

Final Validation Report Gangwon Wind Park Project

KEMCO

December 9, 2005

KOREA ENERGY MANAGEMENT CORPORATION

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Validation methodology		1. Desk Review 2. On-site Assessment 3. Review of Corrective Actions		
Project participants		Unison Co., Ltd. Gangwon Wind Power Co., Ltd. Ecoeye Co., Ltd. Marubeni Corporation, Eurus Energy Japan Corporation	Representative	Lee, Tae-Wha
Project title		Gangwon Wind Park Project		
Project location	Main office	803, Jangsan-Ri, Soosin-Myun, Cheonan-City, Choongnam, Korea	Tel	
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	Plant/project site	Pyeongchang-Gun, Gangwon Province, Republic of Korea	Tel	
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Category	Energy Industries (renewable energy sources)
Scope	<p>The validation scope for the proposed CDM project includes:</p> <ul style="list-style-type: none"> ■ physical and geographical boundaries of the proposed project; ■ legal, institutional, financial and technological aspects of the project; ■ GHG sources and types to be included within the boundaries; ■ time periods to be covered by the project design; ■ baseline scenario established; ■ monitoring plan; ■ environmental impacts caused by the proposed project; and, ■ stakeholders' comments
Objective	<p>The objective of the validation is to assess whether the proposed CDM project conforms to the requirements for CDM projects including Decision 17/CP.7, Modalities and Procedures for a CDM as defined in Article 12 of the Kyoto Protocol and relevant decisions of the CDM executive board by reviewing the project design documentation.</p>
Validation criteria	UNFCCC, Kyoto Protocol, Marrakesh Accords, Relevant CDM EB Decisions
Validation date	1. Desk Review: 20 May 2005 ~ 27 May 2005 2. On-site Assessment: 15 June 2005 ~ 30 June 2005 3. Review of Corrective Actions: 22 August 2005 ~ 9 September 2005

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Validation Results	<p>1. Summary of the project activity</p> <p>The Gangwon Wind Park Project is the first large-scale wind power project with a total capacity of 98MW in Korea. A total of 49 wind turbine generators will be installed in stages, each of which has an asynchronous generator with a rated power of 2MW and operates with variable speed to fit the various local wind conditions. At the first stage, 28MW of the total capacity will be installed and the whole project is expected to start operation in 2007. Given that the annual wind speeds at the site are in the range of 7.65m/s at 60m above ground, the project is estimated to generate 244,400MWh per year thereby reducing 149,536 metric tons CO₂eq which would otherwise occur.</p> <p>This project is expected to significantly contribute to sustainable development in Korea by utilizing renewable and clean energy sources i.e. wind energy, which thus reduce major air pollutants such as sulphur dioxide, nitrogen oxide, and particulates as well as greenhouse gases as compared to fossil fuel-fired generations. Environmental benefits from the project are estimated at 284 tons SO₂, 215 tons NO_x, and 15 tons dust per year. In addition to those benefits, the project will create jobs in the local area during the initial phase. Infrastructure such as access roads, power lines, and foundations for structures will benefit the local economy as well.</p> <p>In spite of these environmental benefits, Korea preferred to build fossil fuel-fired power plants and nuclear plants over the past decades instead of renewable-based power plants because it takes more than 10 years for the renewable power project to pay back the invested capital and it needs more advanced technologies including operation and maintenance skills. The low return on the investment and long payback period still remain obstacles to the renewable power project and thus make it difficult for the technology to enter the current power market under the business-as-usual scenario. In this regard, the CDM can help the project to be economically feasible by earning CERs (Certified Emission Reductions) and inducing foreign investments as well as drawing operation and maintenance know-how.</p>
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Validation Results	<h2>2. Principles</h2> <p>The project design document (PDD) of the Gangwon Wind Park Project is assessed based on the following principles</p> <p>[1] Completeness</p> <p>The completeness of the PDD is ensured by assessing whether the project proponent has identified all greenhouse gases (GHG) sources directly attributable to the proposed project within the project boundary and indirect GHG emissions outside the project boundary</p> <p>[2] Consistency</p> <p>The consistency of the PDD is ensured by assessing whether major factors used in the project plan such as data, formulae/algorithm and assumptions have been uniformly applied:</p> <ul style="list-style-type: none"> - among potential baseline scenarios; - between the project and baseline scenario; and - between the baseline and monitoring methodology. <p>[3] Accuracy</p> <p>The accuracy of the PDD is ensured by assessing whether any material errors or omissions made in using data and estimating GHG emissions have been corrected, and uncertainties associated with GHG quantification have been minimized to the extent possible.</p> <p>[4] Transparency</p> <p>The transparency of the PDD is ensured by assessing whether all assumptions, choices and procedures are clearly stated and substantiated such that another party may reach the same conclusions</p>
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Validation Results	<p>[5] Relevance</p> <p>The relevancy of the PDD is ensured by assessing whether selection of GHG sources, quantification procedures and potential baselines scenarios have been justified taking into account the requirements for the CDM project and the host country's particular situation.</p> <p>[6] Conservativeness</p> <p>The conservativeness of the PDD is ensured by assessing whether the baseline has been established choosing values of parameters that generate a lower baseline projection and thereby reducing the possibility of over-estimating GHG emission reductions</p> <p>3. Definitions of non-conformities and observations</p> <p>Non-conformities refer to validation findings that fail to fulfill the validation criteria such as failure to demonstrate additionality, lack of key information and exclusion of significant leakages. Non-conformities are divided into major and minor ones.</p> <ul style="list-style-type: none"> ■ Major non-conformity includes, inter alia: <ul style="list-style-type: none"> ▪ failure to comply with the Modalities and Procedures of CDM projects; ▪ occurrence of significant errors in the project baseline and monitoring methodologies ■ Minor non-conformity includes, inter alia: <ul style="list-style-type: none"> ▪ unclear data sources; ▪ minor miscalculation and misstatements <p>Observations include validation findings that are likely to be of non-conformity but with few evidences available at the moment and recommendations for improved documentation, data use, etc.</p>		


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Validation Results	<h2>4. Desk review</h2> <p>The desk review has been made during the period from 20 May to 27 May mostly by reviewing documents submitted by the project participants such as the Project Design Document and supporting documentation considering their completeness, consistency, accuracy, transparency, relevance, and conservativeness. The validation criteria, against which the project documentation is assessed, include CDM modalities and procedures required by the Marrakech Accords and relevant CDM EB decisions, which are specified in the Validation Checklist. The desk review focused mainly on the three aspects below:</p> <ul style="list-style-type: none"> ■ Demonstration of the project additionality; ■ Calculation of baseline and project emissions; and ■ Coverage of significant factors in the monitoring plan. <p>The scope of desk review depends primarily on the information provided by the project participants and could be extended through interview and in-depth review of more documents during on-site assessment afterwards. Finally, the results of desk review include what to be corrected and complemented in order to ensure that the project documentation comply with the validation criteria.</p> <ul style="list-style-type: none"> ■ Validation findings: <p>The PDD applied the approved consolidated baseline and monitoring methodologies for grid-connected electricity generation from renewable sources, ACM0002 (ver 02) and thus estimated the Operating Margin and Build Margin emission factors using data from official documents such as the 1996 IPCC Guidelines and Electric Power Statistics of KEPCO (Korea Electric Power Corporation). The formulae for the emission factors were consistently used in the Monitoring Plan. In order to demonstrate the project's additionality, the PDD made the investment analysis and showed that the project is not financially attractive under the baseline scenario. As for its environmental impacts on the local area, the project proponents undertook a Preliminary Environmental Review and accordingly took preventive measures against potential negative impacts identified. In addition, the project proponents held an open forum to invite stakeholders' comments and discuss social and environmental issues.</p>
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Validation Results	<p>■ Validation findings (continued):</p> <p>However, several items to be corrected have been identified by the desk review. In addition, a few issues to be further checked have been raised by the validation team:</p> <ul style="list-style-type: none"> ▪ The process to choose the Simple OM method is not transparent. Exclusion of coal in the list of low-cost/must run resources has not been justified, as applicable by official documents (see Checklist B.2.3); ▪ There is no comparison between the alternatives identified and the project activity in terms of return on investment, which should be justified in the PDD (see Checklist B.3.1); ▪ The date of completion of the baseline study is missing (see Checklist B.5.2); ▪ Since emissions from baseline power plants are displaced by the proposed project, the monitoring plan and relevant formulae for the OM and BM factors should be described in section D.2.1.3 and D.2.1.4 respectively (see Checklist D.2.9 ~ 12); ▪ The emission coefficients of heavy oil and LNG, and names of plants on the Operating and Build Margin are missing in the monitoring plan for the OM emission factor. (see Checklist D.2.9); ▪ Since emission reductions attributable to the proposed project are fully determined by electricity supplied by wind turbines to the grid, the amount of electricity supplied is the most important to be monitored and thus should be carefully maintained following relevant QA/QC procedures. An outline of how to assure the quality of monitored data e.g. ISO 9001/14001 standards should be given in the PDD (see Checklist D.3.1 ~ 4, D.3.7 ~ 8); ▪ The authority and responsibility for project management and monitoring of electricity generation as well as the OM and BM factors has not been described in section D.4 (see Checklist D.4.1 ~ 2). 		CDMC05-001

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<p style="text-align: center;">Validation Results</p>	<ul style="list-style-type: none"> ▪ Observations: the PDD and associated information should be further checked during on-site assessment due to lack of detailed description or information about legal compliance, contribution to sustainable development and transfer of environmentally friendly technology <p>As a result of the desk review, the validation team requests the project proponents to provide more documentary evidences and justification in order to ensure the compliance of the PDD with the validation criteria</p> <ul style="list-style-type: none"> ■ Additional documents and revised sections of PDD to be submitted prior to on-site assessment (deadline: 18 June 2005) <ul style="list-style-type: none"> ▪ Permits for project development and implementation including grid connection, development of mountainous areas(see Checklist A.2.2) ▪ Supplementary documents that demonstrate the project's contribution to sustainable development i.e. reduction of air pollutants and job creation (see Checklist A.2.3) ▪ The written approval of voluntary participation from the designated national authorities of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development (see Checklist A.3.3~4) ▪ Clarification on transfer of environmentally friendly technology (see Checklist A.4.4) ▪ Justification for choice of the Simple OM method, in other words exclusion of coal plants in the list of low-cost/must run resources (see Checklist B.2.3) ▪ Justification for the assumption used in estimating the amount of electricity generation i.e. 75% of confidence level and 28.47% of capacity factor (see Checklist B.2.7)
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<p style="text-align: center;">Validation Results</p>	<ul style="list-style-type: none"> ■ Additional documents and revised sections of PDD to be submitted prior to on-site assessment (continued) <ul style="list-style-type: none"> ▪ Comparison between the alternatives identified and the project activity in terms of return on investment to analyze investment barriers (see Checklist B.3.1) ▪ Documentary evidences on investment decision as mentioned in the section of Common Practice Analysis and Impact of CDM registration of the PDD (see Checklist B.3.2) ▪ The date of completion of the baseline study (see Checklist B.5.2) ▪ The monitoring plan and relevant formulae for baseline emissions (see Checklist D.2.9 ~ 12) ▪ Addition of monitoring indicators in the monitoring plan: emission coefficients of heavy oil and LNG; names of plants on the Operating and Build Margin (see Checklist D.2.9) ▪ Description about how to assure the quality of monitored data (see Checklist D.3.1 ~ 8) ▪ Description about the authority and responsibility for project management and monitoring of electricity generation as well as the OM and BM factors (see Checklist D.4.1 ~ 2) ▪ Details about calculation of baseline emissions e.g. Excel sheets (see Checklist E.4.2) 		

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Validation Results	<p>5. On-site assessment and interview</p> <p>The on-site assessment has been made during the period from 15 June to 30 June by making on-site visits and interviewing relevant persons particularly for the purpose of checking the remaining issues identified at the desk review. The on-site assessment focused mainly on the four aspects below:</p> <ul style="list-style-type: none"> ■ What technologies will be transferred through the project; ■ Whether the project contributes to sustainable development of the local areas; ■ What is missing in the monitoring plan; and ■ Whether due consideration has been taken of local stakeholders' comments. <p>The major methods of assessment are cross-check between documents and interviews with relevant persons. The key persons interviewed at the on-site assessment are as below:</p> <ul style="list-style-type: none"> ■ Young-Seo Ko, Project Manager, Unison Co., Ltd; ■ Roland Ries, Project Manager, Lahmeyer International; ■ Jung-Chul Chun, Representative, Association for Protection of Baekdudaegan Mountains; and ■ Seong-Taeg Yu, Assistant Director, Economic Policy Division, Gangwon Provincial Government. <p>As a result of the on-site assessment, the validation team requests the project proponents to take corrective actions against nine non-conformities i.e. two Major non-conformities and seven Minor non-conformities identified within the deadline, 9 August 2005, as agreed in the Validation Contract.</p>
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<p style="text-align: center;">Validation Results</p>	<p>■ Validation findings:</p> <p>The revised PDD provided a conservative estimation of the Operating Margin by regarding anthracite coal-burned power plants as must-run resources and also minimized uncertainties in choosing the Simple OM by demonstrating that low operating cost/must-run resources represent less than half the total electricity generation in Korea. On the other hand, a site-visit interview with a foreign engineer confirmed that the host company had sufficient capacity to absorb advanced operation and maintenance skills and know-how. In addition, an interview with a responsible government officer found that the project is likely to bring significant economic benefits to the local area by attracting tourists.</p> <p>However, two Major non-conformities and seven Minor non-conformities have been identified at the on-site assessment and there are a small number of issues to be further checked since procedures related to receipt of approval from CDM national authorities and public comments are currently under way:</p> <ul style="list-style-type: none"> ▪ Major non-conformity 1: given the condition, it is obvious that the proposed project is not financially attractive under the baseline scenario since its equity IRR is -3.8%. However, there is no comparison between the alternatives identified and the project activity in terms of return on investment as stipulated by Option II of Step 2 for demonstrating additionality, the reason for which is weakly substantiated. (see Checklist A.4.5, B.3.1~2); ▪ Major non-conformity 2: since emission reductions attributable to the proposed project are fully determined by electricity delivered to the grid, the amount of electricity supplied is the most important to be monitored and thus should be carefully maintained following relevant QA/QC procedures. An outline of how to assure the quality of monitored data should be therefore given in the PDD (see Checklist D.2.3, D.3.1~8);
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<p style="text-align: center;">Validation Results</p>	<p>■ Validation findings(continued):</p> <ul style="list-style-type: none"> ▪ Minor non-conformity 1: estimation of the Build Margin emission factor is not conservative in that some renewable-based power plants such as LFG (Landfill Gas) utilization plants are excluded from the sample plants on the Build Margin (see Checklist B.2.3, E.4.2 3); ▪ Minor non-conformity 2: the monitoring plan should address auxiliary electricity use by the wind turbine itself and auxiliary facilities (see Checklist D.2.4); ▪ Minor non-conformity 3: electricity generation will be monitored ex post according to the monitoring plan, but a data vintage for the Operating Margin and Build Margin emission factors has not been determined clearly. (see Checklist D.2.9); ▪ Minor non-conformity 4: describe the formulae used to estimate baseline emissions in Section D.2.1.4 of the PDD (see Checklist D.2.10~11); ▪ Minor non-conformity 5: describe the formulae used to estimate emission reductions in Section D.2.4 of the PDD (see Checklist D.2.17~18); ▪ Minor non-conformity 6: the authority and responsibility of project management should be clarified in Section D.4 (see Checklist D.4.1); and ▪ Minor non-conformity 7: In an interview with a representative for the Association for Protection of the Baekdudaegan Mountains, serious concerns over rehabilitation of the project site after completion of construction were raised. This issue has not been addressed properly in Section G.3 of the PDD. In addition, protective measures for the Baekdudaegan Mountains should be described in detail e.g. the number of turbines reduced (see Checklist G.3.1).
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Validation Results	<ul style="list-style-type: none"> ■ Validation findings(continued): <ul style="list-style-type: none"> ▪ Observations: the project participants have not yet submitted the written approval of voluntary participation from the designated national authorities of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development and private entities participating in the project have not been authorized by the designated national authorities of the Parties. These issues should be further checked prior to preparation of the preliminary Validation Report. 		
	<p>6. Review of corrective actions</p> <p>In response to the request for corrective actions against non-conformities identified, the project proponents submitted the revised project documentation to the validation team, of which the validation team made a thorough review during the period from 22 August to 9 September as follows:</p> <ul style="list-style-type: none"> ■ Corrective actions and conclusions of the validation team <ul style="list-style-type: none"> ▪ Major non-conformity 1: Unit cost of electricity production was selected as the financial indicator for investment comparison analysis (Step 2, sub-step 2b Option II). As a result of the analysis, some alternatives such as nuclear and coal power plants represent better economics than the proposed project. It is, therefore, concluded that the proposed CDM project is unlikely to be the most financially attractive. ✓ Conclusions: The cost per unit of generated electricity for the proposed project and the alternative resources was calculated properly with data currently available. In addition, the investment comparison analysis reach the conclusion appropriately in accordance with the procedures described in the Tool for the demonstration and assessment of additionality 		

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Validation Results	<ul style="list-style-type: none"> <p>▪ Major non-conformity 2: QA/QC procedures for monitoring equipment, handling of data monitored and staff in charge of monitoring and electricity safety, have been established. In addition, internal audit procedures have been set up in case the system does not work properly.</p> <p>✓ Conclusions: The QA/QC procedures submitted are deemed relevant for the proposed project since it appropriately addresses monitoring equipment, data, staff and internal audits</p> <p>▪ Minor non-conformity 1: The Build Margin has been re-calculated taking into account recently built LFG plants based on KEPCO (Korea Electric Power Corporation) statistics.</p> <p>✓ Conclusions: It is concluded that the re-calculated Build Margin is accurate, conservative and relevant for the proposed project.</p> <p>▪ Minor non-conformity 2: The revised monitoring plan states that electricity consumption in the plants and transmission lines to the grid will be measured by a two-way meter and be accordingly excluded from total electricity generation by the wind turbines.</p> <p>✓ Conclusions: The revised monitoring plan prevents over-estimated credits from the proposed project by monitoring net electricity generation to the grid.</p> <p>▪ Minor non-conformity 3: The OM and BM factors have been determined ex ante, once at the time of PDD submission while electricity generation by the proposed project will be updated based on ex post monitoring.</p> <p>✓ Conclusions: The data vintage for the Operating Margin and Build Margin emission factors has been determined clearly in the revised monitoring plan.</p>
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<p>Validation Results</p>	<ul style="list-style-type: none"> ■ Corrective actions and conclusions of the validation team (continued) <ul style="list-style-type: none"> ▪ Minor non-conformity 4: The revised Section D.2.1.4 describes the formulae used to estimate baseline emissions <ul style="list-style-type: none"> ✓ Conclusions: The formulae is accurate and consistent ▪ Minor non-conformity 5: The revised Section D.2.4 describes the formulae used to estimate emission reductions <ul style="list-style-type: none"> ✓ Conclusions: The formulae is accurate and consistent ▪ Minor non-conformity 6: The operational and management structure for the project activity including monitoring of emission reductions and leakage effects has been described in Section D.4 <ul style="list-style-type: none"> ✓ Conclusions: The operational and management structure for the project activity is properly described in Section D.4 ▪ Minor non-conformity 7: The revised Section G.3 describes that to address serious concerns over protection of the Baekdudaegan Mountains the project proponents cut the number of wind turbines from 103 units to 49 units in total and had a plan to rehabilitate the project site right after completion of the construction. <ul style="list-style-type: none"> ✓ Conclusions: It is concluded that the project proponents had taken due account of stakeholders' comments received, which is properly addressed in the project documentation.
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Validation Results	<p>7. Receipt of public comments</p> <p>In accordance with Paragraph 40(c) of the CDM Modalities and Procedures, the project design document of Gangwon Wind Park Project had been posted on the UNFCCC CDM website for public comments from 13 June 2005 to 12 July 2005. As a result, no comments were received during that period.</p>		
	<p>8. Issuance of written approvals</p> <p>The KEMCO validation team has received the written approvals from the designated national authorities of the Parties involved in the Gangwon Wind Park Project, Japan (issued on 5 October 2005) and Republic of Korea (issued on 7 December 2005), which states the following:</p> <ul style="list-style-type: none"> ■ The Parties, Japan and Korea approves that their participation in the Gangwon Wind Park Project is voluntary ■ The Korean government, the host Party of the Gangwon Wind Park Project, confirms the project activity contributes significantly to sustainable development in Korea. ■ The Parties, Japan and Korea authorize the project participants indicated in the PDD to participate in the Gangwon Wind Park Project. 		


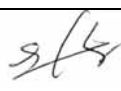


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Validation Results	<p>9. Validation opinion</p> <p>The KEMCO validation team has performed a validation of Gangwon Wind Park Project which claimed approximately 149,536 CO₂eq ton annually by utilizing wind resources. To ensure the transparency and integrity of the validation, the validation team first had established the validation checklist taking into account UNFCCC, Kyoto Protocol, Marrakesh Accords and relevant decisions of the CDM executive board. Based on the checklist the validation of the project activity was undertaken in three stages, i.e. desk review (20 May 2005 ~ 27 May 2005), on-site assessment (15 June 2005 ~ 30 June 2005) and review of corrective actions (22 August 2005 ~ 9 September 2005).</p> <p>As a result of the desk review and on-site assessment, the validation team identified two Major non-conformities and seven Minor non-conformities and then requested the project proponents to take corrective actions against them. In response to the request, the project proponents submitted the revised project documentation to the validation team, of which the validation team made a thorough review. Then the team fully agreed that all the significant non-conformities issued had been cleared.</p> <p>In conclusion, the validation team is of the opinion that the Gangwon Wind Park Project is in full compliance with all the major requirements for the CDM by leading to emission reductions additional to what would have otherwise occurred, providing for reliable and measurable emission reductions with the well-established monitoring plan and contributing to sustainable development in Korea through reduction of air pollutants, job creation and economic benefits from increased tourists.</p>
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Validation Results	<p>10. References</p> <p>Documents and electronic files submitted by the Project Entity</p> <p>[1] Unison, Gangwon Wind Park Project, Project Design Document, Updated in August 2005</p> <p>[2] Unison, Financial Analysis Excel Files, Updated in August 2005</p> <p>[3] Gangwon Wind Power, 2nd Phase Preliminary Environmental Review Report, October 2003</p> <p>[4] PB Power, Gangwon Wind Farm Project – Wind Resource Assessment, April 2005</p> <p>[5] Vestas, Vestas V80-2.0MW OptiSpeed™ Wind Turbine, January 2004</p> <p>[6] Korea NGO's Energy Network, Proceedings of Forum – Environmental Impact and Feasibility Study of the Wind Park in the Backdudaegan Mountains, 2002</p> <p>[7] Korea Electric Power Corporation, Statistics of Electric Power in Korea, 2002~2004 (in excel files)</p> <p>[8] Ministry of Commerce, Industry and Energy, Statistics of Renewable Energy in Korea, 2004 (in Korean only)</p> <p>[9] Ministry of Commerce, Industry and Energy. 2nd Basic National Plan for Electricity Supply. 2004 (in Korean only)</p> <p>Documents and websites referred to by KEMCO</p> <p>[10] http://cdm.unfccc.int/DNA</p> <p>[11] http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf</p> <p>[12] http://www.moleg.go.kr (Ministry of Government Legislation, in Korean only)</p> <p>[13] http://cdm.unfccc.int/methodologies/PAmethodologies/approved.html</p> <p>[14] Korea Electric Power Corporation, 5th Long-term Power Development Plan, (1999~2015), 2000 (in Korean only)</p> <p>[15] Korea Power Exchange, Current Status of Generating Capacity in Korea, 2004 (in Korean only)</p> <p>[16] Korea Power Exchange, Electricity Market Operation Regulation, 2005 (in Korean only)</p>
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	Role	Name	Organization /position	Scope of Validation	Signature
Validation Team	Team Leader, Validator	Han, Seung Ho	KEMCO	Sustainable Development, Baseline methodology, Environmental impacts, Stakeholder comments	
	Lead Validator	Kim, Young Tae	KEMCO	Monitoring methodology, Estimation of GHG emissions	
	Technical Expert	Kim, Geon Hoon	KIER	Technical aspects of the project	
	Lead Validator Performance Evaluator	Lee, Chul Woo	KEMCO	Evaluation of validator's performance	

Appendix	A. Validation Criteria B. Validation Checklist C. Review of Corrective Actions
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Appendix A

Validation Criteria


REQUIREMENT	Reference	Conclusion	Comments
1. The project shall assist non-Annex I Parties in achieving sustainable development, which shall be confirmed by the host Party in the form of a written approval of voluntary participation.	Kyoto Protocol (KP) Article 12.2, Marrakech Accords (MA) CDM Modalities and Procedures (M&P) paragraph 29	Checked	The written approval from the designated national authority of Republic of Korea(date: 7 December 2005) confirms that the Gangwon Wind Park Project contributes to its sustainable development
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC and lead to real, measurable and give long-term benefits related to the mitigation of climate change.	KP Article 12.2, 5(b)	Checked	See Checklist A.4.6
3. The project shall assist Annex I Parties in achieving compliance with their emission reduction commitment under Article 3 of the Kyoto Protocol.	KP Article 12.2	Checked	See Checklist A.4.6
4. Emission reductions attributable to the project shall be additional to any that would occur in the absence of the project activity.	KP Article 12.5(c), MA CDM M&P paragraph 37(d), 43	Checked	See Review of Corrective Actions No.1
5. The project activity should lead to the transfer of environmentally safe and sound technology and know-how.	MA Decision 17/CP.7	Checked	See Checklist A.4.4
6. Public funding for the project from Annex I Parties shall not result in a diversion of official development assistance	MA Decision 17/CP.7	Checked	See Checklist A.4.7
7. Participation in the CDM shall be voluntary, which shall be approved by each party involved	KP Article 12.5(a), MA CDM M&P paragraph 28, 40(a)	Checked	the written approvals from the Parties involved that their participation is voluntary
8. Parties participating in the CDM shall designate a national authority for the CDM	MA CDM M&P paragraph 29	Checked	See Checklist A.3.1
9. Parties participating in the CDM shall be a Party to the Kyoto Protocol	MA CDM M&P paragraph 30, 31	Checked	See Checklist A.3.2


REQUIREMENT	Reference	Conclusion	Comments
10. Comments by local stakeholders shall be invited and a summary of the comments and how due account was taken of any comments shall be provided	MA CDM M&P paragraph 37(b)	Checked	See Review of Corrective Actions No.9
11. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be undertaken.	MA CDM M&P paragraph 37(c)	Checked	See Checklist F.1~2
12. Baseline and monitoring methodology shall be previously approved by the CDM Executive Board	MA CDM M&P paragraph 37(e)	Checked	See Checklist B.1.1, D.1.1
13. Provisions for monitoring, verification and reporting shall be in accordance with decision 17/CP.7, CDM modalities and procedures under the Marrakech Accords and relevant decisions of the COP/MOP.	MA CDM M&P paragraph 37(f)	Checked	See Review of Corrective Actions No.2
14. The project design document shall be in accordance with Appendix B to the CDM modalities and procedures, the UNFCCC CDM-PDD format, and made publicly available	MA CDM M&P paragraph 40(b), Appendix B, relevant decisions of the CDM Executive Board	Checked	The PDD of the proposed project is pursuant to the CDM modalities and procedures and UNFCCC CDM-PDD Format Version 02
15. Comments on the validation requirements shall be received, within 30 days, from Parties, stakeholders and UNFCCC accredited NGOs, and thereafter made publicly available.	MA CDM M&P paragraph 40(c)	Checked	The PDD of the proposed project was posted for 30 days on the CDM website for public comments from 13 June 2005 to 12 July 2005. As a result, no comment was received during that period


REQUIREMENT	Reference	Conclusion	Comments
16. A baseline shall cover emissions from all gases, sectors and source categories listed in Annex A of the Kyoto Protocol within the project boundary	MA CDM M&P paragraph 44	Checked	See Checklist B.4.1~3
17. The baseline shall be established in a transparent and conservative manner, on a project-specific basis and taking into account relevant national and/or sectoral policies and circumstances.	MA CDM M&P paragraph 45(b), (c), (d)	Checked	See Review of Corrective Actions No.3
18. The baseline shall be defined in a way that CERs cannot be earned for decreases in activity levels outside the project activity or due to force majeure.	MA CDM M&P paragraph 47	Checked	The baseline scenario shows that the proposed project claims emission reductions obtained only by displacing electricity generation from power plants that would have occurred in the absence of the proposed project
19. The baseline methodology shall select from among the approaches described in paragraph 48 of the CDM modalities and procedures the one deemed most appropriate for the project activity	MA CDM M&P paragraph 48	Checked	See Checklist B.1.1~4
20. The project shall select a crediting period from among the approaches described in paragraph 49 of the CDM modalities and procedures	MA CDM M&P paragraph 49	Checked	See Checklist C.2.2~4
21. Emission reductions attributable to the project shall be adjusted for leakage	MA CDM M&P paragraph 50	Checked	See Checklist E.2.1
22. The project boundary shall encompass all anthropogenic emissions by sources of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the CDM project activity	MA CDM M&P paragraph 52	Checked	See Checklist E.1.1, E.4.1


Appendix B


Validation Checklist


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
A. General Description of Project Activity <i>In this section, the project design is assessed including the project purpose, how technology will be transferred and whether public funding from Annex I Parties results in a diversion of official development assistance.</i>						
A.1. Title of the project activity <i>Note:</i>						
	A.1.1. Does the title characterize the project activity clearly and properly?	[1]	Document Review	1. Checked: The project title, Gangwon Wind Park Project is clearly described	OK	OK
A.2. Description of the project activity <i>Note:</i>						
	A.2.1. Is the purpose of the project activity clearly described?	[1]	Document Review	1. Checked: The proposed project aims to generate electricity utilizing wind resources and feed it into the grid for users.	OK	OK
	A.2.2. Is the project in compliance with relevant legislation in the host country?	[12]	Document Review	1. Checked: The proposed project conforms to relevant legislations such as Electricity Act, Forest Management Act, and Basic Environmental Policy Act.	OK	OK
	A.2.3. Does the project contribute to sustainable development of the host country from environmental, social and economic perspectives?	[1]	Document Review, Interview	1. Checked: The proposed project is expected to provide directly to the host country and local areas social and environmental benefits including job creation and reduction of air pollutants. In addition, an interview with a responsible government officer presents that the project is likely to bring significant economic benefits to the local area by attracting tourists.	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
A.3. Project Participants <i>Note:</i>						
	A.3.1. Have Parties participating in the project designated a national authority for the CDM?	[10]	Document Review	1. Checked: Both participating Parties, Korea and Japan have designated a national authority for the CDM.	OK	OK
	A.3.2. Are participating Parties including the host country a Party to the Kyoto Protocol?	[11]	Document Review	1. Checked: Both participating Parties, Korea and Japan have ratified the Kyoto Protocol.	OK	OK
	A.3.3. Have the project received the written approval of voluntary participation from the designated national authorities of each Party involved, including confirmation by the host Party that the project activity assists it in achieving sustainable development?			1. To be checked: The project participants have not submitted the written approvals of voluntary participation. But the date of its submission could depend on each country's own procedure.	To be checked	OK
	A.3.4. Have a private and/or public entity participating in the project been authorized by the designated national authorities of the Parties?			Ditto	To be checked	OK
A.4. Technical description of the project activity <i>Note:</i>						
	A.4.1. Is the location of the project activity clearly described?	[1]	Document Review	1. Checked: The wind park is located in the Samyang ranch, Pyeongchang County, Gangwon Province, Korea.	OK	OK
	A.4.2. Is the category of the project activity clearly identified and described?	[1]	Document Review	1. Checked: The proposed project falls under the category of renewable electricity generation for a grid.	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	A.4.3. Does the project design engineering reflect current good practices?	[1] [5]	Document Review	1. Checked: An advanced technology of a pitch-regulated and speed-optimized wind turbine has been employed in the proposed project.	OK	OK
	A.4.4. Are the environmentally safe and sound technology and know how transferred to the host Party through the project?	[1]	Document Review, Interview	1. Checked: The EPC (Engineering, Procurement, and Construction) Contract with foreign contractors stipulates that training for the staff of the host company should be provided with regards to operation and maintenance of wind power systems. In addition, an interview with a foreign engineer confirm that the host company has sufficient capacity to absorb such skills and know-how	OK	OK
	A.4.5. Are the GHGs emissions reductions additional to what would occur in the absence of the project?	[1]	Document Review	1. Major non-conformity 1: Demonstration of additionality for the proposed project is not transparent. See Checklist Question B.3.1~2	Major NC	OK
	A.4.6. Does the project design clearly and consistently indicate the chosen crediting period, the total estimation of emission reductions as well as annual estimate for the chosen crediting period?	[1]	Document Review	1. Checked: A total of 1,495,360 CO ₂ eq tons is estimated to be reduced over ten years of the crediting period.	OK	OK
	A.4.7. In case public funding from Annex I Parties is involved, does the project provide an affirmation that such funding does not result in a diversion of official development assistance?	[1][2]	Document Review	1. Checked: Public funding from Annex I parties is not included in the project investment	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
B. Application of a baseline methodology <i>In this section it is assessed whether the baseline methodology is appropriately applied in terms of project additionality in a transparent and conservative manner</i>						
B.1. Title and reference of the approved baseline methodology applied to the project activity <i>Note:</i>						
	B.1.1. Has the baseline methodology been previously approved by the CDM Executive Board?	[1][13]	Document Review	1. Checked: The ACM0002 methodology and Additionality Demonstration Tool has been applied	OK	OK
	B.1.2. Are the title and reference lists as well as the details of the approved baseline methodologies in the CDM web site properly referred to?	[1][13]	Document Review	1. Checked: The CDM website has been properly referred to	OK	OK
	B.1.3. Is the baseline methodology the one deemed most applicable for this project and is the appropriateness justified?	[1][13]	Document Review	1. Checked: The ACM0002 methodology relates to grid-connected electricity generation from renewable sources	OK	OK
	B.1.4. Is it transparently showed that the project activity meet the applicability conditions under which the methodology is applicable?	[1][13]	Document Review	1. Checked: The PDD (Project Design Document) shows transparently that the proposed project meet the applicability conditions	OK	OK
B.2. Description of how the methodology is applied in the context of the project activity <i>Note:</i>						
	B.2.1. Is the basic assumption of the baseline methodology appropriate	[1]	Document Review	1. Checked: The proposed project displaces electricity from the existing plants and new capacity additions	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	in the context of the project activity?			from the existing plants and new capacity additions that would be otherwise generated.		
	B.2.2. Are the key information and data used to determine the baseline scenario such as variables, parameters and data sources properly described?	[1]	Document Review	1. Checked: In accordance with ACM0002 the Operating Margin and Build Margin are estimated using ex ante data including electricity supplied to the grid, fuel consumption, and emission factor.	OK	OK
	B.2.3. Has the baseline been determined in a transparent and conservative manner?	[1][15]	Document Review	1. Minor non-conformity 1: estimation of the Build Margin emission factor is not conservative in that some renewable-based power plants such as LFG (Landfill Gas) utilization plants are excluded from the sample plants on the Build Margin 2. Checked: In the context of Korea, low operating cost/must-run power plants include hydro, nuclear, renewable and anthracite coal, which in total accounts for less than 50% of total electricity generation over recent five years. Choice of the Simple OM method therefore is relevant. In addition, estimation of the Operating Margin emission factor is conservative in that all power plants consuming anthracite coal is regarded as must-run and thus excluded in calculating the Simple OM.	Minor NC	OK
	B.2.4. Has the baseline been established on a project-specific basis?	[1]	Document Review	1. Checked: The baseline scenario is relevant for a large scale wind power project like the proposed project since it is likely to influence the power plants on both the Operating Margin and Build Margin.	OK	OK
	B.2.5. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies and circumstances, such	[1] [9] [14] [12]	Document Review	1. Checked: In determining the baseline emission factor, power plants burning anthracite coal for domestic use is regarded as must-run considering the Korean government's policy for promoting consumption of	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion
	as sectoral reform initiatives, local fuel availability, power sector expansion plans and the economic situation in the project sector?			domestic anthracite coal and thus excluded in calculating the Simple OM. Secondly in estimating the Build Margin, the PDD appropriately takes into account the 2 nd Basic National Plan for Electricity Supply such that its application is better justified. Thirdly, in accordance with the clarification on the treatment of national and/or sectoral policies and regulations provided at the 16 th EB meeting, the baseline scenario takes into account mandatory purchase of renewable-based electricity required by the Electricity Act (enacted in February 1999) assuming that the new scheme to compensate renewable projects for the difference between the benchmark value of per kWh costs for renewable energy and the system marginal price of the grid, as required by the Promotion Act for New and Renewable Energy Development, Utilization, & Dissemination (enacted in March 2002) would not be in place.		
	B.2.6. Is the baseline determination compatible with the available data?	[1][16]	Document Review	1. Checked: According to the Electricity Market Operation Regulation, dispatch data is available for member companies and relevant public organizations only. But, annual electricity generation data for each power plant are publicly available and thus can be readily used for the Simple OM.	OK	OK
	B.2.7. Have the major risks to the baseline been identified?	[1] [4]	Document Review	1. Checked: The estimated power generation by the proposed project as a standard case (244,400MWh, probability: 75%, capacity factor: 28.47%) is deemed relevant.	OK	OK
	B.2.8. Is all literature and sources clearly	[1] [7]	Document Review	1. Checked: official statistics and documents such as the	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion
	referenced?		Review	1996 IPCC Guidelines and Electric Power Statistics of KEPCO are appropriately used in calculating the baseline emission factor.		
	B.3. Description of how the anthropogenic emissions of GHG by sources are reduced below that would have occurred in the absence of the registered CDM project activity <i>Note:</i>					
	B.3.1. Is the discussion and demonstration of the addtionality of the project activity transparent?	[1]	Document Review	1. Major non-conformity 1: As for Step 2 of the Additionality Demonstration Tool, there is no comparison between the alternatives identified and the project activity in terms of return on investment, the reason for which is weakly substantiated.	Major NC	OK
	B.3.2. Is it demonstrated/justified that the project activity itself is not a likely baseline scenario, as applicable, using the additionality demonstration tool proposed by the CDM Executive Board?	[1] [2] [7][8]	Document Review	1. Major non-conformity 1: given the condition, it is obvious that the proposed project is not financially attractive under the baseline scenario since its equity IRR is -3.8%. But an investment comparison between alternative power plants and the proposed project not made as stipulated Option II of Step 2 2. Checked: As for Step 1 of the Additionality Demonstration Tool, nuclear, hydro, fossil fuel and wind-powered plants have been identified as alternatives to the proposed project and it can be concluded that the proposed project is not the only alternative that conforms to all relevant regulations. As for Step 4, existing wind power plants including stand-alone and grid-connected types represent only about 0.03% of total electricity generation capacity in Korea and it can be therefore concluded that they are	Major NC	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
				not common practices in Korea. As for Step 5, the Gangwon Shareholders Agreement shows that CDM registration have had positive impacts on investment decisions of foreign and domestic investors		
	B.3.3. Is it showed why the emissions in the baseline scenario would likely exceed emissions in the project scenario by analyzing both scenarios?	[1]	Document Review	1. Checked: in accordance with the ACM0002 methodology the proposed project emits almost zero greenhouse gases (GHGs) and mainly reduces them through substitution of fossil-fueled grid electricity generation.	OK	OK
	B.4. Description of how the definition of the project boundary related to the baseline methodology selected is applied to the project activity <i>Note:</i>					
	B.4.1. Are the project's spatial (geographical) boundaries clearly defined?	[1]	Document Review	1. Checked: given that the proposed project would be connected to the grid and there are no electricity imports to the grid, the project boundary encompasses the Gangwon wind park and all grid-connected power plants	OK	OK
	B.4.2. Are the project's system (components and facilities used to mitigate GHGs) boundaries clearly defined?	[1]	Document Review	1. Checked: the project's system boundary includes the 49 wind turbines and ancillary facilities.	OK	OK
	B.4.3. Is the project boundary consistent with the baseline methodology selected?	[1]	Document Review	1. Checked: the project boundary is consistent with application of Operating Margin and Build Margin.	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion
	B.5. Details of baseline information, including the date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline <i>Note:</i>					
	B.5.1. Is the detailed baseline information sufficiently provided in Annex 3 to the PDD?	[1]	Document Review	1. Checked: Annex 3 includes sufficient information about power plants on the Operating Margin and Build Margin	OK	OK
	B.5.2. Are the date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline clearly stated?	[1]	Document Review	1. Checked: the date of completion of the baseline study is February 2005 and the person determining the baseline scenario is Dr. Jae-su Jung	OK	OK
	B.5.3. Is the contact information clearly provided and is it indicated that the person/entity is a project participant listed in Annex 1?	[1]	Document Review	1. Checked: the person and entity determining the baseline methodology are indicated in Annex 1 to the PDD	OK	OK
	C. Duration of the Project/ Crediting Period <i>It is assessed whether the temporal boundaries of the project are clearly defined.</i>					
	C.1. Duration of the project activity <i>Note:</i>					
	C.1.1. Has the project's starting date been chosen as the date on which the implementation or construction or real action of the project activity begins?	[1]	Document Review	1. Checked: the construction of the Gangwon Wind Park Project begins in May 2005	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	C.1.2. Is the operational lifetime of the project activity clearly defined and reasonable?	[1]	Document Review	1. Checked: the operational lifetime of the Gangwon Wind Park Project is 20 years and thus considered as relevant for the project activity		
	C.2. Choice of the crediting period and related information <i>Note:</i>					
	C.2.1. In the case of the project started between 1 January 2000 and the date of the registration of a first CDM project activity and requested registration prior to 31 December 2005, does the project provide reliable evidence to demonstrate that?	[1]		Not applicable		
	C.2.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max. two x 7 years or fixed crediting period of max. 10 years)?	[1]	Document Review	1. Checked: the crediting period for the Gangwon Wind Park Project is ten years without renewal	OK	OK
	C.2.3. Is the assumed crediting time chosen as below the operational lifetime of the project activity?	[1]	Document Review	1. Checked: the crediting period chosen is below the operational life time of the wind power systems, 20 years.	OK	OK
	C.2.4. Are the starting date and length of the crediting period clearly and properly stated?	[1]	Document Review	1. Checked: the crediting period starts in January 2007 and lasts over ten years	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	D. Application of a monitoring methodology and plan <i>In this section it is assessed whether the monitoring plan is properly established in accordance with the baseline methodology ensuring reliable emission reductions</i>					
	D.1. Name and reference of approved monitoring methodology applied to the project activity <i>Note:</i>					
	D.1.1. Has the monitoring methodology been previously approved by the CDM Methodology Panel?	[1]	Document Review	1. Checked: the ACM0002 methodology has been applied	OK	OK
	D.1.2. Are the title and reference lists as well as the details of the approved monitoring methodologies in the CDM web site properly referred to?	[1]	Document Review	1. Checked: the CDM website has been properly referred to	OK	OK
	D.2. Justification of the choice of the methodology and why it is applicable to the project activity <i>Note:</i>					
	D.2.1. Is the monitoring methodology the one deemed most applicable for this project and is the appropriateness justified?	[1][13]	Document Review	1. Checked: The ACM0002 methodology relates to grid-connected electricity generation from renewable sources	OK	OK
	D.2.2. Is it transparently showed that the project activity meet the applicability conditions under which the methodology is applicable?	[1][13]	Document Review	1. Checked: The PDD (Project Design Document) shows transparently that the proposed project meet the applicability conditions	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	D.2.3. Does the monitoring methodology reflect good monitoring and reporting practices?	[1]	Document Review	1. Major non-conformity 2: maintaining the main and auxiliary metering equipment and checking electricity generation as a key monitoring indicator reflect good monitoring practices. However monitoring QA/QC procedures should be outlined in the PDD. See Checklist Question D.3	Major NC	OK
	D.2.4. Does the methodology address possible monitoring errors or uncertainties addressed?	[1]	Document Review	1. Minor non-conformity 2: the main and auxiliary metering equipment will be maintained with the allowable error of $\pm 0.2\%$ and $\pm 0.5\%$ respectively. In addition the amount of electricity supplied will be checked at intervals of five minutes. However the monitoring plan should address auxiliary electricity use by the wind turbine itself and auxiliary facilities.	Minor NC	OK
	D.2.5. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for estimation or measuring the greenhouse gas emissions within the project boundary during the crediting period?			Not applicable: wind power projects are regarded as emitting almost zero greenhouse gases (GHGs)		
	D.2.6. Have the formulae used to estimate project emissions been clearly described?			Not applicable		
	D.2.7. Are the formulae consistent with the formulae outlined in the description of the baseline methodology?			Not applicable		
	D.2.8. Will it be possible to monitor / measure project emissions as described in the monitoring plan?			Not applicable		


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	D.2.9. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline emissions during the crediting period?	[1]	Document Review	1. Minor non-conformity 3: electricity generation will be monitored ex post according to the monitoring plan, but a data vintage for the Operating Margin and Build Margin emission factors has not been determined clearly.	Minor NC	OK
	D.2.10. Have the formulae used to estimate baseline emissions been clearly described?	[1]	Document Review	1. Minor non-conformity 4: fill in Section D.2.1.4 of the PDD	Minor NC	OK
	D.2.11. Are the formulae consistent with the formulae outlined in the description of the baseline methodology?	[1]	Document Review	Ditto	Minor NC	OK
	D.2.12. Will it be possible to monitor / measure baseline emissions as described in the monitoring plan?	[1]	Document Review	1. Checked: the schematic diagram of the wind power plants clearly shows that monitoring of electricity delivered to the grid will be OK.	OK	OK
	D.2.13. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage ?			Not applicable: there are no increased emissions identified that occur outside the project boundary		
	D.2.14. Have the formulae used to estimate leakage emissions been clearly described?			Not applicable		
	D.2.15. Are the formulae consistent with the formulae outlined in the description of the baseline methodology?			Not applicable		
	D.2.16. Will it be possible to monitor / measure leakage as described in the monitoring plan?			Not applicable		


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	D.2.17. Have the formulae used to estimate emission reductions been clearly described?	[1]	Document Review	1. Minor non-conformity 5: fill in Section D.2.4 of the PDD	Minor NC	OK
	D.2.18. Are the formulae consistent with the formulae outlined in the description of the baseline methodology?	[1]	Document Review	Ditto	Minor NC	OK
D.3. Quality control (QC) and quality assurance (QA) procedures undertaken for data monitored <i>Note:</i>						
	D.3.1. Are procedures identified for training of monitoring personnel?	[1]	Document Review	1. Major non-conformity 2: since emission reductions attributable to the proposed project are fully determined by electricity delivered to the grid, the amount of electricity supplied is the most important to be monitored and thus should be carefully maintained following relevant QA/QC procedures. An outline of how to assure the quality of monitored data e.g. considering ISO 9001/14001 standards should be therefore given in the PDD	Major NC	OK
	D.3.2. Are procedures identified for emergency preparedness?	[1]	Document Review	Ditto	Major NC	OK
	D.3.3. Are procedures identified for calibration of equipment?	[1]	Document Review	Ditto	Major NC	OK
	D.3.4. Are procedures identified for maintenance of monitoring equipment and installations?	[1]	Document Review	Ditto	Major NC	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	D.3.5. Are procedures identified for monitoring, taking measurements, recording and reporting?	[1]	Document Review	1. Major non-conformity 2: electricity generation by the proposed project will be checked every five minutes. The following procedures, however, should be further developed.	Major NC	OK
	D.3.6. Are procedures identified for review or checks of reported results/data?	[1]	Document Review	1. Major non-conformity 2: the allowable error in the data of electricity generation will be controlled within $\pm 0.2\%$. The following procedures, however, should be further developed.	Major NC	OK
	D.3.7. Are procedures identified for internal audits to confirm that the project has been monitored as planned?	[1]	Document Review	The same as D.3.1 above	Major NC	OK
	D.3.8. Are procedures identified for corrective actions?	[1]	Document Review	Ditto	Major NC	OK
	D.4. Operational and management structure that the project operator will implement in order to monitor emission reductions and any leakage effects, generated by the project activity <i>Note:</i>					
	D.4.1. Is the authority and responsibility of project management clearly described?	[1]	Document Review	1. Minor non-conformity 6: in accordance with section A.3 of the PDD, Unison Co., Ltd is the O&M contractor of the project. However, the authority and responsibility of project management should be clarified in section D.4	Minor NC	OK
	D.4.2. Is the authority and responsibility for monitoring, measurement and reporting project emission,	[1]	Document Review	1. Checked: the authority and responsibility for monitoring electricity generation as well as the OM and BM factors has been described in section D.4	OK	OK


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	baseline emission and leakage data over time clearly described?					
	D.5. Name of person/entity determining the monitoring methodology <i>Note:</i>					
	D.5.1. Is the contact information clearly provided and is it indicated that the person/entity is a project participant listed in Annex I?	[1]	Document Review	1. Checked: the person and entity determining the monitoring methodology are indicated in Annex 1 to the PDD	OK	OK
	E. Estimation of GHG emissions by sources <i>In this section, it is assessed whether the project design address all relevant formulae and data with regard to emission reductions</i>					
	E.1. Estimate of GHG emissions by sources <i>Note:</i>					
	E.1.1. Are all significant direct and indirect GHG emissions within the project boundary estimated for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?			Not applicable: wind power projects are regarded as emitting almost zero greenhouse gases (GHGs)		
	E.1.2. In the case of direct monitoring of emission reductions, are directly estimated emission reductions provided?			Not applicable		
	E.1.3. Are the project emissions calculations documented in a complete and transparent manner?			Not applicable		


 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	E.1.4. Have conservative assumptions been used to calculate project emissions?			Not applicable		
	E.1.5. Are uncertainties in the project emissions estimates properly addressed in the documentation?			Not applicable		
E.2. Estimated leakage <i>Note:</i>						
	E.2.1. Have these leakage effects been properly accounted for in calculations, for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?			Not applicable: there are no increased emissions identified that occur outside the project boundary		
	E.2.2. Are the leakage calculations documented in a complete and transparent manner?			Not applicable		
	E.2.3. Have conservative assumptions been used when calculating leakage?			Not applicable		
	E.2.4. Are uncertainties in the leakage estimates properly addressed?			Not applicable		
E.3. The sum of E.1 and E.2 representing the project activity emissions <i>Note:</i>						
	E.3.1. Does the sum of estimated GHG emissions within project boundary and estimated leakage clearly represent the emissions			Not applicable		

 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	attributable to project activity?					
	E.4. Estimated anthropogenic emissions by sources of greenhouse gases of the baseline <i>Note:</i>					
	E.4.1. Are all baseline emissions identified in the baseline methodology estimated for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?	[1]	Document Review	1. Checked: the baseline emissions for the proposed project have been estimated using the Simple OM as described in the ACM0002 methodology	OK	OK
	E.4.2. Are the baseline emissions calculations documented in a complete and transparent manner?	[1][15]	Document Review	1. Minor non-conformity 1: some renewable-based power plants such as LFG (Landfill Gas) utilization plants are excluded from the sample plants on the Build Margin. See Checklist Question B.2.3	Minor NC	OK
	E.4.3. Have conservative assumptions been used when calculating baseline emissions?	[1][15]	Document Review	1. Minor non-conformity 1: estimation of the Build Margin emission factor is not conservative in that some renewable-based power plants such as LFG (Landfill Gas) utilization plants are excluded from the sample plants on the Build Margin. See Checklist Question B.2.3	Minor NC	OK
	E.4.4. Are uncertainties in the baseline emission estimates properly addressed in the documentation?	[1]	Document Review	1. Checked: power plants whose auxiliary use is less than 15% are considered in calculating the Simple OM	OK	OK

 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	E.5. Difference between E.4 and E.3 representing the emission reductions of the project activity <i>Note:</i>					
	E.5.1. Does difference between the project emissions and baseline emissions clearly represent the emission reductions due to the project activity?	[1]	Document Review	1. Checked: since it is assumed that the proposed project releases almost zero greenhouse gases (GHGs), electricity generation displaced by the project is equal to the emission reductions attributable to the project.	OK	OK
	E.6. Table providing values obtained when applying formulae above <i>Note:</i>					
	E.6.1. Are all significant values obtained from calculation provided in the Table?	[1]	Document Review	1. Checked: Table 7 in the PDD provides key values for estimating emission reductions.	OK	OK
	E.6.2. In the case of ex post calculation of baseline emission rates, Has proper justification been provided?			Not applicable: historical data is used in estimating baseline emissions		
	F. Environmental Impacts <i>In this section, it is assessed whether documentation on the analysis of the environmental impacts is properly assessed.</i>					
	F.1. Documentation on the analysis of the environmental impacts, including transboundary impacts <i>Note:</i>					
	F.1.1. Is the project likely to create any adverse environmental effects?	[1] [3]	Document Review	1. Checked: the Preliminary Environmental Review (PER) identified several adverse impacts on	OK	OK

 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion
				landscape, birds, etc.		
	F.1.2. Has an analysis of the environmental impacts of the project activity been sufficiently described?	[1] [3]	Document Review	1. Checked: an analysis of the environmental impacts of the project activity is provided in the Preliminary Environmental Review (PER) report	OK	OK
	F.1.3. Are transboundary environmental impacts considered in the analysis?	[1] [3]	Document Review	1. Checked: no significant transboundary impacts have been identified	OK	OK
	F.2. Provision of conclusions and all references to support documentation of an EIA undertaken in accordance with the procedures as required by the Host Party (if environmental impacts are considered significant by the project participants or the Host Party) <i>Note:</i>					
	F.2.1. Does the project comply with environmental legislation in the host country including requirements for an Environmental Impact Assessment?	[1] [3] [12]	Document Review	1. Checked: pursuant to the Basic Environmental Policy Act the proposed project has undertaken a Preliminary Environmental Review (PER)	OK	OK
	F.2.2. Have identified environmental impacts been addressed in the project design?	[1] [3]	Document Review	1. Checked: the Environmental Monitoring and Inspection Committee has been established in consultation with the Wonju Regional Environmental Office to address any adverse impacts on the project site by actual operation	OK	OK

 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
G. Stakeholder Comments <i>In this section, it is assessed whether comments from local stakeholders have been invited and due account has been taken of any comments received.</i>						
G.1. Brief description how comments by local stakeholders have been invited and compiled <i>Note:</i>						
G.1.1.	Is the process clearly described by which comments by local stakeholders have been invited and compiled?	[1] [6]	Document Review	1. Checked: an open forum was held in January 2002 to invite comments from stakeholders including NGOs, central and local government officers, and researchers, particularly addressing concerns about the Baekdudaegan Mountains where the proposed project will be constructed.	OK	OK
G.1.2.	Has an invitation for comments by local stakeholders made in an open transparent manner, in a way that facilitates comments to be received from local stakeholders and allow for a reasonable time for comments to be submitted?	[1] [6]	Document Review	Ditto	OK	OK
G.1.3.	Has detailed description of the project activity been provided in a manner which allows the local stakeholders to understand project activity?	[1] [6]	Document Review	1. Checked: Unison Co., Ltd, one of project participants made a presentation on the proposed project activity and potential environmental impacts at the open forum	OK	OK

 KEMCO	Validation Checklist	Reference	Assessment Methods	Comments	Draft Conclusion	Final Conclusion.
	G.2. Summary of the comments received <i>Note:</i>					
	G.2.1. Have relevant stakeholders been consulted?	[1] [6]	Document Review	1. Checked: comments from stakeholders including NGOs, central and local government officers, and researchers were invited at the open forum	OK	OK
	G.2.2. Is a summary of the comments received provided?	[1] [6]	Document Review	1. Checked: concerns about protection of the Baekdudaegan Mountains, environmental impacts caused by construction of the wind turbines, and impacts on aviation and military facilities, etc. were raised by stakeholders	OK	OK
	G.3. Report on how due account was taken of any comments received <i>Note:</i>					
	G.3.1. Has due account been taken of any comments received?	[1] [6]	Document Review, Interview	1. Minor non-conformity 7: in order to address protection of the Baekdudaegan Mountains, one of the most serious concerns raised by stakeholders, a group of NGOs, experts, government officers and the project entity, set up the committee and planned to monitor environmental impacts regularly during the period from 2005 to 2008. However, in an interview with a representative for the Association for Protection of the Baekdudaegan Mountains, serious concern over rehabilitation of the project site after completion of construction was raised. This issue has not been addressed properly in the PDD. In addition, protective measures for the Baekdudaegan Mountains should be described in detail e.g. the number of turbines reduced	Minor NC	OK

Appendix C

Review of Corrective Actions

Non-conformities	Reference	Corrective Actions	Comments
1. Major non-conformity 1: given the condition, it is obvious that the proposed project is not financially attractive under the baseline scenario since its equity IRR is -3.8%. However, there is no comparison between the alternatives identified and the project activity in terms of return on investment as stipulated by Option II of Step 2 for demonstrating additionality, the reason for which is weakly substantiated.	Checklist A.4.5, B.3.1~2	Unit cost of electricity production was selected as the financial indicator for investment comparison analysis (Step 2, sub-step 2b Option II). As a result of the analysis, some alternatives such as nuclear and coal power plants represent better economics than the proposed project. It is, therefore, concluded that the proposed CDM project is unlikely to be the most financially attractive.	The cost per unit of generated electricity for the proposed project and the alternative resources was calculated properly with data currently available. In addition, the investment comparison analysis reach the conclusion appropriately in accordance with the procedures described in the Tool for the demonstration and assessment of additionality
2. Major non-conformity 2: since emission reductions attributable to the proposed project are fully determined by electricity delivered to the grid, the amount of electricity supplied is the most important to be monitored and thus should be carefully maintained following relevant QA/QC procedures. An outline of how to assure the quality of monitored data should be therefore given in the PDD.	Checklist D.2.3, D.3.1~8	QA/QC procedures for monitoring equipment, handling of data monitored and staff in charge of monitoring and electricity safety, have been established. In addition, internal audit procedures have been set up in case the system does not work properly.	The QA/QC procedures submitted are deemed relevant for the proposed project since it appropriately addresses monitoring equipment, data, staff and internal audits
3. Minor non-conformity 1: estimation of the Build Margin emission factor is not conservative in that some renewable-based power plants such as LFG (Landfill Gas) utilization plants are excluded from the sample plants on the Build Margin	Checklist B.2.3, E.4.2~3	The Build Margin has been re-calculated taking into account recently built LFG plants based on KEPCO (Korea Electric Power Corporation) statistics.	It is concluded that the re-calculated Build Margin is accurate, conservative and relevant for the proposed project.
4. Minor non-conformity 2: the monitoring plan should address auxiliary electricity use by the wind turbine itself and auxiliary facilities	Checklist D.2.4	The revised monitoring plan states that electricity consumption in the plants and transmission lines to the grid will be measured by a two-way meter and be accordingly excluded from total electricity generation by the wind turbines.	The revised monitoring plan prevents over-estimated credits from the proposed project by monitoring net electricity generation to the grid.

Non-conformities	Reference	Corrective Actions	Comments
5. Minor non-conformity 3: electricity generation will be monitored ex post according to the monitoring plan, but a data vintage for the Operating Margin and Build Margin emission factors has not been determined clearly.	Checklist D.2.9	The OM and BM factors have been determined ex ante, once at the time of PDD submission while electricity generation by the proposed project will be updated based on ex post monitoring.	The data vintage for the Operating Margin and Build Margin emission factors has been determined clearly in the revised monitoring plan.
6. Minor non-conformity 4: describe the formulae used to estimate baseline emissions in Section D.2.1.4 of the PDD	Checklist D.2.10~11	The revised Section D.2.1.4 describes the formulae used to estimate baseline emissions	The formulae is accurate and consistent
7. Minor non-conformity 5: describe the formulae used to estimate emission reductions in Section D.2.4 of the PDD	Checklist D.2.17~18	The revised Section D.2.4 describes the formulae used to estimate emission reductions	The formulae is accurate and consistent
8. Minor non-conformity 6: the authority and responsibility of project management should be clarified in Section D.4	Checklist D.4.1	The operational and management structure for the project activity including monitoring of emission reductions and leakage effects has been described in Section D.4	The operational and management structure for the project activity is properly described in Section D.4
9. Minor non-conformity 7: In an interview with a representative for the Association for Protection of the Baekdudaegan Mountains, serious concerns over rehabilitation of the project site after completion of construction were raised. This issue has not been addressed properly in Section G.3 of the PDD. In addition, protective measures for the Baekdudaegan Mountains should be described in detail e.g. the number of turbines reduced	Checklist G.3.1	The revised Section G.3 describes that to address serious concerns over protection of the Baekdudaegan Mountains the project proponents cut the number of wind turbines from 103 units to 49 units in total and had a plan to rehabilitate the project site right after completion of the construction.	It is concluded that the project proponents had taken due account of stakeholders' comments received, which is properly addressed in the project documentation.