	491,709	48,885	442,824	0.612
2004	745,372	212,399	207,690,000	2,750	55,501	525,916	55,204	470,712	0.632
2005	1,072,814	199,383	280,559,000	1,815	86,160	729,451	52,161	677,290	0.631
						566,098	**52,262**	**513,837**	**0.626**

Annex 3

MONITORING PLAN

Emission reductions from the project will be calculated by multiplying annual amount of power dispatched to the grid by emissions factor:

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

Where:
E_R – annual emission reductions, tCO_2
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 tCO_2/MWh

E_R will be calculated for a previous year, starting in 2009 (using annual power dispatch data from previous year). The following monitoring form will be used to monitor dispatched power. Monitoring procedures are described in D3.

Year _____

Month	Power dispatch confirmation document No.	Date of signature of power dispatch confirmation document	ID of the power metering device	Indication of the produced power by the metering device, MWh	Indication of the consumed power by the metering device, MWh	Amount of power dispatched to the grid, MWh	Date of the entry	Name of the person in charge	Signature
January									
February									
March									
April									
May									
June									
July									
August									
September									
October									
November									
December									
TOTAL									