TECHNICAL REPORT

DRAFT FINAL VALIDATION REPORT & OPINION

VALIDATION OF PAKRI WIND FARM PROJECT IN ESTONIA

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TECHNICAL REPORT

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Summary:

The Finnish Pilot Programme on joint implementation (JI) and the clean development mechanism (CDM) has initially approved the Pakri Wind Farm project in Estonia to be considered as a JI project. The project consists of 8 wind turbines with a total production capacity of 20 MW.

The objective of the validation described in this report is to have an independent third party assessment, whether the planned JI project is sound and meets the relevant rules. The rules include the requirements of Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), the guidelines for JI as described in the Marrakesh Accords of the UNFCCC, the Estonian legislation and the guidelines of the Finnish CDM/JI pilot programme.

The reviewed project documentation, a site visit, interviews, discussions and email communication have provided the validation team with enough information to confirm that the Pakri wind farm project has been prepared in line with requirements given for the validation task under the following conditions:

- additionality requirement for JI projects is interpreted as "environmental additionality"
- corrective action requests to the political and legal obligations are fulfilled before the transfer of ERUs
- clarifications stated in this validation report do not provide new significant information.

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Indexing terms

Climate change

Greenhouse gas emission reduction

Joint implementation

Validation

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Abbreviations

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CH_4	Methane
CO_2	Carbon dioxide
ER	Emission Reduction
ERU	Emission Reduction Unit
FIN	The Finnish CDM/JI Pilot Programme guidelines
GHG	Greenhouse gas
GWh	Gigawatthour
JI	Joint implementation
KP	The Kyoto Protocol
MAR	The Marrakesh Accords of the UNFCCC
MW	Megawatt
N_2O	Nitrous oxide
OK	Acceptable
P	Page
PA	Paragraph
PDD	Project Design Document
PVM	Preliminary Validation Manual of the Prototype Carbon Fund
TOR	Terms of Reference for the Validation
UNFCCC	United Nations Framework Convention on Climate Change

Definitions

Baseline	Baseline is the scenario that reasonably represents anthropogenic GHG emissions in the absence of a project. Baseline shall cover emissions from all gases, sectors and source categories listed in Annex A (of the Kyoto Protocol) within the project boundary
Leakage	The net change of anthropogenic GHG emissions, which occurs outside the project boundary, and that is measurable and attributable to the project.
Project boundary	Project boundary encompasses all anthropogenic GHG emissions under the control of the project participants that are significant and reasonably attributable to the project

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1 CONCLUSIVE SUMMARY

The Finnish Pilot Programme on joint implementation (JI) and the clean development mechanism (CDM) has initially approved the Pakri Wind Farm project in Estonia to be considered as a JI project. The project consists of 8 wind turbines with a total production capacity of 20 MW.

The objective of the validation described in this report is to have an independent third party assessment, whether the planned JI project is sound and meets the relevant rules. The rules include the requirements of Article 6 of the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC), the guidelines for JI as described in the Marrakesh Accords of the UNFCCC, the Estonian legislation and the guidelines of the Finnish CDM/JI pilot programme.

The validation process of Electrowatt-Ekono Oy focused on four core areas: compliance with political and legal obligations, assessment of the project design, evaluation of the baseline and evaluation of the monitoring and verification protocol.

The activities undertaken in the validation process included:
- a review and analysis of the project documentation;
- interviews / email communication with the key persons of AS Tuulepargid, EMP-Projects Oy, Estonian Energy Research Institute and Eesti Energia;
- discussions and email communication with the Ministry of the Environment, Estonia and Ministry of the Environment, Finland; and
- a visit to the planned wind farm site

The validated project documentation, site visit, discussions and interviews have provided the validation team with enough information to confirm that the Pakri wind farm project has been prepared in line with requirements given for the validation task under the following conditions:
- additionality requirement for JI projects is interpreted as “environmental additionality”
- corrective action requests to the political and legal obligations are fulfilled before the transfer of ERUs
- clarifications stated in this validation report do not provide new significant information.

2 INTRODUCTION

The Finnish CDM/JI Pilot Programme has initially approved the Pakri Wind Farm project in Estonia to be considered as a JI project. The project consists of 8 wind turbines with a total production capacity of 20 MW.

Validation is a process by which an independent third party assesses the design of a joint implementation (JI) project. Project validation confirms to a reasonable extent that the project, as designed and documented, is sound and meets all relevant 2nd track JI rules. The Finnish Pilot

Programme has found it useful to design all JI projects according to the 2nd track rules in order to have a reasonable guarantee of the soundness of its investments in ERUs.

The Finnish Pilot Programme has commissioned Electrowatt-Ekono Oy (further also: the Validator) to validate the Pakri Wind Farm Project. The validation is a requirement for all pilot programme projects and serves as a learning process and design component of the Finnish pilot programme project cycle. A third party assessment of the project design and, in particular, assessment of compliance of the project baseline and the Monitoring and Verification Protocol with relevant UNFCCC, host country and pilot programme requirements is carried out.

The project developer of Pakri wind farm is an Estonian company AS Tuulepargid, a limited company owned by the Danish wind power development company Global Green Energy ApS, which is a subsidiary of the World Wide Wind group. The Project Design Document (PDD) for the Pakri wind farm project has been coordinated by EMP-Projects Oy, a Finnish co-developer.

Validation team of Electrowatt-Ekono consisted of the following persons:

- Harri Laurikka, team leader
- Kari Hämekoski, team member
- Murat Alehodzhin, team member
- Esa Holttinen, team member
- Satu Monni, team member

2.1 Objective

The objective of the validation is to have an independent third party assessment, whether the planned JI project is sound and meets the relevant rules. For the project, the following requirements are of importance:

- the requirements of Article 6 of the Kyoto Protocol (KP) to the United Nations Framework Convention on Climate Change (KP), the guidelines for the implementation of Article 6 of the KP as presented in the Marrakesh Accords under decision 16/CP.7, and the annex to the decision (hereinafter collectively referred to as "JI Rules");
- other relevant rules, including the host country legislation and JI criteria;
- the guidelines of the Finnish JI/CDM Pilot Programme, and the requirement that the Projects should generate emission reduction units (ERUs) that can be transferred to Finland in accordance with Article 6 of the KP.

In addition, the Finnish Pilot Programme recommended utilisation of the Draft Validation Protocol (PVM) of the World Bank's Prototype Carbon Fund (PCF) to plan the validation process.

2.2 Scope

The scope of validation is to assess the components generating the GHG reductions by reviewing the project design including the baseline and the procedures put in place for monitoring emission reduction results.

The items covered in the validation are described below:

Political and Legal Obligations
- UNFCCC/Kyoto Protocol
- Host country requirements
- a special emphasis will have to be put to the new Estonian electricity market act and its implication to the tariffs and quotas of the wind power.
- Finnish CDM/JI pilot programme requirements

JI Project Description
- Project boundaries
- JI project design
- Predicted JI project GHG emissions

Project Baseline
- Baseline selection methodology
- Baseline determination
- Baseline GHG emissions

Monitoring and Verification Protocol
- Is the MVP concurrent with the scope of the project
- Are the monitoring boundaries clearly defined for the baseline's and the JI project's:
    - MVP methodologies and intervals
    - Indicators/data to be monitored and reported
    - Project management
    - Procedures for management review
    - External verification and certification.

The Validator was expected to determine the level of detail to be analysed and to use his own judgment as to whether the listed items are appropriate and complete, and amend the list if necessary.

According to the terms of Reference, the Validator needs to assess the technical and economic design of the project so that the project is "sound". The technical and economic dimensions of the project are interpreted as follows:

- Whether estimates on the expected activity level (production) are realistic (technical dimension)
- Whether the expected activity level is reached in a cost-effective way (economic dimension)

Documents to Review as Part of Scope are listed in Annex 1.

2.3 GHG Project Description

AS Tuulepargid, an Estonian limited company, is developing a wind farm project at the top of the Pakri peninsula in Estonia. The project consists of 8 wind turbines (each 2.5 MW) with a total production capacity of 20 MW. The wind farm will be connected to a grid operated by the electrical utility Eesti Energia AS. The construction is planned to begin in 2003 and the production in 2004. The project received a construction permit from the Paldiski municipality and an endorsement of the Estonian ministry of the Environment to be included in the Finnish CDM/JI pilot programme.

The project would generate emission reductions by replacing electricity production into the Estonian power grid. The GHG emission reduction during 2004-2012 has been estimated at about 0.5 Mt CO_2.

3 METHODOLOGY

3.1 Review of documents, visits and interviews

The validation was performed as a desk-study including a site visit to Pakri peninsula and interviews of selected key persons. The following persons were interviewed during the validation:

- Hannu Lamp, managing director, AS Tuulepargid
- Johan Malm, managing director, EMP-Projects Oy
- Juha Mattila, business development manager, EMP-Projects Oy
- Inge Roos, Research scientist, Estonian Energy Research Institute
- Heidi Hallik, Senior officer, Ministry of the Environment, Estonia

The site visit and interviews were made during 16.-17.1.2003.

3.2 Assessment

A risk based audit approach has been used where issues most critical with respect to the objectives of the validation were addressed in more detail.

A validation protocol has been developed as part of this validation. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements the project is expected to meet; and
- It documents how a particular requirement has been validated and the result of the validation;

The validation protocol consists of four tables of similar format. The tables are organised according to the key items of the validation and numbered as follows: (1) political and legal obligations, (2) requirements for project description and design, (3) requirements for the baseline and (4) requirements for the monitoring and verification protocol.

The different columns in these tables are described in the table below (Table 1).

Table 1. Validation protocol.

(Number of the requirement category) – Name of the requirement category						
No	**Requirement**	**Reference to Requirement**	**Reference to Document(s)**	**Finding by the Validator**	**Reply by the Author of the PDD**	**Conclusion by the Validator**
Number of the require-ment	Name of the requirement	Gives reference to the document (e.g. legislation or agreement) where the requirement is found.	Gives reference to the document (e.g. the Project Design Document), on which the validation finding is based.	Gives the preliminary finding by the Validator	Gives the reply of the author(s) to the Validator's finding.	Final conclusion of the Validator that takes into account the authors' reply.

The completed Validation Protocol is enclosed in Annex 2 to this report.

3.3 Reporting of Clarifications and Corrective Action Requests

If the items listed in the validation protocol were considered to meet the requirements to an acceptable extent, they were marked as "OK" in the validation protocol (Section "Finding by the Validator").

"Clarification" was noted, when information was regarded as insufficient, unclear or not transparent enough to establish if a requirement was met.

"Corrective Action Request" was noted where:
i) mistakes have been made with a direct influence on project results;
ii) validation protocol requirements have not been met; or
iii) there is a risk that the project would not be accepted as a JI/CDM project or that emission reductions will not be certified.

In case of a "Clarification" or "Corrective Action Request", the project proponents can deliver information required to the Validator, before the final validation opinion is made.

4 CONCLUSIONS

4.1 Compliance with Political and Legal Obligations

4.1.1 Discussion

Political and legal obligations consist of the requirements by the UNFCCC and both participating countries. The Finnish CDM/JI pilot programme has its own criteria for JI projects. Estonia does not have official criteria yet.

A JI project should provide reductions in emissions that are *additional to any that would otherwise occur*. However, there is no established methodology for the interpretation of this requirement in the context of JI yet.

In the current unclear situation regarding the interpretation, it is basically up to the parties of the emission reduction purchasing agreement to decide, whether reductions are additional in JI. It must be emphasised that in the context of JI, environmental integrity of the Kyoto Protocol is not endangered, as both countries are subject to an emission cap.

The Terms of Reference (TOR) for the validation refer to the term "environmental additionality" that has often been defined as the requirement that projects result in GHG emissions reduction that would not have occurred otherwise without taking into account investment criteria or investment barriers (i.e. the so called "investment additionality" or "barrier approach").

In the case of the Pakri wind farm project, it is evident that the mitigation benefits of the Pakri project are additional to any that would occur in the absence of this particular wind farm project (wording used in the criteria used by the Finnish CDM/JI programme). The wind farm would produce emission-free power into the grid and thus replace power produced with higher operating costs i.e. with fossil fuels. This will lead to clear climate change mitigation benefits and "environmental additionality" would thus be met.

It is not evident in the documents provided to the Validator, whether the planned financing from the Finnish CDM/JI programme is essential for the implementation of the Pakri wind farm project. This means that without the JI funding and JI project status, the project might "otherwise occur" as a conventional project. "Investment additionality" of the project can thus be questioned. "Investment additionality" has not been dealt with in the documentation, nor are specific barriers to the project implementation without JI funding identified.

Viability of the project is strongly supported by the tariff set to electricity produced by wind power in the new Electricity Market Act. The sales price of electricity is 1.8 times the price of electricity from Narva power plants, which implies currently EEK cents 80.73/kWh (Document 28). Implementation of the project will finally depend on the individual perceptions of project developers and financiers on the balance of viability vs. project risk, which cannot be sensibly validated by a third party.

Certain JI participation requirements by the UNFCCC (e.g. calculation and recording of assigned amounts, existence of national registries for emission permits) are specifically related to the *transfer of ERUs*. Other participation requirements (e.g. informing the secretariat) are not specifically related to the transfer, but the timing has not been specified. The approach taken in this validation recognises that JI participation requirements are essential criteria for a successful *completion* of a JI project. However, they do not prohibit a positive validation opinion for the *start-up* of the project activities in a situation, where all Parties to the Kyoto Protocol are still preparing for the use of the Kyoto mechanisms. The participation requirements are however listed below as CARs, because a political risk (see criteria for CARs in 3.3) remains regarding the eventual transfer of valid ERUs as planned.

4.1.2 Clarifications and Corrective Action Requests

CAR 1.3 "Please inform the UNFCCC secreteriat of the designated focal point for approving JI projects and of the guidelines for approving JI projects and document it"

- There is a risk that the planned project would not be accepted as a JI project. Neither Finland nor Estonia has informed the secreteriat. However, it has not been specified in the Marrakesh Accords in what phase of a JI project informing should be made. Hence, this risk does not prevent a positive appraisal of the project at this phase.

CAR 1.5 "Assigned Amount of both countries must be calculated and recorded before the transfer of ERUs"

- There is a risk that emission reductions generated by the project are not recognised as ERUs by the UNFCCC. Calculation and recording of assigned amounts must be completed before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.

CAR 1.7 "Both countries need to have in place a national registry for emission permits before the transfer of ERUs"

- There is a risk that emission reductions generated by the project are not recognised as ERUs by the UNFCCC. National emission permit registries must be in place before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.

CAR 1.10 "Estonia needs to make information on the project publicly available, directly or through the secreteriat, in accordance with the criteria on baseline selection and monitoring and the modalities for the accounting of assigned amounts"

- There is a risk that the planned project would not be accepted as a JI project. This risk does not prevent a positive appraisal of the project at this phase as the project related information is still under development.

4.1.3 Conclusion

Additionality requirement is fulfilled in the project, if the requirement is interpreted as "environmental additionality". CARs listed focus on government-level issues that need to be solved in order to ERUs to be transferred successfully. They do not prohibit a positive validation opinion for the *start-up* of the project activities in a situation, where all Parties to the Kyoto Protocol are still preparing for the use of the Kyoto mechanisms.

4.2 JI Project Description

4.2.1 Discussion

The Validator was expected to assess, whether the project is technically, economically and financially sound.

The production estimate of the project is based on a technical availability of 98.5 %. This figure is based on the experience of the turbine manufacturer Nordex and the Validator was provided with data from Nordex turbines in Scandinavia in 2002. The figure was also backed by communication from Nordex to build up its own service organisation in the Paldiski area to keep the down time of the turbines as low as possible.

According to the Validator's experience, the technical availability estimated at 98.5% may be too high in the long term. The arguments for a lower figure are:

- Experience in Finland for similar turbines suggests a lower figure
- Potential problems in the power transmission network may cause additional losses, which are not included in the (wind turbine) availability figures supplied by Nordex
- Cold temperatures and partial icing of the turbine blades in altitudes higher than 80 m (hub height) may cause production losses. Even if these are not directly included in the definition of technical availability, they form an additional potential cause for production losses that should be taken into account as a safety factor in the production estimates

Any construction or land use plans near the wind farm may affect the wind conditions and thus production of the wind farm. The project developer controls an area of 264 ha in the vicinity of the planned wind farm. All the available grid capacity at Paldiski 110 kV substation has been reserved for OÜ Pakri Tuulepark according to project developer.

Construction of another wind farm (phase II), the size of the wind farm and the number and size of turbines are still under consideration, which makes estimation of negative impacts on the production of the planned wind farm impossible. The Validator deems the production losses due to phase II as difficult to avoid, if phase II is implemented according to the maximum scenario. According to project developer, phase II wind farm can positioned far enough from the phase I.

The cashflow estimate of the project is based on a scenario, where the nominal sales price of electricity and thus the income remain constant due to competition and political decisions until 2015. The nominal operational costs are assumed to increase for the same period. In the Validator's opinion, this approach is likely to underestimate the viability of the project.

Loan financing of the project is still open, as the project developer aims to use the validation opinion in the negotiations with banks.

The PDD analyses emission reductions occurring in the Estonian power grid without analysing influence of power exports/imports. It is stated in the PDD that the increase in electricity export is not considered, as Estonia would fail to fulfil obligations regarding reduction of sulphur dioxide emissions (80% by the year 2005 compared to the level of 1980). Estonian power exports have decreased from 4.7 TWh in 1991 to 0.9 TWh in 2000 (Ministry of Economic Affairs, 2001).

If power exports are increased at the same time as the wind farm was added to the power network, the chosen baseline production, Balti power plant in Estonia, might not be valid. However, the development of Estonian power exports is independent on a single power project,

and it is not under the control of the project participants, nor attributable to the Pakri project. It can thus be excluded from the project boundary.

4.2.2 Clarifications and Corrective Action Requests

Clarification 2.8b "It has not been shown that there is no financial risk due to liabilities related to contaminated soils on the wind farm site. An independent expert opinion is recommended to confirm that the economic risk due to soil pollution on-site is low / acceptable".

- Information is insufficient.
- In Estonia the owner of the ground is eventually liable for remediation of soil pollution if the original polluter cannot clean the soil or if it cannot be shown that the original polluter is not the current owner
- Document 24 (AS Eco-Pro in 1993) identified 3 contaminated spots on-site and proposed additional surveys to be carried out. The soil pollution found was noted to endanger the ground water. The amounts found (1 tonne of oil products and 12 tonnes of pig manure) and the area of the spots (ca. 30 m^2) were small. According to the project developer the discovered oil pollution on the site is minor compared to general pollution level at the Pakri peninsula and the economic risk is low (Documents 25 and 27).
- In particular oil can pollute a large volume of ground water (in the proportion of approximately 1: 400,000) and thus cause a potential liability for the company. Therefore, the Validator recommends an independent expert opinion on the issue to confirm that the risk is low / acceptable.

Clarification 2.8c "Debt financing of the project is still open"

- Information is insufficient.

4.2.3 Conclusion

Taking into account the comments and clarifications above, the project fulfils the requirements of the Validation Protocol. Without a binding commitment from Nordex for the technical availability of 98.5%, we recommend a conservative assumption of 95%. An independent expert opinion is recommended to confirm that the economic risk due to soil pollution on-site is low/acceptable. The Validator recommends confirmation of loan financing before the finalisation of the Emission Reduction Purchase Agreement.

4.3 Project Baseline

4.3.1 Discussion

The baseline is the scenario that reasonably represents the anthropogenic emissions by sources of GHG emissions that would occur in the absence of the proposed project. 93 % of the electricity in Estonia is produced in the Estonian and Balti power plants i.e. in Narva Power plants. Four baseline scenarios have been identified in the PDD. All scenarios are based on the Balti Power plant due to the fact that Estonian Power plant has higher efficiency and lower production costs. The Balti power plant will be partly renovated and partly closed in the chosen scenario.

According to the PDD and information provided during the visit, the project would replace production from Balti Power plant because the main power load is on Estonian Power plant with higher efficiency and lower production costs.

According to the PDD, baseline is based on all units of Balti Power plant (1-4, 11 and 12). Based on information gained during the visit the project is, however, likely to replace production from unit 12 in 2004 – 2012 and units 1 - 4 in 2004. Unit 11 would be a base load unit providing also district heat, and it seems unlikely that the project would have an impact on its production. This could have implications for the specific emission factor (g CO_2 e/kWh) and eventually on ERs produced, and the project boundary would need to be updated. The amount of ERs would in this case increase. However, as the baseline approach presented provides a conservative estimate on emission reductions, we find it an acceptable approach.

The baseline scenario selected assumes that unit 12 is not renovated e.g. due to the LCP directive. According to the information obtained by the Validator, this assumption seems acceptable.

4.3.2 Conclusion

A scenario in which Balti Power plant will be partly renovated and partly closed is selected as the baseline. The choice of baseline scenario has been justified. The baseline has been established in a transparent and conservative manner with regard to the choice of approaches, assumptions, methodologies, parameters, data sources and key factors.

4.4 Monitoring and Verification Protocol

4.4.1 Discussion

The project's monitoring and verification protocol must incorporate all factors that are of importance for controlling and reporting project performance and generation of emission reductions. It should clearly identify frequency of, responsibility and authority for monitoring, measurement and data recording activities. The details of the verification process, such as the indicative schedule, should also be determined.

The MVP of the Pakri project has been focused on the amount of electricity produced. Monitoring is governed by the MVP and the Power Purchase Agreement (PPA).

Verification was planned to be done by a single specified entity during the whole crediting period. This is not necessary in the Verification Plan. The entity can be decided during the period.

4.4.2 Conclusion

The Pakri monitoring and verification protocol covers all important project factors. The description of the monitoring and verification protocol is acceptable concerning procedures and responsibilities.

5 VALIDATION OPINION

Ministry of the Environment of Finland has requested Electrowatt-Ekono Oy to validate the Pakri wind farm JI project, located in Estonia. The objective of the validation is to have an independent third party assessment, whether the planned JI project is sound and meets the relevant rules, including:

- the requirements of Article 6 of the Kyoto Protocol (KP) to the United Nations Framework Convention on Climate Change (KP), the guidelines for the implementation of Article 6 of the KP as presented in the Marrakesh Accords under decision 16/CP.7, and the annex to the decision (hereinafter collectively referred to as "JI Rules");
- other relevant rules, including the host country legislation and JI criteria;
- the guidelines of the Finnish JI/CDM Pilot Programme, and the requirement that the Projects should generate emission reduction units (ERUs) that can be transferred to Finland in accordance with Article 6 of the KP.

In addition, the Finnish Pilot Programme recommended to utilise the Draft Validation Protocol (PVM) of the World Bank's Prototype Carbon Fund (PCF) to plan the validation process.

The validation process of Electrowatt-Ekono Oy focused on four core areas: compliance with political and legal obligations, assessment of the project design, evaluation of the baseline and evaluation of the monitoring and verification protocol.

The activities undertaken in the validation process included:

- a review and analysis of the project documentation;
- interviews / email communication with the key persons of AS Tuulepargid, EMP-Projects Oy, Estonian Energy Research Institute and Eesti Energia;
- discussions and email communication with the Ministry of the Environment, Estonia and Ministry of the Environment, Finland; and
- a visit to the planned wind farm site

The reviewed project documentation, a site visit, interviews, discussions and email communication have provided the validation team with enough information to confirm that the Pakri wind farm project has been prepared in line with requirements given for the validation task under the following conditions:

- additionality requirement for JI projects is interpreted as "environmental additionality"
- corrective action requests to the political and legal obligations are fulfilled before the transfer of ERUs.
- clarifications stated in this validation report do not provide new significant information.

Discussion and arguments for the validation opinion are presented in section 4 of this validation report.

The validation is based on the information made available to Electrowatt-Ekono Oy and the engagement conditions detailed in this report. Electrowatt-Ekono Oy cannot guarantee the

accuracy or correctness of this information. Hence, Electrowatt-Ekono Oy cannot be held liable by any party for decisions made or not made based on the validation.

Espoo, 3.3.2003

Harri Laurikka
Team Leader
Electrowatt-Ekono Oy

6 REFERENCES (SEE ALSO ANNEX 1)

Ministry for Foreign Affairs, Finland (2003) Clean Development Mechanism (CDM) and Joint Implementation (JI) Pilot Programme – Operational Guidelines. Version 3.0.

Ministry of Economic Affairs, Estonia (2001) Estonian Energy 1991 – 2000, Tallinn

PCF (Prototype Carbon Fund) (2000) Preliminary Validation Manual. Version 1.0.

UNFCCC (1997) The Kyoto Protocol to the Convention on Climate Change.

UNFCCC (2001) The Marrakesh Accords. FCCC/CP/2001/13/Add.2

DOCUMENT LIST

Document No	Document
1	Pakri Wind Farm JI Project Design Document, EMP Projects Oy, October 2002
2	Clean Development Mechanism and Joint Implementation Pilot Programme – Operational guidelines, Ministry for Foreign Affairs, Finland, version 3.0, January 2003
3	The UNFCCC website: http://www.unfccc.int
4	Construction permit (Ehitusluba NR.38, Paldiski Linnavalitsus, 2.10.2002)
5	Technical terms for production of electrical energy by Eesti Energia AS (Liitumistingimused elektrienergia tootmiseks 12.10.2001)
6	OÜ REI Geotehnika 2001. Engineering geology report, Pakri wind park Harju county, Paldiski. Work No 556-01.
7	Entec AS 2002. Paldiski Linn. Pakri tuulepargi detailplaneering.
8	Entec AS 2002. Pakri tuulepargi detailplaneering. Planeeringu dokumentatsioon.
9	Veljo Volke, Eesti Ornitoloogiaühing. Pakri tuulepargi võimalik mõju linnustikule. Kuressaare aprill 2002.
10	Terms of Reference for the Validation, Ministry of Environment of Finland, 25.10.2002
11	Interview minutes, Heidi Hallik, Ministry of the Environment, Estonia 17.1.2003
12	Email communication by Ismo Ulvila to the Climate Change Info Mailing List 5.12.2002
13	Site visit 17.1.2003
14	Interview minutes, Johan Malm and Juha Mattila, EMP-Projects Oy 16.1.2003
15	Email communications by Inge Roos, Estonian Energy Research Institute, 20.-21.1.2003
16	Interview minutes, Hannu Lamp, Johan Malm, Inge Roos, 17.1.2003
17	New cashflow estimates, AS Tuulepargid, 17.1.2003
18	Email communication by Heidi Hallik, Ministry of the Environment, Estonia 23.1.2003
19	Email communication by Jaakko Ojala, Ministry of the Environment, Finland 23.1.2003
20	Pakri Wind Farm JI Project Design Document, Revision b 16.2.2003
21	Copy of a Letter from the Ministry of the Environment, Estonia, 16.9.2002
22	Letter from Nordex Energy GmbH, 17.2.2003
23	Email communication from Hannu Lamp, 24.2.2003
24	Keskkonnakahjustuste hindamine Paldiski Sõjaväeobjektidel, Paldiski Piirivalveõppekeskus, Aruanne, AS Eco-Pro, 1993
25	Email communication from Hannu Lamp, 25.2.2003
26	Email communication from Valdur Lahtvee, Environmental Manager of Eesti Energia, 27.1.2003
27	Email communication from Hannu Lamp, 28.2.2003
28	Letter from Energy Inspection to Estonian Wind Power Association, 14.10.2002

VALIDATION PROTOCOL

1. POLITICAL AND LEGAL CRITERIA						
No	**Requirement**	**Reference to Requirement**	**Reference to Document(s)**	**Finding by the Validator**	**Reply by the Author of the PDD**	**Conclusion by the Validator**
1.1	Project has approval of both countries	KP 6.1.(a)	1, 10	OK		
1.2	Project provides a reduction in GHG emissions that is additional to any that would otherwise occur. The mitigation benefits must be additional to any that would occur in the absence of the project.	KP 6.1. (b), FIN	1, 10, 14-17	OK The project fulfils the "environmental additionality" requirement. It is evident that the mitigation benefits of the Pakri project are additional to any that would occur in the absence of this particular wind farm project (wording used in the criteria used by the Finnish CDM/JI programme). It is not evident in the documents provided to the Validator, whether the planned financing from the Finnish CDM/JI programme is essential for the Pakri wind farm project to get implemented. This means that without the JI funding and JI project status, the project might "otherwise occur" as a conventional project.		
1.3	Both countries have informed the UNFCCC secreteriat of its designated focal point for approving JI projects and its national guidelines and procedures for approving JI projects including the consideration of stakeholder's comments, as well as monitoring and verification.	MAR P 11, PA 20	11, 19	**CAR 1.3** **"Please inform the UNFCCC secreteriat of the designated focal point for approving JI projects and of the guidelines for approving JI projects and document it"** There is a risk that the planned project would not be accepted as a JI project. Neither Finland nor Estonia has informed the secreteriat. However, it has not been specified in the Marrakesh Accords in what phase of a JI project informing should be made. Hence, this risk does not prevent a positive appraisal of the project at this phase.		**CAR 1.3** **"Please inform the UNFCCC secreteriat of the designated focal point for approving JI projects and of the guidelines for approving JI projects and document it"** There is a risk that the planned project would not be accepted as a JI project. Neither Finland nor Estonia has informed the secreteriat. However, it has not been specified in the Marrakesh Accords in what phase of a JI project informing should be made. Hence, this risk does not prevent a positive appraisal of the project at this phase.
1.4	Both countries are Parties to the Kyoto Protocol	MAR P 12, PA 21 (a)	3	OK		
1.5	Assigned Amount of the both countries have been calculated and recorded	MAR P 12, PA 21 (b)	11	**CAR 1.5** **"Assigned Amount of both countries must be calculated and recorded before the transfer of ERUs"** There is a risk that emission reductions generated by the project are not recognised as ERUs by the UNFCCC. Calculation and recording of assigned amounts must be		**CAR 1.5** **"Assigned Amount of both countries must be calculated and recorded before the transfer of ERUs"** There is a risk that emission reductions generated by the project are not recognised as

				completed before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.		ERUs by the UNFCCC. Calculation and recording of assigned amounts must be completed before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.
1.6	Both countries have in place a national system for the estimation of anthropogenic GHG emissions not controlled by the Montreal Protocol.	MAR P 12, PA 21 (c)	3	OK		
1.7	Both countries have in place a national registry	MAR P 12, PA 21 (d)	11	**CAR 1.7** **"Both countries need to have in place a national registry for emission permits before the transfer of ERUs"** There is a risk that emission reductions generated by the project are not recognised as ERUs by the UNFCCC. National emission permit registries must be in place before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.		**CAR 1.7** **"Both countries need to have in place a national registry for emission permits before the transfer of ERUs"** There is a risk that emission reductions generated by the project are not recognised as ERUs by the UNFCCC. National emission permit registries must be in place before ERUs can be transferred. This risk does not prevent a positive appraisal of the project at this phase as the first ERUs are transferred at earliest in 2009.
1.8	Both countries have submitted annually the most recent inventory	MAR P 12, PA 21 (e)	3	OK		
1.9	Both countries submit the supplementary information on assigned amount and make any additions to and substractions from assigned amount	MAR P 12, PA 21 (f)	11	OK, see 1.5 and 1.7		
1.10	A Party hosting a JI project shall make publicly available, directly or though the secretariat, information on the project in accordance with the criteria for baseline setting and monitoring and modalities for the accounting of assigned amounts	MAR P 13, PA 28	11	**CAR 1.10** **"Estonia needs to make information on the project publicly available, directly or through the secretariat, in accordance with the criteria on baseline selection and monitoring and the modalities for the accounting of assigned amounts"** There is a risk that the planned project would not be accepted as a JI project. This risk does not prevent a positive appraisal of the project at this phase as the project related information is still under development.		**CAR 1.10** **"Estonia needs to make information on the project publicly available, directly or through the secretariat, in accordance with the criteria on baseline selection and monitoring and the modalities for the accounting of assigned amounts"** There is a risk that the planned project would not be accepted as a JI project. This risk does not prevent a positive appraisal of the project at this phase as the project related information is still under development.

1.11	A project design document has been submitted to the Validator.	MAR P 14, PA 31	1	OK		
1.12	PDD has been made publicly available for 30 days	MAR P 32, PA 32	12	OK		
1.13	The project must comply with the host country legislation, as well as withy any criteria and requirements that the host country may have established for JI projects	FIN	1, 4, 11	OK. A Construction permit has been received and there are no official criteria for JI projects in Estonia yet.		
1.14	The project must produce real, measurable and long-term benefits related to the mitigation of climate change	FIN	1	OK		
1.15	The benefits must be produced in a cost-effective way (measured by the purchase price in €/tCO2-eqv)	FIN	1	OK		
1.16	Project must undergo an environmental assessment and provisions must be made for public participation in the project cycle	FIN	1, 7, 8, 9	OK Detailed plan and strategic environmental impact assessment have been carried out with public participation according to the Estonian legislation.		
1.17	Project does not have significant negative environmental impacts	FIN	1, 7, 9, 13	OK		
1.18	Project is supportive of the Finnish Policy on environmental co-operation with neighbouring countries	FIN	1, 10	OK		

2. PROJECT DESCRIPTION						
No	**Requirement**	**Ref. to Requirement**	**Ref. to Document(s)**	**Finding by the Validator**	**Reply by the Author of the PDD**	**Conclusion by the Validator**
2.1	Project boundary has been clearly defined	TOR	1, 14	**CAR 2.1** **"Please revise the description of the project boundary. The current text in the PDD is ambiguous"** The validation protocol requirement has not been met. It is important to present transparently, which activities (e.g. construction of wind farm, oil fuel chain, power production, heat production) and greenhouse gases are included in the project boundary.	Included inside the project boundary is: - Only power production in the baseline - Only CO_2 and NO_x emissions in the baseline - Updated in the PDD.	OK, NO_x presumably refers to N_2O
2.2	Project boundary encompasses all anthropogenic GHG emissions under the control of the project participants that are significant and reasonably attributable to the project	MAR P 19, PA 4 (c)	1, 14, 15	OK CH_4 and N_2O emissions are not included in the project boundary. These emissions can, however, be considered insignificant supporting the requirement of a conservative baseline.		
2.3.	Potential leakage effects are properly identified and addressed (Leakage: the net change of anthropogenic GHG emissions which occurs outside the project boundary and that is	TOR	1	OK		

	measurable and attributable to the JI project).					
2.4.	Projects must be technically sound	FIN	1	OK		
2.5	Have the risks for project perfomance been properly addressed?	TOR, PVM	1, 22, 23	**Clarification 2.5a "According to the Validator's experience technical availability of 0.985 is optimistic. A more conservative value would be 0.95. Are there specific reasons to use a higher value?"** Information is insufficient. **Clarification 2.5b** **"Are there any foreseeable construction plans that might affect the wind conditions on the wind farm?"** Information is insufficient. The Pakri peninsula is an excellent position for production of wind power. Therefore, there might be a possibility that more wind power is constructed near the planned site in the future. Such wind farms could have an effect on the wind conditions and thus the production of the wind farm.	2.5a: See support document 22 2.5b: Deriving from: 1) environmental and technical restrictions, 2) Terms of the General Plan of Paldiski City (*Üldplaneeringu Lähteülesanne*) and 3) land ownership status, an establishment of any wind turbines in all directions except South-East from the wind power plant is out of question. The area in South-Eastern direction is controlled by the mother company of OÜ Pakri Tuulepark (AS Tuulepargid) through land ownership and negotiations with the Estonian Land Board. Furthermore, all existing grid capacity in Paldiski 110 kV substation (only possibility for grid connection) has been reserved in writing to OÜ Pakri Tuulepark. If AS Tuulepargid decides to establish a new wind farm in the area, the WTGs can be positioned in a way not to disturb the electricity generation of Pakri 20 MW Wind Farm in question.	2.5a. OK. Information is sufficient and the risk has been properly addressed. The Validator was provided with data on the technical availability of Nordex turbines in Scandinavia in 2002. According to Nordex, the value 0.985 is realistic and the company will establish its own service organisation in the Paldiski area. According to the Validator's experience, the technical availability estimated at 98.5% may be too high in the long term. The arguments for a lower figure are: - Experience in Finland for similar turbines suggests a lower figure - Potential problems in the power transmission network may cause additional losses, which are not included in the (wind turbine) availability figures supplied by Nordex - Cold temperatures and partial icing of the turbine blades in altitudes higher than 80 m (hub height) may cause production losses. Even if these are not directly included in the definition of technical availability, they form an additional potential cause for production losses that should be taken into account as a safety factor in the production estimates Without a binding commitment from Nordex for 98.5%, we recommend a conservative assumption of 95%. 2.5b: OK. According to the project developer : 1. Construction and size of a new wind farm

					Written proof can be supplied to all above arguments upon first demand. See support document 23	(phase II) in the vicinity of the planned phase I is still under consideration. 2. The area of phase II compared to phase I is large (264 ha vs. 47 ha) and the turbines could be positioned so that they would not affect the production of phase I. Construction of another wind farm (phase II), the size of the wind farm and the number and size of turbines are still under consideration, which makes estimation of negative impacts on the production of the planned wind farm impossible. The Validator deems the production losses due to phase II as difficult to avoid, if phase II is implemented according to the maximum scenario. According to project developer, phase II wind farm can positioned far enough from the phase I.
2.6	Is the project technology likely to be substituted by other or more efficient technologies within the project period?	PVM	1	OK		
2.7	Will the project create other environmental or social benefits than GHG emission reductions?	PVM	1, 7	OK However, positive impacts are overestimated in the PDD. The project does not improve the local air quality. It reduces economic activity in oil shale production chain.		
2.8	Projects must be financially and economically sound	FIN	1, 6, 14-17, 24	**CAR 2.8a** **"Please correct the calculation in the cash flow estimates and adjust the cash flow estimates to reflect the new tariff for green electricity in Estonia."** A mistake has been made with a direct influence on project results. The cash flow estimates provided to the Validator give a too negative view on the project viability. The results from the political process concerning the new electricity market act should be integrated into the cash flow estimate. **Clarification 2.8b** **"It has not been shown that there is no financial risk due to liabilities related to potentially polluted soils on the wind farm site"** Information is insufficient. **Clarification 2.8c "Debt financing**	2.8a: Updated in the PDD acc. to the new energy act. 2.8b: The following reports do not indicate any ground pollution on the land units at the wind farm area. Also the Assessment of the Strategic Environmental Impact used a.o. these reports: 1. The Engineering Geology report. OÜ Rei	2.8a: OK **Clarification 2.8b**: **" It has not been shown that there is no financial risk due to liabilities related to contaminated soils on the wind farm site. An independent expert opinion is recommended to confirm that the economic risk due to soil pollution on-site is low / acceptable".** Information is insufficient. In Estonia the owner of the ground is eventually liable for remediation of soil pollution if the original polluter cannot clean the soil or if it cannot be shown that

				of the project is still open" Information is insufficient.	Geotehnika. 2001 nr. 556-01. 8 boreholes were drilled in connection with the study. The report has already been supplied to the Validator. 2. Supplementary data to the Engineering Geology report. Hella Kink. Institute of Geology. 2002. The report has been provided to the valdiator in an annex to the Detailed Land Use Planning. 3. *Keskonnakahjuste hindamine Paldiski sõjaväeobjektide:. Paldiski Piirivalveõppekeskuses. 1993*. AS Eco-Pro. Manuscript. The report can be supplied upon request. 4. Enviromental Action Plan for Paldiski. 1995. Ministry of the Environment of the Republic of Estonia. Manuscript. The report can be supplied upon request.	cannot be shown that the original polluter is not the current owner Document 24 (AS Eco-Pro in 1993) identified 3 contaminated spots on-site and proposed additional surveys to be carried out. The soil pollution found was noted to endanger the ground water. The amounts found (1 tonne of oil products and 12 tonnes of pig manure) and the area of the spots (ca. 30 m^2) were small. According to the project developer, the economic risk is low (Document 25). In particular oil can pollute a large volume of ground water (in the proportion of approximately 1:400,000) and thus cause a potential liability for the company. Therefore, the Validator recommends an independent expert opinion on the issue to confirm that the risk is low / acceptable. **Clarification 2.8c: "Debt financing of the project is still open".** Information is insufficient.
2.9	Will the project create any adverse environmental or social effects?	PVM	1, 6, 7, 8, 9, 13	OK Social and environmental impacts are described only very generally in the PDD. Visual impact extends further than 800 meters as written in PDD.		
2.10	Have identified social or environmental impacts been addressed in the project design?	PVM	1, 7, 8, 9, 13	OK Social and environmental impacts are described only very generally in the PDD. Detailed plan and strategic environmental impact assessment have been carried out according to the Estonian legislation.		
2.11	Are the GHG emission calculations documented in a complete and transparent manner? Have conservative	PVM	1	OK		

	assumptions been used?					
2.12	Are uncertainties in the GHG emissions estimates properly addressed in the documentation?	PVM	1	OK		
2.13	Is the assumed crediting time reasonable?	PVM	1, 11, 14, 18	OK		
2.14	GHGs are converted to carbon dioxide equivalents using global warming potentials as defined by decision 2/CP.3	MAR P 8, PA 1 (b)	1, 14, 15	OK		

3. BASELINE CRITERIA						
No	**Requirement**	**Reference to Requirement**	**Reference to Document(s)**	**Finding by the Validator**	**Reply by the Author of the PDD**	**Conclusion by the Validator**
3.1	Baseline reasonably represents anthropogenic GHG emissions in the absence of the project. Baseline shall cover emissions from all gases, sectors and source categories listed in Annex A (of the KP) within the project boundary	MAR P 18, PA 1	1, 15, 26	**CAR 3.1a "Please revise the PDD with the information provided in Document 15"** Validation protocol requirement has not been met. According to the PDD and information provided during the visit, the project would replace production from Balti Power plant because the main power load is on Estonian Power plant with higher efficiency and lower production costs. According to the PDD and updated information (document 15), baseline is based on all units of Balti Power plant (1-4, 11 and 12). Based on information gained during the visit the project is, however, likely to replace production from unit 12 in 2004 – 2012 and units 1-4 in 2004. 11 would be a base load unit providing also district heat, and it seems unlikely that the project would have an impact on production of unit 11. This could have implications for the specific emission factor (g CO_2 e/kWh) and eventually on ERs produced, and the project boundary would need to be updated. The amount of ERs would in this case increase. However, as the baseline approach presented in document 15 provides a conservative estimate on emission reductions, we find it an acceptable approach. The new information provided in document 15 should be incorporated in the PDD.	See support document 20	3.1a: OK The approach selected gives a conservative estimate of emission reductions. N_2O emissions were added to the emission reduction estimate. 3.1b: OK The baseline scenario selected assumes that unit 12 is not renovated e.g due to the LCP directive. According to the information obtained by the Validator, this assumption seems acceptable.

				CAR 3.1b "Please correct the carbon emission factor in document 15" A mistake has been made with a direct influence on project results Carbon emission factor of 29,1 t C/TJ is used in updated baseline calculations (document 15). This is in contradiction with PDD (Annex 13). Change of combustion technology in unit 11 is expected to lower emission factor provided that the original assumption would be valid and the project would replace production from all units of Balti Power plant (see Clarification 3.1.a) The choice of CEF needs be clarified and should be in line with assumptions concerning the units from which the production is assumed to decrease due to the project. In addition, LCP Directive and its transitional period in Estonia needs to be discussed in this context having a potential impact on emission factor in unit 12.		
3.3	Baseline is project-specific and/or a multi-project emission factor has been used	MAR P 18, PA 2 (a)	1	OK		
3.4	Baseline has been established in a transparent manner with regard to the choice of a) approaches b) assumptions c) methodologies d) parameters e) data sources f) key factors	MAR P 18, PA 2 (b)	1, 15	OK		
3.5	Baseline takes into account relevant national and/or international sectoral policies and circumstances	MAR P 18, PA 2 (c)	11, 15	OK		
3.6	Baseline has been established in a way that ERUs cannot be earned for decreases in activity levels outside the project activity or due to force majeure	MAR P 18, PA 2 (d)	1, 15	OK		
3.7	Baseline takes into account uncertainties and uses conservative assumptions	MAR P 19, PA 2 (e)	1, 15	OK see CAR 3.1		
3.8	Choice of baseline has been justified	MAR P 19, PA 3		OK		

4. MONITORING AND VERIFICATION PROTOCOL						
No	**Requirement**	**Reference to Requirement**	**Reference to Document**	**Finding by the Validator**	**Reply by the Author of the PDD**	**Conclusion by the Validator**
4.1	Monitoring plan provides for the collection and archiving of all relevant data necessary for estimating or measuring anthropogenic GHG emissions occurring within the project boundary during the crediting period	MAR P 19, PA 4 (a)	1	OK		
4.2	Monitoring plan provides for the collection and archiving of all relevant data necessary for determining the baseline of anthropogenic GHG emissions within the project boundary during the crediting period	MAR P 19, PA 4 (b)	1, 14, 20	**CAR 4.2a** **"Please revise appendices 15 and 16 so that the indicators to be monitored are clearly separated from fixed values."** Validation protocol requirement has not been met. According to the discussions with the authors, baseline emission factor is fixed i.e. it is not monitored during the crediting period. However, it is included in the indicators to be monitored together with the baseline fuel consumption. **CAR 4.2b** **"Please explain what documents are archived for the verification."** Validation protocol requirement has not been met. Monitoring sheets will be filled with data from the billing meter. Where is this data archived until the verification?	See support document 20	4.2a: OK 4.2b: OK
4.3	Monitoring plan provides for the identification of all potential sources of, and the collection and archiving of data on increased anthropogenic GHG emissions outside the project boundary that are significant and reasonably attributable to the project during the crediting period.	MAR P 19, PA 4 (c)	1	OK		
4.4	Monitoring plan provides for the collection and archiving of information on environmental impacts, in accordance with procedures as required by the host Party, where applicable	MAR P 19, PA 4 (d)	1, 4, 14	OK		
4.5	Monitoring plan provides for quality assurance and control procedures for the monitoring process. Are procedures identified for training of monitoring personnel?	MAR P 19, PA.4 (e), PVM	1, 14, 20	**CAR 4.5** **"Please explain in the PDD how you ensure quality and what kind of control procedures are undertaken"** Validation protocol requirement has not been met. For example: how is the measuring device accuracy	See support document 20	OK

				followed and documented? How do you ensure that the operational staff understands the monitoring process? Who should approve the monitoring results and when?		
4.6	Monitoring plan provides for procedures for the periodic calculation of the reductions of anthropogenic GHG emissions and leakage effects, if any.	MAR P 19, PA 4 (f)	1, 14	OK		
4.7	Monitoring plan provides for documentation of all steps involved in the calculations of 4.2. (baseline) and 4.6 (emission reduction and leakage)	MAR P 19, PA 4 (g)	PDD	**CAR 4.7** **"Please revise the PDD and/or appendices 15 and 16 to include a transparent documentation regarding calculation of baseline emissions and emission reductions"** Validation protocol requirement has not been met. It is not clear how the reductions of GHG emissions should be calculated in the monitoring process.	See support document 20	OK
4.8	Is the MVP good practice for this kind of project?	TOR	1	OK		
4.9	Can the MVP be easily used by the project operator?	TOR	1, 20	**CAR 4.9** **"Please revise the MVP so that a person not familiar with the monitoring process understands, what he needs to do in order to be able to produce and present verifiable documentation to an independent entity"** Validation protocol requirement has not been met. The current MVP is partly ambiguous and not explicit enough. For example: how are baseline emissions calculated? What has efficiency of the project got to do with monitoring of emission reductions? Is baseline fuel consumption required in the MVP?	See support document 20	OK
4.10	Are the indicators and assumptions specified in the MVP to measure and/or observe baseline and project data suitable for this purpose?	TOR	1	OK		
4.11	Does the MVP contain adequate provisions for verification of emission reductions achieved in compliance with stated project requirements?	PVM	1	**CAR 4.11** **"Please explain what the procedure before the annual verification of monitoring results is"** Validation protocol requirement has not been met. Project participants shall submit to an accredited independent entity a report in accordance with the monitoring plan of the emission reductions. How,	See support document 20	OK Verification was planned to be conducted by a single specified entity during the whole crediting period. This is not necessary in the Verification Plan. The entity can be decided during the

				when and by whom does this procedure start?		period.