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:

Ciuteliai wind power joint implementation project
Version: 1.1
Date: May 22, 2012

The sectoral scope: (1) Energy industries (renewable/non-renewable sources)

A.2. Description of the project:

The objective of the Ciuteliai wind power joint implementation project (Project) is to establish a wind power farm with a total capacity of 39,1 MW at Ciuteliai village, located in Silute district in the western part of Lithuania.

The renewable electricity produced by the wind power farm will displace carbon intensive electricity produced from fossil fuel sources in the Lithuanian power network, thus contributing to the lowering of greenhouse gas emissions as well as other pollutants related to fossil fuel based power generation. Lithuania has undertaken to increase the share of renewable energy to 23%[1] by the year 2020.

The set feed-in tariff for wind power generated electricity is unfortunately not sufficient to realize the proposed Project on a commercial basis. Additional income from the sale of 'carbon credits' under the Kyoto Joint Implementation scheme is thus required to turn the Project attractive for the investors.

A.3. Project participants:

Table 1. Project participants

Party involved	Legal entity project participant (as applicable)	Please indicate if the Party involved wishes to be considered as project participant (Yes/No)
Republic of Lithuania (Host Party)	UAB Naujoji Energija	No

UAB Naujoji Energija is a joint stock company established for the development and operation of the Project. The company belongs to Nelja Energia AS from Estonia which is majority owned by Vardar Eurus AS from Norway.
The PDD was prepared by UAB 4energia in cooperation with Nelja Energia OÜ and LHCarbon OÜ.
Contact: UAB 4energia, tel: +370 685 21249, e-mail: tadas.navickas@4energia.ee

[1] http://www.enmin.lt/lt/activity/veiklos_kryptys/atsinaujantys_energijos_saltiniai/aei_more.php

A.4. Technical description of the project:

A.4.1. Location of the project:

A.4.1.1. Host Party(ies):

Republic of Lithuania

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

Klaipeda county, Šilutė district

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

Ciuteliai, Lankupiai, Grumbliai villages

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

The Project will be located at Ciuteliai, Lankupiai, Grumbliai villages at Silute district at the western part of Lithuania. Project location provided in Figure 1. Detailed layout of wind power plants in the territory is shown in Figure 2.

Figure 1. Project location map

Figure 2. Project layout

The Project site (land plots) was carefully selected based on the site conditions such as landscape, direction of prevailing winds, as well as existing infrastructure (possibility to connect to the grid and existing road network). The site location was also evaluated in respect of residential area. The chosen location is well suited for wind power generation. Coordinates of the turbines provided in the Table 2.

Table 2. Coordinates

Turbine No.	Center Coordinates (LKS94 system)	
WEC 1	6155016,73	333768,66
WEC 2	6154841,03	334059,93
WEC 3	6154473,39	334601,39
WEC 4	6154340,46	334877,73
WEC 5	6153704,71	334417,83
WEC 6	6153941,03	334410,57
WEC 7	6154363,69	335554,65
WEC 8	6154083,52	336052,44
WEC 9	6153957,79	336375,06
WEC 10	6153138,18	334515,33
WEC 11	6153236,21	335016,18
WEC 12	6153186,87	335935,66
WEC 13	6153277,20	336602,63
WEC 14	6151991,40	334920,35
WEC 15	6152343,27	335112,64
WEC 16	6152334,93	335415,31
WEC 17	6152652,09	335654,33

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

It is planned to install seventeen Enercon E-82 E2 type wind turbines at the project site. The power generation of these wind farms will displace carbon-intensive generation from the Lithuanian power plant.

Technology

The technical data of the planned wind farm is presented in Table 3.

Table 3. Technical data of wind turbines

Type of wind turbine	Enercon E-82 E2
Rated power	2300 kW
Hub height	108,4 m
Rotor diameter	82 m
Number of rotor blades	3
Cut-in wind speed	2.5 m/s
Cut-out wind speed	28-34 m/s
Rotation speed	6 - 18 rpm
Voltage frequency	50Hz

An energy production estimate has been carried out by EMD using measurements from a 85 m meteorological mast located close (~3km) to the site with a 12-month measurement period (2005-6) and from other closely located wind park. Data from the site has been calibrated to represent long term conditions using the Measure-Correlate-Predict (MCP) tools in the software WindPRO. As basis for the long term correction data from NCAR/NCEP re-analysis data has been used. As result of the analysis the wind farm is conservatively estimated to generate 82.666,8 MWh of electric power per year over a period of 20 years, which results in an average load factor of 24,7 %.

The wind power park will be connected to a 110kV power line.

History, key permits and contracts

The development of the Project started in 2005 when project company received a letter from Lietuvos Energija AB (Lithuania‘s largest electricity generation company, which combines all electricity generation capacities controlled by the State) informing that project company was ranked as a winner in the competition to expand the generating capacities from renewable energy sources and stating companies possibility to develop new wind park (40 MW).

On 3d of April 2006 a license to expand the generating capacities from renewable energy sources was issued by the Ministry of Economy (license No. LP -0097).

On 8th of May 2007 the Project received a Letter of Endorsement from the Ministry of Environment of Lithuania. This provided the certainty with regard to the cash-flows from the sale of carbon credits and thus enabled the developer to proceed with the project financing and implementation.

The local municipality has agreed to the establishment of the wind farm and approved the respective detailed land use plan on July 17 2008. The project detailed technical design has been completed and Building Permit No. 08(1)1-156 was obtained on October 6, 2008.

The Klaipeda Regional Department of Environment Protection of Lithuanian Ministry of Environment (further – EIA institution) has during the EIA procedure approved the construction and operation of the

Project and decided that there should be bird observation monitoring carried out a year before the start of operation of the park and for two years after (letter of 2008-04-30 No. (9.14.5.)-LV4-2702). Firsts stage of bird observation monitoring has been carried out and results provided to EIA institution.

Besides the low feed-in tariff, the main development barrier to wind projects in Lithuania is the securing of grid connection rights and planning permits. This barrier has been effectively removed for this Project. UAB Naujoji Energija won tender for grid connection 40 MW and received energy generation capacity enhancement permit from the Ministry of Economy for development of the wind farm, No. LP-0097 on 2006-04-03. The permit is prolonged every 6 months. An agreement of connection to the grid with Lietuvos Energija AB was concluded in 2009 and the connection fees have been paid.

Table 4. Key permits

No.	Permit	Approval
1.	Grid connection agreement	2009-12-31
2.	Detailed plan	2008-07-17
3.	Building permit	2008-10-06
4.	EIA /screening	2008-04-30

The Power Purchase Agreement (PPA) has been signed 2011-12-21.

It is planned that the wind farm will be supplied by Enercon GmbH. The same company will take care of technical maintenance during the operational period of first eight years.

Milestones, time schedule and current status of implementation

The Project is currently in the advanced development phase with feasibility analysis completed and key permits obtained. Project financing (anticipating also carbon financing) has been completed. The time-line for Project physical implementation is planned as following:

- construction of roads and hard stands will be completed in May, 2012
- construction of substation and cabling works at 110 kV, will be completed in May, 2012
- construction of foundations will be completed in May, 2012
- erection of 6 wind turbines is scheduled in May 2012, others in June 2012
- commissioning of wind turbines in June, 2012

Emission reductions would thus begin to be generated from June 2012 onwards.

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:

The renewable electricity produced by the wind power farms would displace carbon intensive electricity produced from fossil fuel sources in the Lithuanian power network.
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 a lower price. The difference in national demand for the electric power and total production thereof (quotas and over-quotas) is being covered by AB Lietuvos Elektrine. Thus, if the implementation of this Project fails, the estimated electric power would be produced by AB Lietuvos Elektrine using fossil fuels – natural gas, heavy fuel oil and orimulsion. It was calculated that AB Lietuvos Elektrine, by generating 1 MWh of electric power, contributes to the pollution of atmosphere with 0.626 tonnes of CO2.
See chapter B.1. for more details of baseline calculation and chapter B.2 for estimation of the GHG emission reductions of the Project which have been calculated conservatively on basis of the above carbon emission factor of 0.626 tCO2e/MWhe and the expected power production.

The proposed Project supports Lithuania's objective to increase use of renewable energy sources in energy sector to 23% in 2020[2].
The Law of the Republic of Lithuania on Energy[3] points out promotion of consumption of renewable energy resources as one of the principal objectives of regulation of state energy sector activities. The law provides that the state encourages the producers to generate electricity from renewable energy sources by imposing the "must carry" obligations. The Resolution on the promotion of electricity produced from renewable energy sources declares that grid operator obliges to purchase green electricity from the licensed grid-connected producers at the fixed feed-in tariffs.[4]
In order to provide incentives for wind power development the government has issued legislation regulating obligatory purchase of wind power at a price of 0,30 LTL per kWh (0.087 EUR)[5]. Such feed-in tariff scheme is expected to remain until year 2020. In order to obtain the mentioned feed-in tariff the wind power farm must be built in one of the six zones for which tenders for grid connection are organised by Litgrid AB - the electricity Transmission System Operator in Lithuania.
The above feed-in tariff for wind power is unfortunately not sufficient for commercial development of the wind power sector. Thus all recent wind power developments are being carried out under the JI scheme.

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.

[2]The National Renewable energy sources development strategy (Official Gazette, 2010, No. 73-37250 and Action Programme (Official Gazette, 2010, No. 78-4030)
[3] Law No. IX-884 of the Republic of Lithuania on Energy, dated 16 May 2002.

[4]2001-12-05 Resolution on the promotion of electricity produced from renewable energy sources No. 1474

http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_1?p_id=342973

[5]2008-02-28 Resolution of the national price and energy control commission No. 03-27

http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_1?p_id=315044

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

Table 5. Estimated emission reductions

Length of the crediting period	7 months
Year	**Estimate of annual emission reductions in tonnes of CO2 equivalent**
2012	30,187
Total estimated emission reductions over the crediting period (tonnes of CO2 equivalent)	30,187
Annual average of estimated emission reductions over the crediting period (tonnes of CO2 equivalent)	30,187

Estimate of annual emission reductions after year 2012 is 51,749 tons of CO2 equivalent.

A.5. Project approval by the Parties involved:

The Project idea (Project Idea Note) was approved by Lithuanian DFP (Ministry of Environment of the Republic of Lithuania) and the Letter of Endorsement (LoE) No. (10-5)-D8-3945 was issued on May 8, 2007. 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.

According to national Joint Implementation Project development rules[6], the final Project approval or Letter of Approval (LoA) might be issued only after draft Project Determination Report submission to Lithuanian DFP (during 60 days period). After LoA issuance project proponent should give it to the Independent Accredited Entity to be able to complete Project Determination.

Due to the reason that Lithuanian energy generators are covered under EU Emission Trading Scheme, for double counting avoidance reason new installations under JI scheme have a special reserve in the National Allocation Plan 2008-2012. After LoA issuance the estimated amount of ERUs will be reserved for particular JI project proponent.[7]

Written approval by the Host Party involved, including the necessary authorisations, will be attached to the final PDD.

Investor Country Approval

The Investor Country approval will be issued by a selected Investor Country by latest prior to the first verification of the Project.

[6] 2010-06-03 Order of Ministry of Environment No. D1-470

http;//www3.lrs.lt/pls/inter3/dokpaieska.showdoc_1?p_id=374514

[7] Lithuanian Environment Investment Fund information http;//www.laaif.lt/index.php?1413169444

SECTION B. Baseline

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

The baseline is the amount of GHG that would be emitted to the atmosphere during the crediting period of the Project, i.e. during 2011-2012, in case the Project was not implemented.

Project baseline was chosen in accordance with Appendix B of the JI guidelines and the Guidance on criteria for baseline setting and monitoring, using the following stepwise approach:

Step 1: Indication and description of the approach chosen regarding baseline setting

Paragraphs 1.3 of Appendix B of the JI guidelines define criteria for baseline setting a baseline shall be established:

i. On a project-specific basis and/or using a multi-project emissions factor;
ii. In a transparent manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors;
iii. Taking into account relevant national and/or sectoral policies and circumstances, such as sector reform initiatives, local fuel availability, power sector expansion plans, and the economic situation in the project sector;
iv. In such a way that ERUs cannot be earned for decreases in activity levels outside the project or due to force majeure; and
v. Taking account of uncertainties and using conservative assumptions.

Taking into consideration the specifics of the Lithuanian power market, the methodology based on historical data is most suitable for country's baseline estimation. Furthermore, the usage of described methodology allows to have united country's baseline scenario and baseline emissions (tone CO2 per MWh of electricity). Based on this fact it was chosen to use JI specific approach by using a multi-project emissions factor adopted by the Ministry of Environment of the Republic of Lithuania.

Step 2: Application of the approach chosen

The country's baseline scenario and baseline emissions factor have been described by Ministry of Environment of the Republic of Lithuania during National Allocation Plan (NAP) preparation for First commitment period (2008-2012). The European Commission during supervision on NAP did not reject country's baseline methodology. The NAP indicates that Lithuanian baseline emission factor is 0.626 tCO2/MWhe[8].
The Baseline methodology that is indicated in the NAP is based on historic data of Lietuvos Elektrine and this method is best suited for Lithuanian power market. Approved CDM ACM0002 and AMS I.Q methodologies are not used for the baseline calculation due to the following reasons:

- Lietuvos Elektrine, power plant with the largest installed capacity in Lithuania (after closure of Ignalina nuclear power plant –INPP) is operating on the power grid 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.
- 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 Build Margin emissions factor.

[8] Lithuanian National Allocation Plan 2008-2012 (18.04.2007 version), section 6.3.

http://www.am.lt/VI/files/0.127744001228738706.pdf

Hence, the current emission factor – **0.626 tCO2/MWhe** is considered to be conservative and will be used to calculate CO2 reductions from the Project.

Table 6. Key information and data used to establish the baseline scenario:

Data/Parameter	CO2 emission factor for electricity
Data unit	tCO2/MWh
Description	Emissions from fossil fuel burning
Time of determination/monitoring	Period 2002-2005
Source of data (to be) used	Lithuanian National Allocation Plan 2008-2012 (18.04.2007 version)
Value of data applied (fox ex ante calculations/determinations)	0.626 tCO2/MWhe (average value)
Justification of the choice of data or description of measurement methods and procedures (to be applied)	Presented emission factor is widely used for other Lithuanian JI wind projects
QA/QC procedures (to be) applied	Used official publicly available data
Any comment	Presented emission factor is widely used for other Lithuanian JI wind projects[9]

[9]UNFCCC website, JI Project registration numbers: 0025, 0034, 0163, 0178, 0200, 0229

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:

Additionality of the Project is proven using version 06.0.0 of the CDM Tool for the Demonstration and Assessment of Additionality as approved by the CDM Executive Board.

Baseline calculation presented in Section B.1 shows that production of an additional 1 MWh of electric power reduces CO2 emissions at average by 0.626 tCO2. With an estimated annual power production of 82,667 MWh the wind farm of the proposed Project would thus reduce CO2 emissions annually by 51,749 tonnes.

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

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

- Alternative A – the proposed project activity not undertaken as JI project activity;
- Alternative B – the electric power in the Lithuanian network will be produced by new modern cogeneration power plants.

Sub-step 1b. – Consistency with mandatory laws and regulations:

The both alternatives are in compliance with mandatory legislation and regulations.

Although existing legal environment is in favour of production of electricity from renewable energy sources, the factual regulatory enforcement (i.e. established renewable energy promotion schemes) is not strong enough for motivation of investment into production of renewable energy. Therefore the existing conditions are in favour of alternative B - continuation of the current situation and are not in favour of alternative A - proposed project activity not undertaken as a JI project activity.

The obligatory purchase tariff for wind power established by the governmental regulation on promotion of electric power produced from renewable sources is not sufficient for commercial development of the wind power sector. (Sub-step 2c).

Result: Pass

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 sale of 'carbon credits' is not the only source of revenues for the Project.

Investment comparison analysis (option II) is not applicable for the Project as the alternative "A" is the Project itself but without a JI incentive and on the other hand the alternative "B" is based on investment that is out of control of the Project developer, i.e. project could be developed by a different entity.

Benchmark analysis (option III) will be used for this Project as it is the only applicable method.

Because there exist no specific investment benchmarks for the Lithuanian power sector the needed benchmark value for the analysis is derived from the financial and economic indicators that are standard for the country and are publicly available. The benchmark analysis has been adopted wherein the Internal Rate of Return (IRR) of the Project activity serves as a benchmark to assess the financial attractiveness of the project activity. Option III assesses if the project returns are sufficient for investors to make the initial investment and further bear the associated costs of successfully operating the project activity over the crediting period of the project.

Sub-step 2b. Option III. Apply Benchmark analysis

In order to apply a benchmark comparable to the Project IRR the Project participant selected to use average value of the interest rate (AVIR) on loans for non-financial corporations published by the central Bank of Lithuania (LB). The AVIR is the benchmark interest rate at which Lithuanian commercial banks and other financial institutions (unions, funds and etc.) lend money to their customers (http://www.lb.lt/stat_pub/statbrowser.aspx?group=7279&lang=lt).
Typically, projects in Lithuania would be borrowing money at a rate equal to or higher that the AVIR. Hence, for any project to be financially attractive, the IRR of the project must be higher than the debt rate (i.e. higher that the AVIR). Accordingly, if any project's IRR does not exceed the AVIR, it could be considered a financially unattractive project.

The use of the AVIR is consistent with the *Tool for the demonstration and assessment of additionality v.06.0.0* which suggests that "*...benchmarks for IRR, NPV, etc. Can be derived from...Estimates of the cost of financing and required return on capital (e.g.* ***commercial lending rates*** *and guarantees required for the country and the type of project activity concerned), based on bankers views and private equity investors/funds' required return on comparable projects."*

The AVIR that was taken for consideration in the PDD (7.78 %) is based on the official decision making time's data (March 2008) (Figure 3). For comparison the VILIBOR (Vilnius Interbank Offered Rate) value (for 1 year period) was added. VILIBOR is based on the quotes of no less than 5 local commercial banks, designated by the Bank of Lithuania, that are most active in Lithuanian money market. Banks by lending money to their clients use VILIBOR values as basis. Moreover banks always add their fixed margin (%).

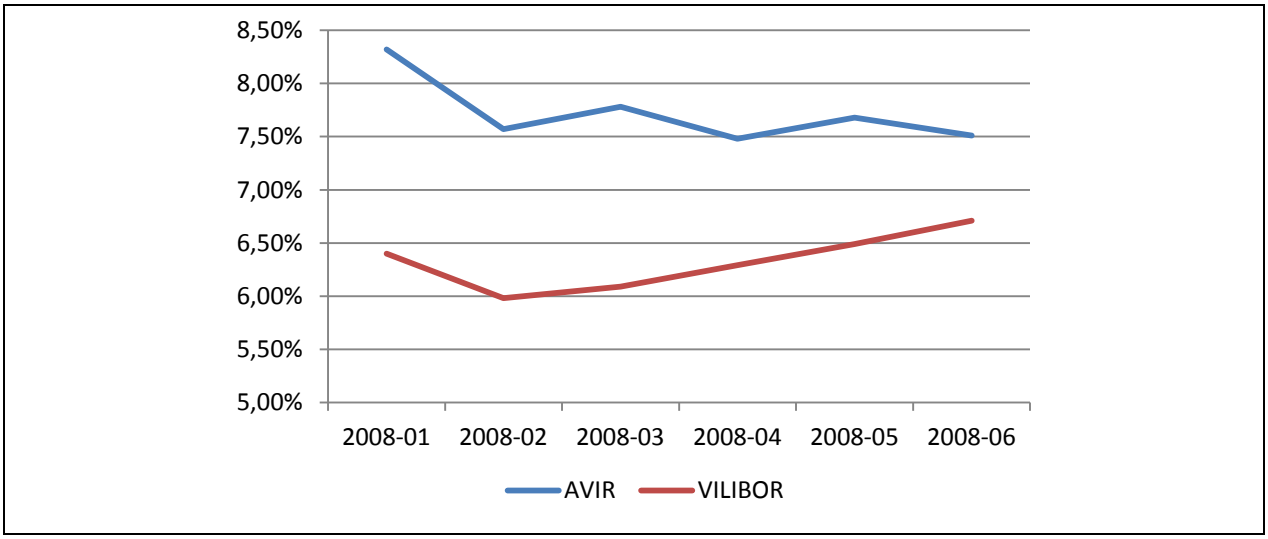

Figure 3. Loan interest rate in Lithuania

In order to keep this benchmark conservative no risk premium associated with the project type or the project developer was added to it. Further, AVIR is a conservative benchmark itself as it does not take into account the commercial lending rates of individual private sector banks that are typically higher than AVIR (because VILIBOR+bank margin).

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

1) Parameters needed for calculation of key financial indicators:

Table 7. Parameters for calculation of key financial indicators

Parameter	Value	Unit
Total investment cost	67,080	th. EUR
Annual service and maintenance cost	12	EUR/MWh
Annual electricity production	82,667	MWh
Feed-in tariff	86,89	EUR/MWh
Project life time	20	Years
ERU main crediting period	7	Months
ERU price	11	EUR/ERU

2) Comparison of IRR for the Project and the benchmark

In accordance with benchmark analysis (Option III), if the financial indicators of the proposed project, such as the project IRR, are lower than the benchmark, the proposed project is not considered to be financially attractive.

Table 8 shows the comparison of the Project IRR with benchmark value. In both cases the Project IRR is lower than the benchmark value. It means that project is financially unattractive on present market conditions. Additional revenues from ERUs sale increase Project IRR by from [4.03%] (Alternative A) to [4.06%].

Table 8. Project IRR in two scenarios

	Project IRR
Without ERUs	4.03%
With ERUs	4.07%
Benchmark value	7.78%

For comparison – the average IRR on new natural gas based cogeneration power plants is about 8-10%. However, EU structural funds are available for new cogeneration plants (up to 50% from all investments) but not for wind power projects in Lithuania. With the EU structural support IRR of new cogeneration plants jumps up to around 15%. This fact makes cogeneration option more attractive for the investors compared to the wind power. As concrete example may be used the new erected CHP plant (Panevezys CHP) where the project IRR is 16,2%[10] (Alternative B).

[10] UNFCCC webpage, JI Project – Rudaiciai wind power park, PDDs supporting documentation Enclosure 3 – IRR for cogeneration plant Panevezys

Sub-step 2d. Sensitivity analysis

The sensitivity analysis shall show whether the conclusion regarding the financial attractiveness is robust to reasonable variations in the critical assumptions.

For the Project, two parameters were selected as sensitive factors to assess the financial attractiveness:

1) Total Investment
2) Annual Electricity Output

There aren't variables which constitute less than 20% and have a material impact on the sensitivity analysis.

Table 9. Project sensitivity analysis

Investment variation range	-10%	-5%	0%	5%	10%
Investments, € th	60.372	63.726	67.080	70.434	73.788
Project IRR	5,29%	4,66%	4,06%	3,60%	3,05%

Energy production variation range	-10%	-5%	0%	5%	10%
Energy output, MWh/year	74.400	78.533	82.667	86.800	90.933
Project IRR	2,88%	3,54%	4,06%	4,66%	5,22%

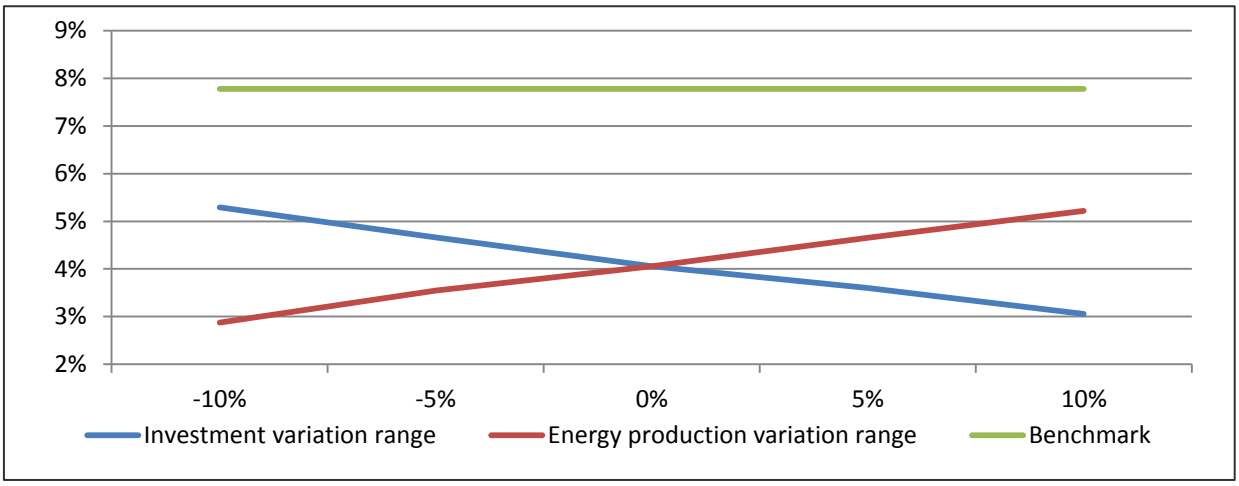

Figure 4. Project IRR sensitivity

It can be seen from the analysis that the Project IRR does not exceed the benchmark IRR when the total investment drops by 10 percent, or annual electricity output increases by 10 percent.
The sensitivity analysis shows that the annual power production and total investment size is crucial factors for project economic feasibility. The power production is variable and depends from on site wind conditions and wind turbines technical characteristics. The used power generation approach gives for project the capacity factor – 23,59%. The probability that project financial figures may vary into negative side is higher than into positive side and it shall turn the project less financially attractive than is assumed.
Total investment cost depends on the labour and material market price. The real project investments will be known only after project implementation.

The sensitivity analysis confirms the fact that the Project without carbon revenue is not enough financially attractive. File with sensitivity analysis of the Project (Ciuteliai sensitivity.xlsx) has been made available to the Independent Entity during determination.

Result: Pass

Step 3. Barrier analysis

According to Tool for the Demonstration and Assessment of Additionality methodology *"If after the sensitivity analysis it is concluded that : (1) the proposed CDM project activity is unlikely to be the most financially/economically attractive (as per step 2c para 11a) or is unlikely to be financially/economically attractive (as per step 2c para 11b), then proceed to Step 4 (Common practice analysis)".*

Step 4. Common practice analysis

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

Step 1: *Calculate the applicable output range as +/-50% of the design output or capacity of the proposed project activity.*

The total installed capacity of the proposed Project is 40 MW and the applicable output range is between 20 MW and 80 MW.

Step 2: *In the applicable geographical area, identify all plants that deliver the same output or capacity within in the applicable output range, calculated in Step1, as the proposed project activity and have started commercial operation before the start date of the project.*
Note their number N_{all}. *Registered CDM project activities and projects activities undergoing validation shall not be included in this step.*

Currently 2 wind energy plants produce the same output (20-80 MW) in all regions of Lithuania but they are all implemented as Joint Implementation projects.
Therefore, $\mathbf{N_{all} = 0}$

Step 3: Within the plants identified in Step 2, identify those that apply technologies different to the technology applied in the proposed project activity. Note their number N_{diff}

As $N_{all} = 0$, therefore $\boldsymbol{N_{diff} = 0}$

Step 4: Calculate factor $F=1-N_{diff}/N_{all}$ *representing the share of plants using technology similar to the technology used in the proposed project activity in all plants that deliver the same output or capacity as the proposed project activity.*

$F=1-N_{diff}/N_{all} = 1 - 0/0 =$ **1**

The proposed project activity is a common practice within a sector in the applicable geographical area if both the following conditions are fulfilled:
(a) the factor F is greater than 0.2, and
(b) $N_{all}-N_{diff}$ *is greater than 3.*

The **factor F** is above 0.2 and fulfils the condition but the condition value of $\mathbf{N_{all}-N_{diff}}$ =1 does not fulfil the condition. Therefore, the proposed Project is not a common practice.

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

There is no need to analyze Step 4b because the proposed Project is not common practice through the Step 4a.

Outcome of Step 2
The proposed Project activity is not "common practice". In conclusion the proposed Project shall be deemed to be additional.

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

The BASREC JI Project Guidelines 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 Project boundary is drawn around the physical boundary of the wind power farm (i.e. the wind turbines and generators) and the power plants of AB Lietuvos Elektrine, the power generation of which the wind power farm would replace. Other producers as well as consumers of electric power are not included into the Project boundary due to the structure of Lithuanian power grid (see section B1).

The boundaries of the Project are shown in Figure 5.

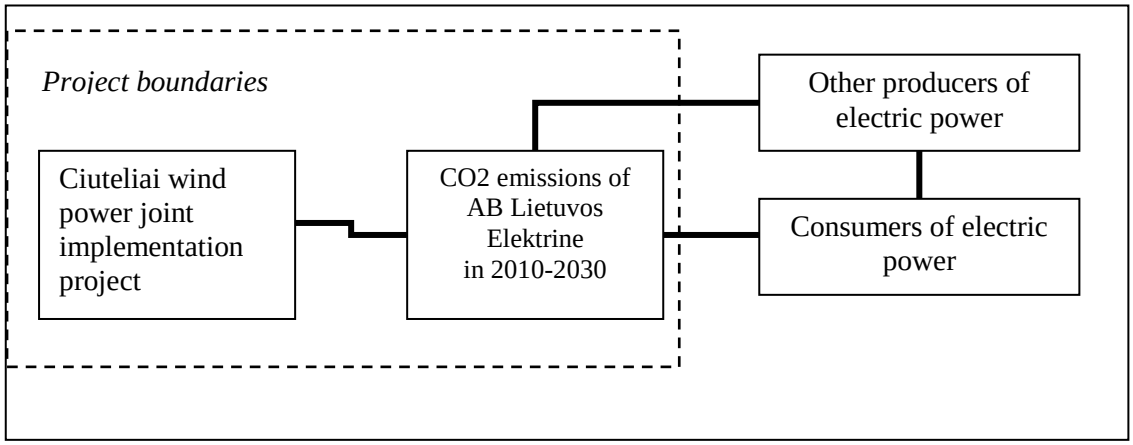

Figure 5. Project boundaries

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

Baseline Study date: 26.03.2012
Conducted by: UAB 4energia in cooperation with Nelja Energia OÜ and LHCarbon OÜ, Contact: UAB 4Energia Tel: +370 685 21249, e-mail: tadas.navickas@4energia.ee

SECTION C. Duration of the project / crediting period

C.1. Starting date of the project:

August 8, 2011 (signing of the contract for delivery of wind turbines)

C.2. Expected operational lifetime of the project:

20 years 0 months.

C.3. Length of the crediting period:

First crediting period: 7 months (2012).
Starting date: June 1, 2012.

Pending decisions on the framework for generation and transfer of emissions reduction credits post 2012, the Project developer will seek the right to earn carbon credits for the post 2012 crediting period in addition to emission reductions units (ERUs) generated under the first commitment period of the Kyoto Protocol.

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.

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

Option 1 is not used therefore section D.1.1 is left blank.

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

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

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

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
1	EG_y – Net electricity supplied to the grid	Project proponent	kWh	Calculated; EGy = Esup - Econ Where: Esup = Electricity supplied to the grid by the project (kWh/year) Econ = Electricity consumed from the grid by the project (kWh/year).	Monthly	100%	Electronic and in paper form	
2	Esup - Electricity supplied to the grid by the Project	Deeds of transfer and acceptance from Lietuvos energija.	kWh	Measured. The data of commercial power meter on electricity supplied to the grid and double checked with receipt of sales and with the SCADA system as back-up	Monthly	100%	Electronic and in paper form	
3	Econ - Electricity consumed from the grid by the project	Deeds of transfer and acceptance from Lietuvos energija.	kWh	Measured. The data of commercial power meter on electricity supplied to the grid and double checked with receipt of sales and with the SCADA system as back-up	Monthly	100%	Electronic and in paper form	

The monitored data will be kept for two years after the end of the crediting period.

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):

Wind power does not create any anthropogenic greenhouse gas emissions in operation, so Project emissions are zero.

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

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):

There are no direct or indirect emissions outside the Project boundary attributable to the project activity.

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):

Wind power does not create any anthropogenic greenhouse gas emissions in operation, so Project emissions are zero.

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:

National Energy Strategy approved by the resolution No. X-1046 of Seimas of the Republic of Lithuania of January 18, 2007 (Official Gazette., 2007, No-11-430) 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 gathered.
The planned economic activity will not result in pollution of any kind, will not be any waste generated, scarce natural resources will not be used. Electricity will be produced using alternative renewable wind energy resources.

According to the Communication No (9.14.5.)-LV4-5178 of Klaipeda Regional Department of Environment Protection of Lithuanian Ministry of Environment of 30 April 2008, the decision, concerning the environmental impact of the planned economic activity, was drawn that the environmental impact assessment (EIA) of the planned economic activity of *UAB Naujoji energija* – installation and maintenance of the wind farm – is required.

According to the Communication No (9.14.5.)-LV4-2702 of Klaipeda Regional Department of Environment Protection of Lithuanian Ministry of Environment of 30 April 2008, the conclusion, concerning the environmental impact of the planned economic activity, was drawn as acceptable and EIA was confirmed.
According to EIA conclusions bird and noise monitoring should be performed. Please see the Monitoring Plan for further details.

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.
1. EG_y	Low. The accuracy of voltage measuring transformer at 110kV is 0,2%	Data will be directly measured with metering equipment at the connection point to the national electricity transmission system operator AB Litgrid (TSO) at the 110kV side of the transformer. A separate back-up meter will be installed. This equipment will be sealed, calibrated and checked periodically for accuracy. In addition, all metered data will be double checked with the readings of a separate power meters at the 20 kV side on transformer and with SCADA system as a back-up.
2. Esup	Low. The accuracy of voltage measuring transformer at 110 kV is 0,2%	Data will be directly measured with metering equipment at the connection point to the national electricity transmission system operator AB Litgrid (TSO) at the 110 kV side of the transformer. A separate back-up meter will be installed. This equipment will be sealed, calibrated and checked periodically for accuracy. In addition, all metered data will be double checked with the readings of a separate power meters at the 20 kV side on transformer and with SCADA system as a back-up.
3. Econ	Low. The accuracy of voltage measuring transformer at 110 kV is 0,2%	Data will be directly measured with metering equipment at the connection point to the national electricity transmission system operator AB Litgrid (TSO) at the 110 kV side of the transformer. A separate back-up meter will be installed. This equipment will be sealed, calibrated and checked periodically for accuracy. In addition, all metered data will be double checked with the readings of a separate power meters at the 20 kV side on transformer and with SCADA system as a back-up.

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

The basic guidelines of the Monitoring Plan are as follows:

The Project proponent will measure only the net electricity output of the wind power farm. All other data has already been collected at the beginning of the Project, and has been presented in the Baseline Study and PDD.

In order to ensure a successful operation of the Project and the credibility and verifiability of the emission reductions (ERs) achieved, UAB Naujoji Energija recognizes that the Project must have a well defined management and operational system. The management and operation of the Project is the responsibility of UAB Naujoji Energija i.e. ensuring the environmental credibility of the Project through accurate and systematic monitoring of the Project's implementation and operation for the purpose of achieving trustworthy ERs. UAB Naujoji Energija will outsource the daily monitoring and verification tasks to 4energia which will as earlier described also be responsible for operating the wind turbines.

Data handling and quality assurance:

Data will be entered on a monthly basis to the MS Excel worksheet on basis of information provided by the power purchaser AB Lietuvos Energija and AB Litgrid (purchaser of the public obligation services (POS)) on kWh delivered to the grid on basis of the installed bi-directional power meter (incl. a back-up meter). Litgrid issues electric power dispatch reports monthly and provides them for review and approval of UAB Naujoji energija. On the basis of these reports Litgrid and Lietuvos Energija issues invoices for purchased (by UAB Naujoji Energija) electricity. Recpectively UAB Naujoji energija issues invoices for purchased (by Lietuvos Energija and Litgrid) electricity. Data will be double-checked with the readings of a separate power meters at the 20 kV side on transformer and the wind farm's SCADA system that will be calibrated with the meter. The power purchaser will also be asked to report on scheduled repair/replacement of the power meter.
UAB 4energia manager Tadas Navickas will be in charge of and accountable for the generation of ERs including monitoring, record keeping, computation of ERs and verification. He will officially sign-off on all monitoring reports that are prepared by UAB 4energia. Regular back-ups of the monitoring and SCADA databases will be made.

Reporting:
UAB Naujoji Energija in cooperation with UAB 4energia will prepare an annual monitoring report which will be provided to the verifier and if required also to the Lithuanian JI focal point on an regular basis for verification of the generated emission reductions.

Training:
UAB 4energia will be responsible for initial and periodic operational staff training on the power accounting and control activities defined in the Monitoring Plan. Initial staff training will be provided by UAB 4energia before the Project starts operating and generating ERs.

Corrective Actions:
UAB Naujoji Energija /UAB 4energia will periodically undertake performance reviews as part of its ongoing operation and management. Where corrective actions are required by the Lithuanian authorities or the verifiers, these will be acted upon within a reasonable timescale as dictated by relevant authorities.

Data collection:

ID number	Data variable	Responsible person	
		Name	Position and department
MP1	EGy – Net electricity supplied to the grid (kWh)	Tadas Navickas	Member of the Management Board

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

Tadas Navickas, UAB Naujoji Energija. UAB Naujoji energija is a Project participant as listed in Annex 1.

SECTION E. Estimation of greenhouse gas emission reductions

E.1. Estimated project emissions:

Wind power does not create any anthropogenic greenhouse gas emissions in operation, so Project emissions are zero.

E.2. Estimated leakage:

There are no direct or indirect emissions outside the Project boundary attributable to the Project activity.

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

Since there are no leakages: E.1 + E.2 = E.1 (0)

E.4. Estimated baseline emissions:

Baseline emissions (BE) are calculated as following:

$BE_y (tCO_2) = EG_y (MWh) \times EF_y (tCO_2/MWh)$
EG_y – Net electricity supplied to the grid
EF_y – Emission factor of the power plant of AB Lietuvos Elektrine

Please refer to Section B for detail on how the emission factor (0.626 tCO2e/MWh) is calculated.

	2012
Baseline emissions (in t CO2e)	30,187

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

	2012
Baseline emissions = Emission reductions (in t CO2e)	30,187

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

Year	Estimated project emissions (tonnes of CO2 equivalent)	Estimated leakage (tonnes of CO2 equivalent)	Estimated baseline emissions (tonnes of CO2 equivalent)	Estimated emission reductions (tonnes of CO2 equivalent)
Year 2012	0	0	30,187	30,187
Total (tonnes of CO2 equivalent)	0	0	30,187	30,187

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 Communication No (9.14.5.)-LV4-2702 of Klaipeda Regional Department of Environment Protection of Lithuanian Ministry of Environment of 30 April 2008, 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 Naujoji energija* – installation and maintenance of wind power farm – is acceptable and according to EIA conclusions construction and exploitation of the wind farm is affirmed.

During EIA process potential environmental impacts were analysed a summary of which is provided 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 emerge, 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 2.

Table 2 SO_2 and NO_x emission reductions

Pollutant	kg of pollutant/MWh	Amount of pollutant saved during the crediting period
SO_2	0.45	18.6 t
NO_x	0.95	39.27 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 farm project. Water is not used for technological purposes in the wind farm so wastewaters are not produced.

Soil

There will not be any significant impact on soil quality. The project area mainly consists of farmlands. During the construction process, in the power plant foundation areas, road construction areas and cable laying areas the loam (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 finalized, the loam will be re-cultivated and planted according to projects plans in order to avoid soil erosion.

In case of wind farm liquidation after the forecasted operation time of the project it is planned to dismantle all wind farm including foundations and re-cultivate loam. If road accesses are not used for other purposes they will also be deconstructed and loam re-cultivated in their place.

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.

Biodiversity

Planned wind power park does not have boundaries with protected territories Natura 2000 and does not get in the ITBP* territory (Important Territory for Bird Protection).

Cultural heritage

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

Electromagnetic field

Strong electromagnetic field is usually formed around high voltage air power lines.

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 farm (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 is mounted at 100 m height from the surface in metal, connected to earth baskets, which perform as electromagnetic shields. Zone of electromagnetic impact is not present in wind farm territory or in neighbouring areas.

The electromagnetic field will not have a negative impact for people health, because electromagnetic field which could have impact to health could be only close to high voltage (110 kV) electricity

transformation and transfer devices and near electric generators in wind turbines, which were in 85 meter high.

Noise

According to supplied Enercon technical characteristics, planned noise level of wind turbines will be in 10 meter height and when there is 8 meter per second wind speed, from 102 to 108 ± 2 dB(A).

The noise modeling study of wind farm was made with program CUSTIC 1.1, which is designed for investigation of various noise sources. Marginal noise level in living environment at night time is 55 dBA. It was calculated that generated noise of wind power plant will decrease to 55 dBA in 80 meter distance from wind turbine tower.

Visual - psychological impact

Notionally shadowing of wind turbines may have negative visual – psychological impact for neighboring areas, which are closer then 500 metre from wind power park. In concrete case when taking in consideration probable sun shining timing and angle , it was established that 30 hours per year allowable intensive shadowing area will be in the distance from 460 to 700 meter. Towers of Wind turbines, which influence shadow blinking, will be assembled with shadow control function, which will allow avoiding shadow blinking in sunny day.

Transboundary impact

Due to location of the wind farm in the territory of the Republic of Lithuania and at minimum 20 km distance from the land border of the closest neighboring country (Russia) the wind farm will have no transboundary impacts.

Intended compensation and environmental mitigation measures provided in EIA document:

- To reduce the shading effects, wind turbines will be allocated so that shading to the closest homesteads caused by the rotor blades will be minimal. Based on the homestead owner's consent, it's is planned to plant the plants, that would obscure the wind turbines at the time when their shadows are falling at the homestead. After completing the shading simulation using the WindPro program, it was determined that only one homestead falls into the intense shading area. In order to reduce the zone of intense shading, wind turbines that cause shadowing to the above mentioned homesteads, will be equipped with a shading reducing mechanism, which will stop the rotor blade rotation during intense sun hours.
- In order to avoid the wind farm noise cause adverse environmental impact, the wind turbines will be located so that their noise level in the residential area does not exceed the maximum allowed noise levels (55 dBA) during the night time. After performing the noise simulation using the Wind Pro program, it was determined that wind farm caused noise level, does not exceed allowable limits. The sanitary zone for the wind farm will be set, where the wind turbine noise will not exceed the permissible noise levels.
- As wind power generators are housed in nacelles and are sufficiently high above the ground, the electromagnetic field strength will have no impact on the environment as it will not exceed the limit and will be below 0.5kV /m.

According to the EIA conclusions further monitoring will be carried out: bird monitoring in wind park territory and noise monitoring. Please see the Monitoring Plan for further details.

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:

In accordance with the EIA study, the environmental impacts are not considered as significant.

SECTION G. Stakeholders' comments

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

Compulsory public consultation procedure, that gives opportunity to all stakeholders to participate in decision making procedure, has been undertaken during detailed planning. Information about the start of the detailed planning process has been announced at the internet site of local Silute district municipality and in the local newspaper on the 05-10-2007. No remarks or proposals have been received.

All information on the proposed solutions of the detailed plan has been made public during the period 19/10/2007-05/11/2007. Also date and venue of the stakeholders meeting has been announced in the local newspaper on 19-10-2007.
The stakeholder meeting has been held 06/11/2007 in Klaipėda city. 6 participants have registered to the meeting. No remarks or suggestion have been raised during the meeting so the detailed plan proceeded with further approvals. The information about the public hearings of the detailed plan is a part of the detailed planning process.

Furthermore all stakeholders had opportunity to participate in decision making procedure and to provide comments during EIA procedures. Information about prepared environmental impact assessment program was announced in local newspaper ,,Pamarys" in 28th of September, 2007.
There were few people who expressed interest in EIA procedures during phone contact. Motivated proposals regarding EIA were not given by local community people.
Information about prepared EIA report and possibility to familiarize with it's solutions were announced in local newspaper ,,Pamarys" in 4 of December, 2007 and also in Saugai township local billboard.
The stakeholder meeting has been held 20/12/2007 in Saugai municipality premises. 7 participants have registered to the meeting. No remarks or suggestion have been raised during the meeting so the EIA report proceeded with further approvals.
The information about the public hearings of the EIA report is a part of the EIA procedures and the documents are available for check if needed.

Annex 1

CONTACT INFORMATION ON PROJECT PARTICIPANTS

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Annex 2

BASELINE INFORMATION

See chapter B for details.

Annex 3

MONITORING PLAN

MONITORING PLAN
OF
CIUTELIAI WIND POWER
JOINT IMPLEMENTATION PROJECT

PREPARED BY:

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Table of Contents

1. General

The purpose of Monitoring Plan (MP) is to specify the monitoring procedure described in chapter D of the PDD of the Ciuteliai wind power joint implementation project.

The monitoring plan is based on:

- 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").
- Monitoring methodology as defined in chapter D of PDD, "Ciuteliai wind power joint implementation project".

The monitoring plan defines a systematic surveillance and measurement of aspects related to implementation and performance of the project which enables measurement or calculation of emission reductions. Every factor influencing project performance must be included in the MP. It should clearly identify frequency of responsibility and authority for registration, monitoring and measurement activities. The indicators to be monitored may relate to actual project performance, validity of project performance, validity of project baseline or possible leakage effects.

Monitoring of project performance is crucial in ensuring that Emission Reduction Units can be claimed from the Project. Monitoring must be conducted in such a way that the indicators related to emission level from the project can be compared with the baseline emission scenario. Subsequently, the difference in actual and baseline emissions can be claimed as GHG emission reductions. Monitoring and recording of indicators will also provide a foundation for verification of emission reductions by an independent entity, and ultimately end up in reporting of verified emission reductions to the parties involved in the project and towards the UNFCCC.

2. Grid connection

The Project connection to the Main Grid (110 kV) is established via one coupling point to the national electricity transmission system operator (TSO) Litgrid AB.

3. Monitoring methodology and responsibilities

In accordance with the PDD, the amount of electricity supply to the grid is defined as the key activity to be monitored to calculate emission reductions. The main grid meter is connected to the TSO SCADA and monitored remotely by TSO. The meter is backed up with a backup meter.

Net power production is calculated as a difference between actual power production and active power consumption.

Active power consumption is measured with the same measuring equipment (as mentioned above) as used for measuring of actual power production. The equipment has 2 separate electronic registers (1 (one) for actual power production and 1 (one) for active power consumption).

TSO will install measuring meters (one serving as a backup meter). Calibration of the measuring meters is processed according to Lithuanian legislation and standards. Measuring meters are connected to the remote monitoring system of TSO.

UAB Naujoji energija will further install a separate power meters at the 20 kV side of the transformer at the grid connection point. The power meters will be periodically tested and calibrated.

The contractual party of purchase of power generated by the Project is Lietuvos Energija AB and LITGRID AB (purchaser of the public obligation services (POS) part).

As all everyday business of UAB Naujoji energija is managed by renewable operator company 4Energia UAB (4energia) under a management agreement, 4energia also takes care of monitoring and verification activities for UAB Naujoji energija for the purpose of the Project. 4energia may subcontract third parties to assist in the process. Responsible person at UAB Naujoji energija for monitoring is the member of the management board (Tadas Navickas) who will officially sign all monitoring reports that are prepared by 4Energia.

Based on monthly production reports received from TSO the responsible person at 4energia generates the annual production report. Data from annual production reports form the basis for filling out the monitoring protocol and annual calculation of greenhouse gas emission reductions for the Project.

In case of employee turnover the head of the management board of 4energia will appoint one of its employees to temporarily take over the duties related to monitoring for the purpose of the Project until a new employee is assigned to the job. The employee who is leaving and/or manager of 4eneriga will carry out training of the newly appointed employee.

4. Data back-up and storing

In case of failure of commercial measuring meters, electricity production data can be retrieved also from:

a) a separate power meters installed at the 20 kV side of the transformer at the grid connection point and
b) the SCADA system of Enercon.

As the power meter at 20 kV side and SCADA measure the production closer to the wind turbines, they provide slightly higher production values compared to the measuring meter values at the official grid connection point (GCP). The difference is due to the losses in the cable lines as well as own consumption of the power substation.

In case measuring meters at the GCP are not functioning the electricity production data as indicated with the meter at 20 kV (minus estimated consumption of the substation) will be used to calculate achieved emission reductions.
In case also the 20 kV meter should fail, the values from SCADA will be used (minus estimated consumption of the substation and minus estimated losses in the cable lines).

UAB Naujoji energija will on a monthly basis monitor and record in an Excel sheet the grid losses related to the above points that can be taken as basis for estimating grid losses for the period the meters should fail.

Data is stored as following:

Production data history is stored electronically as received from TSO and also hardcopies as described above. Data is also stored in:

1) TSO, as the owner of the main measuring meter, the backup meter and the meters at 20kV lines,
2) TSO Litgrid AB and Lietuvos energija AB in form of electricity sales invoices issued by Naujoji energija UAB,
3) Naujoji energija UAB bookkeeping as issuer of electricity sales invoices,
4) Enercon SCADA.

4energia UAB also performs regular backups of the computer hard drives.

Annual production report:

	Active power generation (MWh)	**Active power consumption (MWh)**	**Net power production (MWh)**
January			
February			
March			
April			
May			
June			
July			
August			
September			
October			
November			
December			
Total			

5. Training

4energia UAB is responsible for initial and periodic operational staff training on the power accounting and control activities defined in the Monitoring Plan. Initial staff training will be provided by 4energia UAB before the project starts operating and generating ERs. All new staff member trainings and periodic/follow up trainings are carried out by 4energia UAB that may also subcontract third party (LHCarbon OÜ, represented by Hannu Lamp).

Internal staff trainings records/ template:

The below table will include trainings.

Date	Training by	Participants	Topic

6. Emission reduction calculation

Emission reductions achieved in the Project are on an annual basis calculated as in accordance with sections E.4 and E.5 of the project PDD as following:

Baseline emissions = Emission reductions (in t CO_{2e})

BE_y (tCO_2) = EG_y (MWh) x EF_y (tCO_2/MWh)

EG_y – Net electricity supplied to the grid
EF_y – Emission factor of the power plants of AB Lietuvos Elektrine (0.629 tCO2e/MWh)

Monitoring protocol will be used for the annual calculation of achieved emission reductions of the Project.

Monitoring Protocol:

	2012
Constants:	
Emission factor EFy, tCO2/MWh	0,626
Actual data:	
Net power generation EGy, kWh	
Annual Emission reduction, tCO2	
Total annual emission reductions, tCO2e	
Total cumulative emission reductions, tCO2e	

7. Monitoring of environmental impacts

Considering Environmental Impact Assessment process conclusions, monitoring of the environmental impacts will be carried out as following.

- Bird monitoring:

One year before start and two years after the start of the wind park operation general bird monitoring will be carried out at the wind park territory. Three years after the start of the wind park operation monitoring of possible bird loss will be carried out.

- Noise monitoring:

After the start of wind park operation noise monitoring will be performed.

As part of each monitoring report the results of the above EIA monitoring will be presented.

Information flow diagram: