

Validation Report

Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW)


KEMCO


24 July 2009


Korea CDM Certification Office
KOREA ENERGY MANAGEMENT CORPORATION


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 KEMCO	<h1>Validation Report</h1>		Contract No. CDMC07-006	
Validation Methodology	1. Desk Review 2. On-site Assessment 3. Review of Corrective Actions:			
Project Participants	Korea East-West Power Co., Ltd	Management Representative	Jae-su Jung	
Project Title	Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW)			
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Project Location	Gyoro-Ri, Seckmun-Moen, Dangjin-Gun	Tel		
		Fax		
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		FAX	+82-2-3456-8499	
		E-mail	jongbhwa@ewp.co.kr	
Category	Energy Industries (renewable energy sources)			
Scope	The validation scope for the proposed CDM project includes: <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	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.			
Validation Criteria	UNFCCC, Kyoto Protocol, Marrakesh Accords, Decision 3, 4/CMP.1, Relevant CDM EB Decisions			
Validation Date	1. Desk Review: 13 Dec 2007 ~ 17 Dec 2007 2. On-site Assessment: 20 Dec 2007 ~ 18 Jan 2008 3. Review of Corrective Actions: 10 Mar 2008 ~ 17 Mar 2008			

 KEMCO	<h1 style="text-align: center;">Validation Report</h1>		Contract No. CDMC07-006
Validation Results	<p>1 Summary of the project activity</p> <p>The Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW) involves generation of electricity using cooling water from the thermal power plant. The electricity generated will be exported to the grid and thus displace electricity produced from fossil fuel fired plants and result in reduced GHG emissions. The installed capacity of the project is 5MW (three 1.666 kW turbines) and the yearly generation of electricity is likely to be 27,899 MWh. The estimated emission reductions due to the project are 150,960 tCO₂e for 10 years of the crediting period, with annual average reduction of 15,096 tones of CO₂e.</p> <p>The small hydroelectric power project is located in the inside of the Dangjin thermal power plant in Gyoro-Ri, Seckmun-Moen, Dangjin-Gun Chungcheonnang-Do, Republic of Korea. The purpose of the this project is to make clean energy and maximize the energy efficiency by utilizing sea water which is used as cooling water in the thermal power plant.</p> <p>Thus, the project is expected to significantly contribute to sustainable development in Korea by utilizing renewable and clean energy sources in respect of:</p> <ul style="list-style-type: none"> - Reduction of GHG emissions and other air pollutants; - Saving energy by using renewable energy in place of fossil fuel; - Being consistent with national policies on renewable energy promotion. 		

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Validation Results	<h2>2 Principles</h2> <p>The project design document (PDD) of the proposed project is assessed based on the following principles</p> <h3>2.1 Completeness</h3> <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> <h3>2.2 Consistency</h3> <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. <h3>2.3 Accuracy</h3> <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> <h3>2.4 Transparency</h3> <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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	<div> <div>Validation Results</div> <div> <h2>2.5 Relevance</h2> <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> <h2>2.6 Conservativeness</h2> <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> <h2>3 Definitions of non-conformities and observations</h2> <h3>3.1 Non-conformities</h3> <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 (CAR) 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 (CL) includes, inter alia: <ul style="list-style-type: none"> • unclear data sources; • minor miscalculation and misstatements <h3>3.2 Observations</h3> <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> </div> </div>		

2.5 Relevance

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.

2.6 Conservativeness

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

3 Definitions of non-conformities and observations


3.1 Non-conformities


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.


- Major non-conformity (CAR) includes, inter alia:
 - 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 (CL) includes, inter alia:
 - unclear data sources;
 - minor miscalculation and misstatements


3.2 Observations


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.


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Validation Results	<h2>4 Desk review</h2> <p>The desk review has been made during the period from 13 December to 17 December by reviewing documents submitted by the project participants including the Project Design Document and supporting documentation in respect of completeness, consistency, accuracy, transparency, relevance, and conservativeness. The Validation Criteria, against which the project documentation is assessed, include the CDM modalities and procedures determined by the Marrakech Accords and relevant CDM EB decisions, and 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 - Environmental Impacts. <p>The scope of desk review depends primarily on the information provided by the project participants and could be extended by using additional reliable information which the Validation Team obtained from other sources.</p>		
	<h3>4.1 Validation findings</h3> <p>The proposed project - 5 MW small hydroelectric power project - applied the approved baseline and monitoring methodologies for small-scale projects. As the project generates electricity utilizing renewable sources and supplies it to the grid, Category I.D, Grid-connected renewable electricity generation (version 12) is applied. Given that the electricity system in Korea comprise nuclear power and renewable-based power as well as fuel oil and diesel fuel, and low operating cost/must run resources comprise less than 50% of total electricity generation in the national grid, the project adopted as a baseline emission factor the weighted average of the Simple OM (Operating Margin) and Build Margin emission factors. The formulae for the emission factors were consistently used in the monitoring plan.</p>		


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Validation Results	<p>In particular, the team cross-checked key data for determination of the baseline grid emission factor including net electricity generation, fuel consumption, net calorific value, etc. with the most recent versions (2005, 2006, and 2007) of Electric Power Statistics published by KEPCO (Korea Electric Power Corporation) at the commencement of validation as well as 2006 IPCC Guidelines. It is therefore concluded that determination of the baseline emission factors are well substantiated.</p> <p>In order to demonstrate the project's additionality, the PDD analyzed investment barriers and showed that the project is not financially attractive under the baseline scenario. The 30-year period of assessment in the investment analysis is deemed appropriate for the proposed project because the project involves installation of hydro power facilities using cooling water inside a thermal power plant. In general, the operational lifetime of power plants is 30 years in the host country. As for its environmental impacts on the local area, the host country legislation does not require an analysis of the environmental impacts of the project activity because of the small-scale nature of the hydro power projects. The project participant has made plans to publicize and to receive comments from relevant stakeholders.</p> <p>The validation team identified several items as follows that need to be further checked:</p> <ul style="list-style-type: none"> - Selection of a capacity factor for the proposed project is not clearly specified in the PDD. (see Appendix B, B.3.2); - Descriptions about national policies on the use of renewable energies are not provided in the PDD. (see Appendix B, B.3.4); - The additionality of the proposed project is weakly justified. (see Appendix B, B.3.2); - Validity of the version of the selected approved methodologies for small scale projects of the proposed project. (see Appendix B, B.1) - There seems to be inconsistency in using the most recent power generation statistics in order to calculate the OM and BM (see Appendix B, B.2.4); - Documentary evidences on environmental impacts by the hydroelectric power plants and the receipt of stakeholder comments will be further checked during the onsite assessment. (see Appendix B, F, G); 		


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Validation Results	<p>Based on the results 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. Additional documents and revised sections of PDD to be submitted prior to on-site assessment (deadline: 21 December 2007) are:</p> <ol style="list-style-type: none"> 1) 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 Appendix B, A.3.3~4); 2) Detailed descriptions about national policies on use of renewable energy (see Appendix B, B.3.4); 3) Supplementary documents to justify selection of a capacity factor for the proposed project (see Appendix B, B.3.2); 4) Supplementary documents on the justification of assumptions for investment barriers(NPV calculation) in developing the proposed project (see Appendix B, B.3.2); 5) Validity of the using AMS. I.D version (10) (see Appendix B, B.1); 6) Re-calculation of the Operating Margin and Build Margin in a transparent and conservative manner (see Appendix B, B.2.4, E.1.12~13); 7) Clarification on how to compile and invite comments of local stakeholders (see Appendix B, G.1.1~3.1). 		

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Validation Results	<h2>5 On-site assessment and interview</h2> <p>On-site assessment has been performed during the period from 20 December 2007 to 18 January 2008 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 three aspects below:</p> <ol style="list-style-type: none"> 1) The capacity factor of the proposed project; 2) Demonstration of investment barriers to implementation of the proposed project; and 3) Coverage of significant factors in the monitoring plan. <p>The major means of validation is by cross-check between documents and interviews with relevant persons. The key persons interviewed at the on-site assessment are as below:</p> <ol style="list-style-type: none"> 1) Park, Chan-Hyeok, Assistant Manager, Construction Team, Korea East-West Power Co., LTD, Dangjin Thermal Power Plant; and 2) Lee, Jun Woo, Manager, Headquarter, Korea East-West Power Co., LTD <p>As a result of the on-site assessment, the Validation Team requests the project participants to take corrective actions against eight non-conformities i.e. four Major non-conformities (CAR) and four Minor non-conformities (CL) identified within the deadline, 19 February 2008, as agreed in the Validation Contract.</p> <h3>5.1 On-site assessment findings</h3> <h4>Legal aspects</h4> <p>First, the Validation Team examined whether the proposed project is in compliance with relevant legislation in the country. The team reviewed relevant documents such as the License for Power Generation issued by the Ministry of Commerce, Industry and Energy to check whether the project is in compliance with local legislation.</p>		

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Validation Results	<p>Additionality</p> <p>In regards to verification of project additionality, the validation team checked the documents for determination of initial investment costs and other financial data such as discount rate, fuel costs and NPV. In accordingly, the PDD showed that the project is not financially attractive under the baseline scenario by performing investment barrier analysis.</p> <p>It was further validated that the sensitivity analysis for the project activity was properly carried out considering both negative and positive variations in major variables such as total investment costs, O&M costs, and electricity tariff. Results of the sensitivity analysis were confirmed by assessing the appropriateness of the assumed variations in the cash flow and noting that the NPV remains below zero under the favorable conditions assumed. Finally it is concluded that the statement that the proposed project activity under baseline scenario is not considered a financially attractive course of action was properly justified.</p> <p>Monitoring plan</p> <p>The validation team checked the monitoring plan of the proposed project and confirmed that the monitoring of electricity delivered to the grid by the proposed project will be undertaken in accordance with ‘Act on Measurement’ and ‘Regulation on Operation of Electricity Market’. In addition, it was checked that the QA/QC procedures for the proposed project had been appropriately established.</p> <p>Environmental impacts and stakeholder’s comments</p> <p>In accordance with the Act on Assessment of Impacts of Works on Environment, Traffic, and Disasters the project developer undertook the consultation process with the Ministry of Commerce, Industry and Energy since the proposed project will modify the Dangjin Thermal Power Plants which had already undertaken an Environmental Impact Assessment prior to the time of commissioning.</p>		

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Validation Results	<p>In accordance with the consultation process, the project developer reviewed environmental impacts by the proposed project and reported to the Ministry of Commerce, Industry and Energy how to reduce the potential environmental impacts. The validation team concluded that the project was not likely to create any adverse environmental effects</p> <p>As per stakeholders' comments, the project participant has plans to hold a public meeting to invite comments from relevant stakeholders. Meanwhile, the project participant has used the media (Korea's public service broadcaster, KBS, 2004.02.03) to announce the construction plan of the proposed project.</p> <p>However, it is not transparently described in the project design document (PDD) how comments of local stakeholders will be invited. Furthermore, the project participant should clearly describe how the capacity factor of the proposed project is determined. The PDD should also provide complete monitoring plan including the monitoring plans for auxiliary consumption. In regards to proving additionality, the PDD should further clarify NPV calculation in the investment analysis of the proposed project by reliable documents. In addition, the PDD does not specify description on national policies on the use of renewable energy and the transfer of environmentally friendly technology through the proposed project. Major and minor non-conformities identified during the assessment is summarized as follows:</p>		
	<ol style="list-style-type: none"> 1. Major Non-conformity 1: A capacity factor of the proposed project should be justified by more detailed feasibility studies. (see Appendix B. A.4.5) 2. Major Non-conformity 2: The version of the selected approved methodologies for small scale projects in the PDD is outdated. (see Appendix B. B.1.1, D.1.1) 		

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Validation Results	<ol style="list-style-type: none"> 3. Major Non-conformity 3: NPV calculation in the investment analysis of the proposed project has not been substantiated by reliable documents. (see Appendix B. B.3.2) 4. Major Non-conformity 4: Calculation of the baseline emission factor is not correct. (see Appendix B. E.1.11~14) 5. Minor Non-conformity 1: Further elaboration on the transfer of environmentally friendly technology through the proposed project should be made. (see Appendix B. A.4.6); 6. Minor Non-conformity 2: The PDD does not specify description on national policies on use of renewable energies. (see Appendix B. B.3.4); 7. Minor Non-conformity 3: The monitoring plan is not complete because it does not address the monitoring of auxiliary consumption. (see Appendix B. D.3.3); and, 8. Minor Non-conformity 4: Comments of local stakeholders have not been invited. (see Appendix B. G.1~3). <p>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>		

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6 Review of corrective actions

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 10 March 2008 to 17 March 2008. Corrective actions of the project proponents and conclusions of the validation team are as follows:

1) Major non-conformity 1


- A. Corrective Actions:** Estimated electricity generation is described in the Project Design Document (PDD) based on the Purchase Agreement of Generation Facilities.
- B. Conclusions:** Estimated electricity generation and capacity factor of the proposed project is well substantiated.

2) Major non-conformity 2


- A. Corrective Actions:** The revised PDD corrected the version of the selected approved methodologies for small scale projects.
- B. Conclusions:** The PDD has applied the currently valid baseline and monitoring methodologies.


3) Major non-conformity 3


- A. Corrective Actions:** NPV for the proposed project is re-calculated with total investment costs and discount rate for the proposed project as described in the Report on Re-estimation of Construction Costs (24/03/2008).
- B. Conclusions:** NPV for the proposed project is appropriately re-calculated. In particular, total investment costs and discount rate for the proposed project are properly referenced.


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Validation Results	<p>4) Major non-conformity 4</p> <p>A. Corrective Actions: The baseline emission factor for the proposed project is re-calculated.</p> <p>B. Conclusions: The baseline emission factor for the proposed project is correctly re-calculated.</p> <p>5) Minor non-conformity 1</p> <p>A. Corrective Actions: The revised PDD mentions that the proposed project is the first small hydro power project for Korea East-West Power Co., Ltd. the project participant and thus will bring much know-how on O&M to the company.</p> <p>B. Conclusions: The revised PDD elaborates upon the transfer of environmentally friendly technology through the proposed project.</p> <p>6) Minor non-conformity 2</p> <p>A. Corrective Actions: The revised PDD provides details about national policies to promote use of renewable energies.</p> <p>B. Conclusions: The revised PDD sufficiently addresses national policies to promote use of renewable energies.</p> <p>7) Minor non-conformity 3</p> <p>A. Corrective Actions: The monitoring plan is revised such that net electricity generation supplied to the grid will be monitored</p> <p>B. Conclusions: The monitoring plan appropriately addresses the monitoring of auxiliary consumption.</p> <p>8) Minor non-conformity 4</p> <p>A. Corrective Actions: Via homepage, comments of local stakeholders have been invited. As such summary of the comments received and how to handle those comments are described in the PDD.</p> <p>B. Conclusions: The revised PDD sufficiently addresses stakeholders' comments.</p>		


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Validation Results	<Summary Table : Validation of Key Values>		
	Input Values	Reference Document	Notes
	Total investment	- Korea East-West Power Co., Ltd., Report of Re-estimation of Construction Costs for Dangjin Small Hydropower Facility, 24 Mar. 2008.	Conservative value comparing to the total investment costs presented in the Feasibility Study Report, Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant (19 Oct. 2007).
	O&M costs	- KOPEC (Korea Power Engineering Corporation), Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant, 19 Oct. 2007.	Supported by the Research Report on Compensation of the Difference between the SMP (System Marginal Price) and the Reference Electricity Tariff for New and Renewable Energy published by the Ministry of Commerce, Industry, and Energy (31/03/2006).
	Electricity tariff	- Electric Power Statistics Information System operated by Korea Power Exchange (KPX) (http://www.kpx.or.kr/epsis/)	Electricity tariff for small hydropower projects during the period of 01/01/2006 and 31/12/07
	Discount rate	- Korea East-West Power Co., Ltd., Report of Re-estimation of Construction Costs for Dangjin small hydro power facility, 24 Mar. 2008.	WACC (Weighted Average Cost of Capital) for Korea East-West Power Co., Ltd. The value comes from the Investment Analysis Model developed by the Financing Team of the project proponent on 21 Aug 2007.
	Project start date	- Korea East-West Power Co., Ltd. Purchase Agreement of Dangjin Small Hydropower Equipment (Volume I, II), 25 January 2008	
	Baseline emission factors	- Korea Electric Power Corporation (KEPCO), Statistics of Electric Power in Korea, 2005, 2006, and 2007 - Korea Power Exchange (KPX), Status of Power Generation Facility, 2007	The most recent versions of Electric Power Statistics published by KEPCO at the commencement of validation


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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 the “Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW)” had been posted for 30 days on the UNFCCC CDM website for public comments from 24 Nov. 2007 to 23 Dec. 2007. As a result, no comments have been received.</p> <p>8 Issuance of written approvals</p> <p>The Validation Team has received from the participants the written approvals issued by the designated national authorities of the Party involved in Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW) (issued on 20 June 2008), which states the following:</p> <ol style="list-style-type: none"> 1) The Party, Republic of Korea approves that its participation in Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW) is voluntary 2) The Korean government, the host Party of Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW) confirms the project activity contributes significantly to sustainable development in Korea. 3) The Party, Republic of Korea authorizes the project participants indicated in the PDD to participate in Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW). <p>The team also confirmed the project title and the project participants described in the letter and the authenticity of the letter by cross-checking it with other letters previously issued by the Korean DNA.</p> <p>9 Internal Quality Control</p> <p>The final validation report has been reviewed by two Review Members qualified in the relevant sectoral scopes in accordance with KEMCO’s Committee Operation Procedure mainly in terms of validation procedures and results, and approved by Director of Korea CDM Certification Office.</p>		


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Validation Results	<p>10 Request for review</p> <p>1) Reasons for Request 1: The DOE should clarify how it has validated the investment analysis, in line with EB 41, Annex 45, in particular: a) whether the 30-year period of assessment is appropriate, taking into account the validated operational lifetime of 45 years and that no salvage value is considered in the analysis; b) the sensitivity analysis, as this was not mentioned in the validation report; and c) whether the input values used are appropriate and applicable to the project activity. The DOE should provide a positive validation opinion regarding the assumptions used.</p> <p>A. Comments from KEMCO</p> <p>i. Whether the 30-year period of assessment is appropriate, taking into account the validated operational lifetime of 45 years and that no salvage value is considered in the analysis :</p> <p>The Validation Team is of the opinion that the 30-year period of assessment is appropriate for the proposed project because the project involves installation of hydro power facilities using cooling water inside a thermal power plant. In general, the operational lifetime of power plants is 30 years in the host country. But, the Validation Team acknowledges that there are discrepancies between 30-year period of assessment and operational lifetime of 45 years. So, it is further confirmed that the PDD is revised such that operational lifetime of 30 years is used for the proposed project.</p> <p>With regards to the salvage value, the Regulation for Accounting of Electricity Generation Business (effective period: 6 Apr 2002 ~ present) states that salvage value is zero for the purpose of accounting of electricity generation business. So, it is justified that NPV for the proposed project is calculated considering no salvage value. In conclusion, it is confirmed that 30-year period of assessment and use of no salvage value is appropriate for the proposed project.</p>		



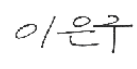
 KEMCO	<h1 style="text-align: center;">Validation Report</h1>		Contract No. CDMC07-006
Validation Results	<p>ii. The sensitivity analysis, as this was not mentioned in the validation report:</p> <p>As per paragraph 16, Annex 45 of EB 41 stating that only variables, including the initial investment cost, that constitute more than 20% of either total project costs or total project revenues should be subjected to reasonable variation, it was validated that the sensitivity analysis for the project activity was properly carried out considering both negative and positive variations in major variables such as total investment costs, O&M costs, and electricity tariff.</p> <p>Results of the sensitivity analysis were confirmed by assessing the appropriateness of the assumed variations in the cash flow and noting that the NPV remains below zero under the favorable conditions assumed. Finally it is concluded that the statement that the proposed project activity under baseline scenario is not considered a financially attractive course of action was properly justified. This assessment will be added in the Validation Report.</p> <p>iii. Whether the input values used are appropriate and applicable to the project activity:</p> <p>As per Annex 45, EB 41 stating that Input values used in all investment analysis should be valid and applicable at the time of the investment decision taken by the project participant, the KEMCO Validation Team assessed the appropriateness of total investment costs, O&M costs, electricity tariff, and discount rate by cross-checking the Feasibility Study Report of Dangjin Hydropower Project published in Oct 2007. It was also noted that this Feasibility Study Report was the most relevant document that was available at the point of investment decision by the project developer, viz. 25 Jan 2008.</p>		

<div> KEMCO</div>		<h1>Validation Report</h1>		<div>Contract No.</div> <div>CDMC07-006</div>										
<div>Validation Results</div>		<p>Total investment costs: The appropriateness of total investment costs for the proposed project, i.e. 24,280 mil.KRW is assessed by referring to the Feasibility Study Report and Internal Report on Re-estimation of Construction Costs for Dangjin small hydro power facility. Particularly, it is noted that even though the internal report is published later than the time of investment decision, the project proponent uses the investment costs stated in the report because the value is more conservative than that of the Feasibility Study Report as demonstrated in the table below:</p>												
		<table><tr><th>Total investment cost</th><th>Reference</th><th>Note</th></tr><tr><td>25,840 mil.KRW</td><td>KOPEC (Korea Power Engineering Corporation), Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant, 19 Oct. 2007.</td><td></td></tr><tr><td>24,280 mil.KRW</td><td>Korea East-West Power Co., Ltd., Internal Report on Re-estimation of Construction Costs for Dangjin small hydro power facility, 24 Mar. 2008.</td><td>This value is used in calculating NPV for the proposed project</td></tr></table>				Total investment cost	Reference	Note	25,840 mil.KRW	KOPEC (Korea Power Engineering Corporation), Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant, 19 Oct. 2007.		24,280 mil.KRW	Korea East-West Power Co., Ltd., Internal Report on Re-estimation of Construction Costs for Dangjin small hydro power facility, 24 Mar. 2008.	This value is used in calculating NPV for the proposed project
		Total investment cost	Reference	Note										
25,840 mil.KRW	KOPEC (Korea Power Engineering Corporation), Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant, 19 Oct. 2007.													
24,280 mil.KRW	Korea East-West Power Co., Ltd., Internal Report on Re-estimation of Construction Costs for Dangjin small hydro power facility, 24 Mar. 2008.	This value is used in calculating NPV for the proposed project												
<p>O&M costs: The appropriateness of O&M costs for the proposed project, i.e. 2.5% of total investment costs is assessed by referring to the Feasibility Study Report and the Research Report on Compensation of the Difference between the SMP (System Marginal Price) and the Reference Electricity Tariff for New and Renewable Energy published by the Ministry of Commerce, Industry, and Energy (31/03/2006). It is noted that the report performs financial analysis for small scale hydropower projects in the host country assuming that O&M costs constitute 3% of total investment costs. It is therefore concluded O&M costs are conservative and appropriate for the proposed project.</p>														

 KEMCO	<h1 style="text-align: center;">Validation Report</h1>		Contract No. CDMC07-006
Validation Results	<p>Electricity tariff: NPV is calculated using average electricity tariff for small hydropower projects during the period of 01/01/2006 and 31/12/07. The Validation Team confirmed this value by cross-checking the homepage of the Electric Power Statistics Information System operated by Korea Power Exchange (KPX) (http://www.kpx.or.kr/epsis/).</p> <p>Discount rate: As stated in the sub-step 2b (6) of the Additional Tool (Version 05.2), weighted average costs of capital (WACC) are chosen as a discount rate for the project. The project proponent selects 6.2% as the discount rate as described in the Internal Report on Re-estimation of Construction Costs for Dangjin small hydro power facility (24 Mar. 2008). It is further noticed that the value, 6.2% originally comes from the Investment Analysis Model developed by the Financing Team of the project proponent on 21 Aug 2007.</p> <p>In conclusion, the KEMCO Validation Team is of the opinion that all the input values for the investment analysis are in conformity with the guidance issued by the EB and appropriate in the context of the proposed project.</p>		

 KEMCO	<h1 style="text-align: center;">Validation Report</h1>		Contract No. CDMC07-006
Validation Results	<h2>11 Validation opinion</h2> <p>The KEMCO Validation Team has undertaken validation of the proposed project which claimed approximately 15,096 CO₂eq ton annually by installing photovoltaic system and solar water heaters. 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, Decision 3, 4/CMP.1 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 (13 Dec 2007 ~ 17 Dec 2007), on-site assessment (20 Dec 2007 ~ 18 Jan 2008) and review of corrective actions (10 Mar 2008 ~ 17 Mar 2008).</p> <p>As a result of the desk review and on-site assessment, the validation team identified four Major non-conformities (CAR) and four Minor non-conformities (CL) 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 “Korea East-West Power Dangjin Small Hydro Power Plant Project (5MW)” is in full compliance with all applicable 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 GHG emissions and other air pollutants, energy saving by using renewable energy in place of fossil fuel as well as being consistent with national policies on renewable energy promotion.</p>		

 KEMCO	<h1 style="text-align: center;">Validation Report</h1>		Contract No. CDMC07-006
Validation Results	<h2>12 References</h2> <p>Documents and electronic files submitted by the Project Participants</p> <ul style="list-style-type: none"> [1] Ecoeye Co., Ltd. Project Design Document, version 13 dated 5 Jun. 2009 [2] Ecoeye Co., Ltd. Investment Analysis Excel Spreadsheet, dated 10 Oct. 2008 [3] Korea Power Engineering Corporation, Small Hydropower Basic Design Report for Dangjin SmallHydro Power Plant, 19 Oct. 2007 [4] Korea East-West Power Co., Ltd. Report on Re-estimation of Construction Costs, 24 March 2008 [5] Korea Power Exchange (KPX), Electric Power Statistics Information System (http://www.kpx.or.kr/epsis/) [6] Korea East-West Power Co., Ltd. Purchase Agreement of Dangjin Small Hydropower Equipment (Volume I, II), 25 January 2008 		
	<p>Documents and websites referred to by KEMCO</p> <ul style="list-style-type: none"> [7] http://cdm.unfccc.int/DNA [8] http://unfccc.int/files/essential_background/kyoto_protocol/application/pdf/kpstats.pdf [9] http://cdm.unfccc.int/methodologies/SSCmethodologies/approved.html [10] http://www.moleg.go.kr (Ministry of Government Legislation, in Korean only) [11] IPCC, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories [12] Korea Electric Power Corporation (KEPCO), Statistics of Electric Power in Korea, 2005, 2006, and 2007 [13] Korea Power Exchange (KPX), Status of Power Generation Facility, 2007 		

 KEMCO	<h1 style="text-align: center;">Validation Report</h1>				Contract No.
					CDMC07-006
Validation Team	Role	Name	Organization /position	Scope of Validation	Signature
	Team Leader, Validator	Han, Seung Ho	KEMCO	Baseline methodology, Monitoring methodology, Estimation of GHG emissions	
	Validator	Lee, Eun Koo	KEMCO	Sustainable Development, Environmental impacts, Stakeholder comments	
Appendix	A. Validation Criteria B. Validation Checklist C. Review of Corrective Actions D. CVs of Validators				

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	See Section 8. Issuance of written approvals.
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 Appendix B. A.4.8
3. The project shall assist Annex I Parties in achieving compliance with part of their emission reduction commitment under Article 3 of the Kyoto Protocol.	KP Article 12.2	Checked	See Appendix B. A.4.8
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 Action No. 3
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 Review of Corrective Action No. 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 Appendix B.A.4.9
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	See Section 8. Issuance of written approvals.
8. Parties participating in the CDM shall designate a national authority for the CDM	MA CDM M&P paragraph 29	Checked	See Appendix B.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 Appendix B.A.3.2


REQUIREMENT	Reference	Conclusion	Comments
10. The proposed project activity shall meet the eligibility criteria for small-scale CDM project activities set out in paragraph 6 (c) of decision 17/CP.7	Simplified Modalities and Procedures for Small Scale Projects, paragraph 12a	Checked	See Appendix B.A.4.2
11. The proposed project activity shall conform to one of the project categories in appendix B to the Simplified Modalities and Procedures for Small Scale Projects	Simplified Modalities and Procedures for Small Scale Projects, paragraph 12b	Checked	See Appendix B. A.4.3
12. The proposed project activity shall not be a debundled component of a larger project activity, as determined through appendix C to the Simplified Modalities and Procedures for Small Scale Projects	Simplified Modalities and Procedures for Small Scale Projects, paragraph 12c	Checked	See Appendix B. A.4.10
13. The project design document is in conformance with the Small Scale CDM-PDD format	Simplified Modalities and Procedures for Small Scale Projects, Appendix A	Checked	The PDD of the proposed project was prepared in accordance with UNFCCC Small-scale CDM-PDD Format Version 03.
14. The proposed project activity shall use the simplified baseline and monitoring methodologies specified in appendix B to the Simplified Modalities and Procedures for Small Scale Projects for its project category	Simplified Modalities and Procedures for Small Scale Projects, paragraph 14	Checked	See Review of Corrective Action No. 2
15. Comments by local stakeholders are invited, a summary of these provided and how due account was taken of any comments received	Simplified Modalities and Procedures for Small Scale Projects, paragraph 22b	Checked	See Review of Corrective Action No. 8
16. An analysis of the environmental impacts of the project activity is carried out and documented if required by the Host Party	Simplified Modalities and Procedures for Small Scale Projects, paragraph 22c	Checked	See Appendix B. F.1.1~3
17. The project activity conforms to all other requirements for CDM project activities in the CDM modalities and procedures that are not replaced by the Simplified Modalities and Procedures for Small Scale Projects	Simplified Modalities and Procedures for Small Scale Projects, paragraph 22f	Checked	See Review of Corrective Action No. 1, 4, 6, 7


REQUIREMENT	Reference	Conclusion	Comments
18. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements for minimum 30 days, and the project design document and comments have been made publicly available.	Simplified Modalities and Procedures for Small Scale Projects, paragraph 23b,c	Checked	The PDD of the proposed project has been posted for 30 days on the CDM website for public comments from 24 Nov. 2007 to 23 Dec. 2007. As a result, no comments have been received.
19. Emission reductions attributable to the project shall be adjusted for leakage	Simplified Modalities and Procedures for Small Scale Projects, paragraph 30	Checked	See Appendix B. E.1.6
20. 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	Simplified Modalities and Procedures for Small Scale Projects, paragraph 31	Checked	See Appendix B. E.1.1, E.1.6


Appendix B


Validation Checklist


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
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 small-scale 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, Korea East-West Power Dangjin Small Hydroelectric Power Plant Project (5MW) is clearly characterized in the PDD.	OK		
A.2. Description of the small-scale 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 cooling water from the thermal power generation and feed it into the grid.	OK		
A.2.2. Is the project in compliance with relevant legislation in the host country?	[1][10]	Document Review	1. Checked: The proposed project has been approved by the authority concerned in accordance with the Electric Utility Act	OK		
A.2.3. Does the project contribute to sustainable development of the host country from environmental, social and economic perspectives?	[1]	Document Review	1. Checked: The proposed project is expected to bring the host country and local areas social and environmental benefits including diversification of energy sources, reduction of GHG emissions.	OK		
A.3. Project Participants <i>Note:</i>						
A.3.1. Have Parties participating in the project designated a national authority for the CDM?	[7]		1. Checked: Korea has designated a national authority for the CDM.	OK		


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	A.3.2. Is the host country a Party to the Kyoto Protocol?	[8]	Document Review	1. Checked: Korea has ratified the Kyoto Protocol on 08-11-2002.	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?		Document Review	1. Checked: see Section 8 of this report, Issuance of Written Approval.	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 Party?		Document Review	Ditto	To be checked	OK
	A.4. Technical description of the small-scale project activity <i>Note:</i>					
	A.4.1. Is the location of the project activity clearly described?	[1]	Document Review	1. Checked: The hydroelectric power plant is located in the inside of the Dangjin thermal power plant in Gyoro-Ri, Seckmun-Moen, Dangjin-Gun, Chungcheongnam-do, Republic of Korea.	OK	
	A.4.2. Does the project qualify as a small scale CDM project activity in Paragraph 6(c) of decision 17/CP.7 of the Marrakech Accords?	[1][9]	Document Review	1. Checked: The rated power of the proposed project is 5MW.	OK	
	A.4.3. Does the project activity conform with one of the project categories defined in Appendix B to the	[1][9]	Document Review	1. Checked: The proposed project belongs to the category of I.D, Grid connected renewable electricity generation.	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	simplified M&P for small scale CDM project activities?					
	A.4.4. Is it justified how the project activity conforms to the project categories?	[1][9]	Document Review	1. Checked: The proposed project generates electricity utilizing renewable resources and feed it to the grid	OK	
	A.4.5. Does the project design engineering reflect current good practices?	[1][3]	Document Review, Interview	1. Major Non-conformity 1: a capacity factor of the proposed project should be justified by more detailed feasibility studies	Major NC	OK
	A.4.6. Are the environmentally safe and sound technology and know how transferred to the host Party through the project?	[1]	Document Review	1. Minor Non-conformity 1: further elaboration on the transfer of environmentally friendly technology through the proposed project should be made.	Minor NC	OK
	A.4.7. Are the GHGs emissions reductions additional to what would occur in the absence of the project?	[1][9]	Document Review	1. See Section B.	Major NC	OK
	A.4.8. Does the project design clearly and consistently indicate the chosen crediting period, the total estimation of emission reductions for the chosen crediting period?	[1]	Document Review	1. Checked: The length of the crediting period is 10 years and the total estimated reductions of 14,277 tonnes of CO ₂ eq per year	OK	
	A.4.9. 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]	Document Review	1. Checked: The proposed project is equity-funded.	OK	
	A.4.10. Has the confirmation been provided that the project activity is not a debundled component of a	[1]	Document Review	1. Checked: There are no other CDM projects with the same project participant within 1 km of the project boundary.	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
larger project activity?						
B. Application of a Baseline methodology <i>The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.</i>						
B.1. Title and reference of the project category applicable to the project activity <i>Note:</i>						
B.1.1. Has the PDD properly referred to the most recent list of the small scale CDM project activity categories in Appendix B of the simplified M&P for small scale CDM projects?		[1][9]	Document Review	1. Major Non-conformity 2: The version of the selected approved methodologies for small scale projects in the PDD is outdated.	Major NC	OK
B.2. Project category applicable to the project activity <i>Note:</i>						
B.2.1. Has the PDD justified the choice of the applicable baseline calculation for the project category as provided for in Appendix B of the simplified M&P for small scale CDM project activities?		[1][9]	Document Review	1. Major Non-conformity 2: The version of the selected approved methodologies for small scale projects in the PDD is outdated.	Major NC	OK
B.2.2. Has the PDD described how the baseline methodology is applied in the context of the project activity?		[1][9]	Document Review	1. Checked: The scale and technical description of proposed project are appropriately provided in regards to application of baseline methodologies.	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	B.2.3. Has the PDD explained the basic assumptions of the baseline methodology in the context of the project activity?	[1][9]	Document Review	1. Checked: It is assumed that the proposed project displaces electricity from the existing fossil fuel utilizing plants.	OK	
	B.2.4. Has the baseline been determined in a transparent and conservative manner?	[1]	Document Review	1. Major Non-conformity 4: Calculation of the baseline emission factor is not correct.	Major NC	OK
	B.2.5. Has the PDD provided the key information and data used to determine the baseline scenario (variables, parameters, data sources, etc.)?	[1]	Document Review	1. See Section B.2.4	Major NC	OK
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 it justified that the proposed project activity qualifies to use simplified methodologies?	[1][9]	Document Review	1. Checked: The proposed project is a renewable energy project and less than 15MW.	OK	
	B.3.2. Is the discussion and demonstration of the additionality of the project activity transparent?	[1][2][3] [4][5]	Document Review	1. Major Non-conformity 3: NPV calculation in the investment analysis of the proposed project has not been substantiated by reliable documents.	Major NC	OK
	B.3.3. Is it demonstrated that the project activity itself is not a likely baseline scenario (e.g. through demonstrating investment barriers, technology barriers, barriers to	[1] [2][3] [4][5]	Document Review, Interview	1. See Section B.3.2	Major NC	OK


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	prevailing practices, and/or other barriers showing that emissions would have been higher without the project activity)?					
	B.3.4. Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	[1][2] [10]	Document Review	1. Minor Non-conformity 2: The PDD does not specify description on national policies on use of renewable energies.	Minor NC	OK
	B.3.5. 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: The proposed project is deemed to be zero emission technology	OK	
	B.4. Description of the project boundary for the project activity <i>Note:</i>					
	B.4.1. Is the project boundary clearly defined?	[1]	Document Review	1. Checked: the project boundary established encompasses the physical, geographical site of the proposed project.	OK	
	B.4.2. Is the project boundary consistent with the guidance for the applicable project category in Appendix B of the simplified M&P for small scale CDM project activities?	[1]	Document Review	1. Checked: the project boundary consistent with the guidance for the applicable project category in Appendix B of the simplified M&P for small scale CDM project activities	OK	
	B.5. Details of baseline and its development <i>Note:</i>					


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	B.5.1. Has the PDD specified the baseline for the project activity using a methodology specified in the applicable project category in Appendix B of the simplified M&P for small-scale CDM projects?	[1][9]	Document Review	1. Checked: Operating Margin and Build Margin are specified in Section B.4 and Annex 3 of the PDD	OK	
	B.5.2. Has the date of completion of the baseline study and the name of person(s)/entity(ies) determining the baseline clearly been stated?	[1]	Document Review	1. Checked: Relevant information is provided in Section B.8 of the PDD	OK	
	B.5.3. Is 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 contact information on the entity determining the baseline methodology is clearly provided	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 at which the implementation or construction or real action of the project activity begins?	[1][6]	Document Review	1. Checked: The starting date of the proposed project activity is the date when the contract for equipment purchase was signed.	OK	
	C.1.2. Is the operational lifetime of the project activity clearly defined and reasonable?	[1]	Document Review	1. Checked: The lifetime of the project is assumed to be 45 years.	OK	
C.2. Choice of the crediting period and related information						


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
<i>Note:</i>						
	C.2.1. If the starting date of the project activity is before the date of validation, has sufficient evidence been provided that the incentive from the CDM was seriously considered in the decision to proceed with the project activity?	[1]	Document Review	1. Checked: The project proponents have applied for validation before the proposed project starts.	OK	
	C.2.2. Is the assumed crediting time clearly defined and reasonable (renewable crediting period of max. two times 7 years or fixed crediting period of max. 10 years)?	[1]	Document Review	1. Checked: The crediting period for the proposed project activity is 10 years.	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 lifetime of the proposed project activity.	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 November 1 st 2010 and lasts over 10 years	OK	
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. Title and reference of approved monitoring methodology applied to the project activity <i>Note:</i>						
	D.1.1. Has the PDD properly referred to	[1][9]	Document	1. Major Non-conformity 2: The version of the selected	Major	OK


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	the most recent list of the small scale CDM project activity categories in Appendix B of the simplified M&P for small scale CDM projects?		Review	approved methodologies for small scale projects in the PDD is outdated.	NC	
	D.1.2. If a national or international monitoring standard has to be applied to monitor certain aspects of the project activity, has the PDD provided a reference to the source where a detailed description of the standard can be found?	[1]	Document Review	1. Checked: the monitoring meters will operate in accordance with ‘Act on Measurement’ and ‘Regulation on operation of electricity market’.	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. Has the PDD justified the choice of the monitoring methodology applicable to the project category as provided for in Appendix B of the simplified M&P for small scale CDM project activities?	[1][9]	Document Review	1. Major Non-conformity 2: The version of the selected approved methodologies for small scale projects in the PDD is outdated.	Major NC	OK
	D.3. Data to be monitored <i>Note:</i>					
	D.3.1. Does the monitoring methodology reflect good monitoring and reporting practices?	[1]	Document Review	1. Checked: The monitoring and reporting of electricity generation will be undertaken electronically and cross checked with electricity sales receipt.	OK	
	D.3.2. Does the methodology address possible monitoring errors or	[1]	Document	1. Checked: Electricity supplied to the grid are	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	uncertainties addressed?		Review	monitored on a continuous basis and recorded on a monthly basis, and cross-checked with electricity sales receipt.		
	D.3.3. 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?	[1]	Document Review	1. Minor Non-conformity 3: The monitoring plan is not complete because it does not address the monitoring of auxiliary consumption.	Minor NC	OK
	D.3.4. Will it be possible to monitor / measure project emissions as described in the monitoring plan?	[1]	Document Review	Ditto	Minor NC	OK
	D.3.5. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining the baseline within the project boundary during the crediting period?	[1]	Document Review	1. Minor Non-conformity 3: The monitoring plan is not complete because it does not address the monitoring of auxiliary consumption.	Minor NC	OK
	D.3.6. Will it be possible to monitor / measure baseline emissions as described in the monitoring plan?	[1]	Document Review	1. Checked: The current electricity metering system of the proposed project is as described in the monitoring plan	OK	
	D.3.7. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	[1]	Document Review	N.A.		
	D.3.8. Will it be possible to monitor / measure leakage as described in the monitoring plan?	[1]	Document Review	N.A.		


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
D.4. Qualitative explanation of how quality control (QC) and quality assurance (QA) procedures undertaken <i>Note:</i>						
D.4.1. Are procedures identified for monitoring, taking measurements and reporting?		[1]	Document Review	1. Checked: The monitoring and operation of the proposed project will be undertaken in accordance with ‘Act on Measurement’ and ‘Regulation on operation of electricity market’.	OK	
D.4.2. Are procedures identified for training of monitoring personnel?		[1]	Document Review	1. Checked: Described in B.7.2 of the PDD	OK	
D.4.3. Are procedures identified for emergency preparedness?		[1]	Document Review	1. Checked: Described in Section B.7.1 of the PDD	OK	
D.4.4. Are procedures identified for calibration of equipment?		[1]	Document Review	1. Checked: Described in B.7.2 of the PDD	OK	
D.4.5. Are procedures identified for monitoring of maintenance needs for equipment and installations?		[1]	Document Review	1. Checked: Described in B.7.2 of the PDD	OK	
D.4.6. Are procedures identified for review or checks of reported results/data?		[1]	Document Review	1. Checked: Described in B.7.1 of the PDD	OK	
D.4.7. Are procedures identified for internal audits to confirm that the project has been monitored as planned?		[1]	Document Review	1. Checked: Described in B.7.1 of the PDD	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	D.5. 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.5.1. Is the authority and responsibility of project management clearly described?	[1]	Document Review	1. Checked: The management and operation structure for the proposed project has been defined in the PDD	OK	
	D.5.2. Is the authority and responsibility for monitoring, measurement and reporting project emission, baseline emission and leakage data over time clearly described?	[1]	Document Review	1. Checked: See D.5.1	OK	
	D.6. Name of person/entity determining the monitoring methodology <i>Note:</i>					
	D.6.1. Is contact information provided and is it indicated that the person/entity determining the monitoring methodology is a project participant listed in Annex I?	[1]	Document Review	1. Checked: The contact information on the entity determining the monitoring methodology is clearly provided.	OK	


 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
E. Estimation of GHG Emissions by Sources <i>It is assessed whether all material GHG emission sources are addressed and how sensitivities and data uncertainties have been addressed to arrive at conservative estimates of projected emission reductions.</i>						
E.1. Formulae used <i>Note:</i>						
E.1.1.	Does the PDD clearly describe the formulae used to estimate all significant direct and indirect GHG emissions within the project boundary for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?	[1][11] [12][13]	Document Review	1. Checked: the proposed project activity is deemed to emit no greenhouse gases.	OK	
E.1.2.	In the case of direct monitoring of emission reductions, are directly estimated emission reductions provided?	[1][11] [12][13]	Document Review	Ditto	OK	
E.1.3.	Are the project emission calculations documented in a complete and transparent manner?	[1][11] [12][13]	Document Review	Ditto	OK	
E.1.4.	Have conservative assumptions been used to calculate project emissions?	[1][11] [12][13]	Document Review	Ditto	OK	
E.1.5.	Are uncertainties in the project emissions estimates properly addressed in the documentation?	[1][11] [12][13]	Document Review	Ditto	OK	

 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	E.1.6. Does the PDD clearly describe the formulae used to estimate leakage effects for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?	[1][11] [12][13]	Document Review	1. Checked: The proposed project activity is deemed to cause no leakage effects.	OK	
	E.1.7. Are the leakage calculations documented in a complete and transparent manner?	[1][11] [12][13]	Document Review	Ditto	OK	
	E.1.8. Have conservative assumptions been used when calculating leakage?	[1][11] [12][13]	Document Review	Ditto	OK	
	E.1.9. Are uncertainties in the leakage estimates properly addressed?	[1][11] [12][13]	Document Review	Ditto	OK	
	E.1.10. Does the sum of estimated GHG emissions within project boundary and estimated leakage clearly represent the emissions attributable to project activity?	[1][11] [12][13]	Document Review	Ditto	OK	
	E.1.11. Does the PDD clearly describe the formulae used to estimate all baseline emissions identified in the baseline methodology for each gas, source, formulae/algorithm, emissions in units of CO ₂ equivalent?	[1][11] [12][13]	Document Review	1. Major Non-conformity 4: Calculation of the baseline emission factor is not correct.	Major NC	OK
	E.1.12. Are the baseline emission calculations documented in a complete and transparent manner?	[1][11] [12][13]	Document Review	1. Major Non-conformity 4: Calculation of the baseline emission factor is not correct.	Major NC	OK
	E.1.13. Have conservative assumptions been used when calculating	[1][11]	Document Review	1. Major Non-conformity 4: Calculation of the baseline	Major	OK

 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	baseline emissions?	[12][13]		emission factor is not correct.	NC	
	E.1.14. Are uncertainties in the baseline emission estimates properly addressed in the documentation?	[1][11] [12][13]	Document Review	1. Major Non-conformity 4: Calculation of the baseline emission factor is not correct.	Major NC	OK
	E.1.15. Does difference between emissions from the project activity and baseline emissions clearly represent the emission reductions due to the project activity?	[1][11] [12][13]	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	
	E.2. Table providing values obtained when applying formulae above <i>Note:</i>					
	E.2.1. Have all significant values obtained from calculation provided in the Table?	[1]	Document Review	1. Checked: Annex 3 in the PDD provides key values for estimating emission reductions	OK	
	F. Environmental Impacts <i>Documentation on the analysis of the environmental impacts will be assessed, and if deemed significant, an EIA should be provided to the validator.</i>					
	F.1. If required by the Host Party, documentation on the analysis of the environmental impacts of the project activity <i>Note:</i>					
	F.1.1. Does the project comply with environmental legislation in the host country?	[1]	Document Review	1. Checked: In accordance with the Act on Assessment of Impacts of Works on Environment, Traffic, and Disasters the project developer undertook the	OK	

 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
				consultation process with the Ministry of Commerce, Industry and Energy since the proposed project will modify the Dangjin Thermal Power Plants which had already undertaken an Environmental Impact Assessment prior to the time of commissioning.		
F.1.2.	Is the project activity likely to create any adverse environmental effects?	[1]	Document Review	1. Checked: In accordance with the consultation process, the project developer reviewed environmental impacts by the proposed project and reported to the Ministry of Commerce, Industry and Energy how to reduce the potential environmental impacts. The validation team concluded that the project was not likely to create any adverse environmental effects.	OK	
F.1.3.	Have the environmental impacts identified been properly addressed in the PDD?	[1]	Document Review	1. Checked: See F.1.2	OK	
G. Stakeholder Comments <i>The validator should ensure that a stakeholder comments have been invited and that 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]	Document Review	1. Minor Non-conformity 4: Comments of local stakeholders have not been invited.	Minor NC	OK

 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
	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]	Document Review	1. Ditto	Minor NC	OK
	G.1.3. Has detailed description been provided to stakeholders in a manner which allows the local stakeholders to understand project activity?	[1]	Document Review	1. Ditto	Minor NC	OK
	G.1.4. If a stakeholder consultation process is required by regulations/laws in the host country, has the stakeholder consultation process been carried out in accordance with such regulations/laws?	[1]	Document Review	1. Ditto	Minor NC	OK
G.2. Summary of the comments received <i>Note:</i>						
	G.2.1. Have relevant stakeholders been consulted?	[1]	Document Review	1. Minor Non-conformity 4: Comments of local stakeholders have not been invited.	Minor NC	OK
	G.2.2. Is a summary of the comments received provided?	[1]	Document Review	1. Minor Non-conformity 4: Comments of local stakeholders have not been invited.	Minor NC	OK

 KEMCO	Small Scale Projects Validation Checklist	Ref.	MoV	Comments	Draft Concl.	Final Concl.
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]	Document Review	1. Minor Non-conformity 4: Comments of local stakeholders have not been invited.	Minor NC	OK	

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Appendix C

Review of Corrective Actions

Non-conformities	Reference	Corrective Actions	Comments
1. Major Non-conformity 1: A capacity factor of the proposed project should be justified by more detailed feasibility studies.	Appendix B. A.4.5	Estimated electricity generation is described in the Project Design Document (PDD) based on the Purchase Agreement of Generation Facilities.	Estimated electricity generation and capacity factor of the proposed project is well substantiated.
2. Major Non-conformity 2: The version of the selected approved methodologies for small scale projects in the PDD is outdated.	Appendix B. B.1.1, D.1.1	The revised PDD corrected the version of the selected approved methodologies for small scale projects.	The PDD has applied the currently valid baseline and monitoring methodologies.
3. Major Non-conformity 3: NPV calculation in the investment analysis of the proposed project has not been substantiated by reliable documents.	Appendix B. B.3.2	NPV for the proposed project is re-calculated with total investment costs and discount rate for the proposed project as described in the Report on Re-estimation of Construction Costs (24/03/2008).	NPV for the proposed project is appropriately re-calculated. In particular, total investment costs and discount rate for the proposed project are properly referenced.
4. Major Non-conformity 4: Calculation of the baseline emission factor is not correct.	Appendix B. E.1.11~14	The BM emission factor for the proposed project is re-calculated by using electricity generation data in 2006 instead of the data in 2005.	The BM emission factor for the proposed project is correctly re-calculated using the most recently available data at the point of the commencement of validation.
5. Minor Non-conformity 1: Further elaboration on the transfer of environmentally friendly technology through the proposed project should be made.	Appendix B. A.4.6	The revised PDD mentions that the proposed project is the first small hydro power project for Korea East-West Power Co., Ltd. the project participant and thus will bring much know-how on O&M to the company.	The revised PDD elaborates upon the transfer of environmentally friendly technology through the proposed project.

Non-conformities	Reference	Corrective Actions	Comments
6. Minor Non-conformity 2: The PDD does not specify description on national policies on use of renewable energies.	Appendix B.3.4	The revised PDD provides details about national policies to promote use of renewable energies.	The revised PDD sufficiently addresses national policies to promote use of renewable energies.
7. Minor Non-conformity 3: The monitoring plan is not complete because it does not address the monitoring of auxiliary consumption.	Appendix B. D.3.3	The monitoring plan is revised such that net electricity generation supplied to the grid will be monitored	The monitoring plan appropriately addresses the monitoring of auxiliary consumption.
8. Minor Non-conformity 4: Comments of local stakeholders have not been invited.	Appendix B. G.1~3	Via homepage, comments of local stakeholders have been invited. As such summary of the comments received and how to handle those comments are described in the PDD	The revised PDD sufficiently addresses stakeholders' comments.

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Appendix D

CVs of Validators



Personal History

Name		Han, Seung-Ho (Mr.)	
ID No.	-	Phone No.	(031) 260 – 4883
Date of employment/ Contract date	March 1, 2000	Scope of Qualification	Sectoral Scope 1
Classification	<input checked="" type="checkbox"/> Full-time Validator/verifier <input type="checkbox"/> Full-time Lead Validator/verifier <input type="checkbox"/> Part-time Validator/verifier <input type="checkbox"/> Part-time Lead Validator/verifier <input type="checkbox"/> Technical Expert <input type="checkbox"/> Committee member() <input type="checkbox"/> Others()		
Organization	Korea Energy Management Corporation	Position	GHG Auditor, Korea CDM Certification Office
Description			
Educational background	1. 1990-1994 Yonsei University, Department of Science, Physics (Bachelor's degree) 2. 1995-2000 Seoul National University, Environmental Studies, Urban Planning major(Mater's degree)		
Work experience	March 2000 – present: Project Coordinator, GHG Auditor, Korea CDM Certification Office, Korea Energy Management Corporation 1. 2006: Conducted validation of several CDM projects: - Yangyang Renewable Energy Project; - LG Chem Fuel Switching Project; - Taishir Hydro Power Project in Mongolia; - Durgun Hydro Power Project in Mongolia; - Hangeong second phase hydroelectric power plant 2. 2005: Conducted validation of the Gangwon Wind Park Project 2002 ~ 2004: Developed the manual and procedures for a CDM certification. 3. 2001 ~ 2004: Performed analysis of GHG reduction potentials for a heat pump project, refinery waste recovery project, wind power project and landfill gas utilization project. 4. 2000 ~ 2001: Produced reports on Climate Change and renewable energy policies of developed countries		
Certificate	1. Certificate of Environmental Engineer(1 st) 2. Environmental Auditor (ISO 14001)		
Training	Completion of the training course for environmental auditors (ISO 14001) - Date: 21 Jan. 2002 ~ 25 Jan. 2002 (44 hours) - Training organization: Korean Standards Organization		
Publications	1) Master's thesis "A study on GHGs mitigation options through forestry projects"(2000) 2) General Approaches to Validation of CDM Projects (2005) 3) Analysis on Leakage Effects Attributable to CDM Projects (2006) 4) Application of Approved Baseline Methodologies for CDM Projects in Korea-Case Study: Landfill Gas-to-Electricity Projects (2006) 5) Assessment of Data Uncertainty in Verifying Corporate GHG Emissions(2006) 6) Clean Development Mechanism, an Innovative Tool for Combating Climate Change Under the UNFCCC (2006)		
Linguistic abilities	1. Korean: A 2. English: A		
Date of preparation : 5 March 2007			



Personal History

Name	Lee, Eunkoo (Mr.)		
ID No.		Phone No.	(031) 260 – 4882
Date of employment/ Contract date	2005. 02. 01	Scope of Qualification	Sectoral Scope 1~3
Classification	<input checked="" type="checkbox"/> Full-time Validator/verifier <input type="checkbox"/> Full-time Lead Validator/verifier <input type="checkbox"/> Part-time Validator/verifier <input type="checkbox"/> Part-time Lead Validator/verifier <input type="checkbox"/> Technical Expert <input type="checkbox"/> Committee member() <input type="checkbox"/> Others()		
Organization	Korea Energy Management Corporation	Position	Project Coordinator, Korea CDM Certification Office
	Description		
Educational background	1) 1992-1997 The University of Michigan(Ann Arbor), College of Liberal Arts & Science, Statistics (Bachelor of Science) 2) 1997-1999 Pennsylvania State University, College of Engineering, Industrial Engineering(Master of Science)		
Work experience	1) 2005~2006 Project Coordinator, Center for Climate Change Mitigation, Korea Energy Management Corporation • Published KEMCO Climate Change Newsletter • Organized Climate Change seminars and conferences 2) 2006~Current, GHG Auditor, Korea CDM Certification Office • Participated in the validation of Yangyang Renewable Energy CDM Project(2006) • Participated in the validation of Korea South-East Power Co. (KOSEP) small scale hydroelectric power plants CDM project (2006) • Participated in the verification of LG Chemical Ulsan plant GHG inventory (2006) • Participated in the verification of SK Ulsan Complex GHG inventory (2006)		
Certificate	GHG Auditor Certificate(2007)		
Training	Completion of the training course for GHG Auditor 1) Date: 6 Feb. 2006 ~ 10 Feb. 2006 (44 hours) - Training organization: Korea Energy Management Corporation 2) Date: 31 Mar 2006 ~ 1 April 2006 (16 hours) - Training organization: Korea Energy Management Corporation 3) Date: 31 Mar 2006 ~ 1 April 2006 (16 hours) - Training organization: Korea Energy Management Corporation		
Publications	7) Master's thesis "A cost effective model in justifying the optimal mean and variance settings of a process"		
Linguistic abilities	1) Korean: A 2) English: A		
Date of preparation : January 4th, 2007			