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# VALIDATION REPORT

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## KOREA WATER RESOURCES CORPORATION (KWATER) SMALL-SCALE HYDROELECTRIC POWER PLANTS II PROJECT

REPORT No. 2006-1021

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DET NORSKE VERITAS



## VALIDATION REPORT

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Client: Korea Water Resources Corporation (Kwater)	Client ref.: Kyul-Ho Kwak

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### Summary:

Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” in the Republic of Korea on the basis of UNFCCC criteria for the CDM, as well as criteria given to provide for consistent project operations, monitoring and reporting. UNFCCC criteria refer to Article 12 of the Kyoto Protocol, the CDM modalities and procedures, the simplified modalities and procedures for small-scale CDM project activities and the subsequent decisions by the CDM Executive Board.

The validation consists of the following three phases: i) a desk review of the project design documents, ii) follow-up interviews with project stakeholders and iii) the resolution of outstanding issues and the issuance of the final validation report and opinion. This validation report summarizes the findings of the validation.

In summary, it is DNV’s opinion that the project, as described in the project design document meets all relevant UNFCCC requirements for the CDM and correctly applies the approved baseline and monitoring methodology AMS-I.D. Hence, DNV requests the registration of the “Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” as a CDM project activity.

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Report title: Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project in the Republic of Korea			
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<i><b>Table of Content</b></i>	<i><b>Page</b></i>
1 INTRODUCTION.....	1
1.1 Validation Objective	1
1.2 Scope	1
1.3 Description of Proposed CDM Project	1
2 METHODOLOGY.....	2
2.1 Review of Documents	4
2.2 Follow-up Interviews	4
2.3 Resolution of Clarification and Corrective Action Requests	4
2.4 Internal Quality Control	4
3 VALIDATION FINDINGS .....	5
3.1 Participation Requirements	5
3.2 Project Design	5
3.3 Project Baseline	5
3.4 Additionality	6
3.5 Monitoring Plan	6
3.6 Calculation of GHG Emissions	6
3.7 Environmental Impacts	7
3.8 Comments by Local Stakeholders	7
4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS .....	7
5 VALIDATION OPINION .....	8
REFERENCES .....	9
<a href="#">Appendix A Validation Protocol</a>	
<a href="#">Appendix B Certificates of Competence</a>	



### ***Abbreviations***

CAR	Corrective Action Request
CDM	Clean Development Mechanism
CEF	Carbon Emission Factor
CER	Certified Emission Reduction
CL	Clarification request
CO <sub>2</sub>	Carbon dioxide
CO <sub>2</sub> e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
GHG	Greenhouse gas(es)
GWP	Global Warming Potential
IPCC	Intergovernmental Panel on Climate Change
KEPCO	Korea Electric Power Corporation
KWATER	Korea Water Resources Corporation
MP	Monitoring Plan
NGO	Non-governmental Organisation
ODA	Official Development Assistance
PDD	Project Design Document
UNFCCC	United Nations Framework Convention on Climate Change



## 1 INTRODUCTION

Korea Water Resources Corporation (Kwater) has commissioned Det Norske Veritas Certification Ltd. (DNV) to validate the “Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” in Korea. This report summarises the findings of the validation of the project, performed on the basis of UNFCCC criteria for small-scale CDM projects, as well as criteria given to provide for consistent project operations, monitoring and reporting.

The validation team consists of the following personnel:

Mr Kim Young-Keun	DNV Certification Korea	Team Leader, GHG auditor
Mr Soumik Biswas	DNV Certification India	CDM Validator
Mr. Michael Lehmann	DNV Certification Norway	Sector expert
Mr Einar Telnes	DNV Certification Norway	Technical verifier

### 1.1 Validation Objective

The purpose of a validation is to have an independent third party assess the project design. In particular, the project's baseline, monitoring plan, and the project's compliance with relevant UNFCCC and host Party criteria are validated in order to confirm that the project design, as documented, is sound and reasonable and meets the identified criteria. Validation is a requirement for all CDM projects and is seen as necessary to provide assurance to stakeholders of the quality of the project and its intended generation of certified emission reductions (CERs).

### 1.2 Scope

The validation scope is defined as an independent and objective review of the project design document (PDD). The PDD is reviewed against the criteria stated in Article 12 of the Kyoto Protocol, the CDM modalities and procedures as agreed in the Marrakech Accords, the simplified modalities and procedures for small-scale CDM project activities /4/ and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology AMS-I.D. The validation team has, based on the recommendations in the Validation and Verification Manual /7/ employed a risk-based approach, focusing on the identification of significant risks for project implementation and the generation of CERs.

The validation is not meant to provide any consulting towards the project participants. However, stated requests for clarifications and/or corrective actions may have provided input for improvement of the project design.

### 1.3 Description of Proposed CDM Project

The Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project is a bundled project activity which involves generation of electricity from hydro resources in four sites, namely Seongnam II, Dalbang, Juam and Daecheong in the Republic of Korea. The electricity generated will be exported to the KEPCO grid and thus displace electricity produced from fossil fuel fired plants and result in reduced GHG emissions. The installed capacity of the project is 2.33 MW and the yearly generation is likely to be 13 996 MWh. The



estimated emission reductions due to the project are 60 879 tonnes CO<sub>2</sub> e over the first seven years of crediting period, with annual average reduction of 8 697 tonnes of CO<sub>2</sub> e .

## 2 METHODOLOGY

The validation consists of the following three phases:

- I a desk review of the project design and the baseline and monitoring methodology
- II follow-up interviews with project stakeholders
- III the resolution of outstanding issues and the issuance of the final validation report and opinion.

This validation report summarises the findings of the validation.

In order to ensure transparency, a validation protocol was customised for the project, according to the Validation and Verification Manual /7/. The protocol shows in transparent manner criteria (requirements), means of verification and the results from validating the identified criteria. The validation protocol serves the following purposes:

- It organises, details and clarifies the requirements a CDM project is expected to meet;
- It ensures a transparent validation process where the validator will document how a particular requirement has been validated and the result of the validation.

The validation protocol consists of three tables. The different columns in these tables are described in Figure 1.

The completed validation protocol for the “The Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” is enclosed in Appendix A to this report.

Findings established during the validation can either be seen as a non-fulfilment of validation protocol criteria or where a risk to the fulfilment of project objectives is identified. Corrective action requests (CAR) are issued, where:

- i) mistakes have been made with a direct influence on project results;
- ii) validation protocol requirements have not been met; or
- iii) there is a risk that the project would not be accepted as a CDM project or that emission reductions will not be certified.

The term Clarification may be used where additional information is needed to fully clarify an issue.



<b>Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities</b>			
<b>Requirement</b>	<b>Reference</b>	<b>Conclusion</b>	<b>Cross reference</b>
The requirements the project must meet.	Gives reference to the legislation or agreement where the requirement is found.	This is either acceptable based on evidence provided ( <b>OK</b> ), a <b>Corrective Action Request (CAR)</b> of risk or non-compliance with stated requirements or a request for <b>Clarification (CL)</b> where further clarifications are needed.	Used to refer to the relevant checklist questions in Table 2 to show how the specific requirement is validated. This is to ensure a transparent Validation process.

  

<b>Validation Protocol Table 2: Requirement Checklist</b>				
<b>Checklist Question</b>	<b>Reference</b>	<b>Means of verification (MoV)</b>	<b>Comment</b>	<b>Draft and/or Final Conclusion</b>
The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in seven different sections. Each section is then further sub-divided. The lowest level constitutes a checklist question.	Gives reference to documents where the answer to the checklist question or item is found.	Explains how conformance with the checklist question is investigated. Examples of means of verification are document review (DR) or interview (I). N/A means not applicable.	The section is used to elaborate and discuss the checklist question and/or the conformance to the question. It is further used to explain the conclusions reached.	This is either acceptable based on evidence provided ( <b>OK</b> ), or a <b>Corrective Action Request (CAR)</b> due to non-compliance with the checklist question (See below). A request for <b>Clarification (CL)</b> is used when the validation team has identified a need for further clarification.

  

<b>Validation Protocol Table 3: Resolution of Corrective Action Requests and Requests for Clarification</b>			
<b>Draft report corrective action requests and requests for clarifications</b>	<b>Ref. to Table 2</b>	<b>Summary of project participants' response</b>	<b>Final conclusion</b>
If the conclusions from the draft Validation are either a Corrective Action Request or a Clarification Request, these should be listed in this section.	Reference to the checklist question number in Table 2 where the Corrective Action Request or Clarification Request is explained.	The responses given by the project participants during the communications with the validation team should be summarised in this section.	This section should summarise the validation team's responses and final conclusions. The conclusions should also be included in Table 2, under "Final Conclusion".

**Figure 1 Validation protocol tables**



## 2.1 Review of Documents

The project design document (PDD) /1/ submitted by Kwater in its original as well as revised versions and additional background documentation /2/ - /10/ related to the project design and baseline were reviewed as a part of the validation.

## 2.2 Follow-up Interviews

Follow-up interviews were performed in the period of 07-08 June, 2006 in Korea with representatives from Kwater and on 12 June 2006 with representatives of Korea Electric Power Corporation (KEPCO). The name of the persons interviewed is included in the reference.

The main topics of the interviews are summarised in Table 1.

**Table 1 Interview topics**

Interviewed organisation	Interview topics
Kwater (Interviews conducted at all sites and head office)	<ul style="list-style-type: none"> <li>➤ Technology applied and operational lifetime</li> <li>➤ Provisions for training, operation and maintenance</li> <li>➤ Monitoring and reporting procedures</li> <li>➤ Additionality</li> <li>➤ Baseline methodology</li> <li>➤ Estimated emission reductions and emission factors applied</li> <li>➤ Stakeholder consultation process and environmental impacts</li> <li>➤ Legal compliance</li> </ul>
KEPCO	<ul style="list-style-type: none"> <li>➤ Clarifications pertaining grid data</li> <li>➤ Assumptions in baseline determination</li> </ul>

## 2.3 Resolution of Clarification and Corrective Action Requests

The objective of this phase of the validation was to resolve any outstanding issues which needed to be clarified for DNV's positive conclusion on the project design. The initial validation identified one *corrective action requests* and six requests for *clarification*. The corrective action requests and requests for clarification that were presented to the project participants in DNV's draft validation report of 2006-07-17 (rev. 2) were resolved during communications between the client and DNV. To guarantee the transparency of the validation process, the concerns raised and responses given are documented in the validation protocol in Appendix A.

Since modifications to the project design were necessary to resolve DNV's concerns, the client decided to revise the PDD and resubmitted the PDD. There were further 3 revisions in the PDD. The latest revision is SSCDM 2\_PDD\_(1124)\_Eng.pdf. After reviewing the revised PDD, DNV issued this draft validation report and opinion.

## 2.4 Internal Quality Control

The draft validation report including the initial validation findings underwent a technical review before being submitted to the project participants. The final validation report underwent another technical review before requesting registration of the project activity. The technical review was





performed by a technical reviewer qualified in accordance with DNV's qualification scheme for CDM validation and verification.

### 3 VALIDATION FINDINGS

In the following sections the findings of the validation are stated. The validation criteria (requirements), the means of verification and the results from validating the identified criteria are documented in more detail in the validation protocol in Appendix A.

#### 3.1 Participation Requirements

The only project participant is Korea Water Resources Corporation (Kwater). The host Party Republic of Korea meets the requirements to participate in the CDM. The project is approved by DNA of Korea. No Annex I Party has yet been identified yet.

#### 3.2 Project Design

The project consists of bundling of 4 small-scale hydro power plants, namely Seongnam II, Dalbang, Juam and Daecheong, located in the Republic of Korea.

The Seongnam II small-scale hydroelectric power plant consists of one vertical Francis turbine with a generation capacity of 360 kW. The Dalbang-dam project consists of one horizontal Francis turbine with a capacity of 170 kW. The Daecheong-dam small-scale hydroelectric power plant consists of two units, each with a generation capacity of 400 kW with propeller (tubular) type wheels. The Juam-dam small-scale hydroelectric power plant also consists of two units, each with generation capacity of 500 kW with horizontal Francis turbine.

The technology applied is deemed current good practice and is not expected to be replaced within the crediting period.

The project will have all inherent benefits of a renewable energy project. It will also result in better utilisation of the water resources.

The starting date has been identified as the date on which commercial operation starts. The earliest date is 28 February 2007 for the Dalbang site and the latest is 30 April 2008 for the Seongnam site. The operational lifetime of the project is estimated to be around 30 years and a renewable crediting period of 7 years starting on 1 June 2008 is selected.

The project meets the sustainable development objectives of the Republic of Korea. The validation did not reveal any information that indicates that the project can be seen as a diversion of official development assistance (ODA) funding towards Korea.

#### 3.3 Project Baseline

The project selects the simplified baseline methodology for category I.D small scale CDM project activities AMS-I.D (version 9) "Grid connected renewable electricity generation" of the "Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories".



The project qualifies as small-scale CDM project activity as the combined total maximum output capacity of 2.33 MW<sub>e</sub> is less than the 15 MW<sub>e</sub> capacity limit specified under the CDM modalities and procedures for small-scale activities, category I.D.

Since the Korean electricity system is not constituted of layered despatch system, the Korean National grid is considered for the determination of a baseline grid electricity emission coefficient. The project uses the average of the approximate operating margin and build margin for determination of the baseline emission factor. In the calculation of the approximate operating margin, the generation from hydro, nuclear, low cost biomass and geothermal power plants have been excluded. In the calculation of build margin, capacity additions of the most recent plants that contribute to 20% of the total generation are used. Since 20% falls on part capacity, plants contributing to 21.81% of the total generation have been considered during build margin calculations.

The approximate operating margin is calculated as an average of data available for the three years 2002, 2003 and 2004, which is the most recent statistics available at the time of initial PDD preparation. The build margin is calculated using data of 2004. The baseline emission factor determined ex-ante will be used for calculation of emission reductions.

### 3.4 Additionality

The investment analysis is based on unit cost of electricity production.

The additionality of the project has been demonstrated by a barrier analysis as well as a financial analysis. The financial analysis presented for each of the project sites has been verified and the NPV have been found to be negative for each of the four sites. It has been verified from the NPV calculations attached with the PDD that the returns from the project in the absence of the benefits from CDM are not attractive enough for the project proponent to go forward with the project. Thus it has been established that the project activity would not have occurred in the absence of CDM and is hence additional.

### 3.5 Monitoring Plan

The project is a renewable energy generation project and thus the monitoring requirement under small-scale category I.D. is used in this project. As required in the approved simplified monitoring methodology AMS-I.D, the monitoring plan involves direct continuous monitoring of the net electricity supplied to the grid.

The monitoring plan also includes monitoring of data required for estimating the baseline emission factor at the beginning of each crediting period.

All data will be archived electronically for a period of 2 years after the crediting period.

Electricity meters are calibrated when they are installed and re-calibrated every 3 years.

### 3.6 Calculation of GHG Emissions

The only relevant GHG emission related to the project is the CO<sub>2</sub> emissions from the displaced electricity. There are no project emissions and leakages envisaged in this project because the project generates electricity by utilizing hydroelectric power. The electricity generated is dispatched to the Korean grid. The dispatched electricity displaces electricity generated by the



existing fossil fuel power plants connected to the grid. Accordingly, the reduction of fossil fuel leads to the reduction of CO<sub>2</sub> emission.

Hydro, geothermal, wind, low-cost biomass, nuclear and solar plants are excluded from the data in the calculation of the applied operating margin (OM) factor. The OM is calculated using 3-year average data from 2002-2004, and is determined to 0.7710 kgCO<sub>2</sub> eq/kWh.

For the build margin (BM), the project participant has used the most recent data from the sample group of power plants that has already been built. For the sample group, the participants choose the power plants capacity additions in the electricity system that comprise 20% of the system generation (in MWh) and that have been built most recently. The BM is calculated at 0.4718 kgCO<sub>2</sub> eq/kWh.

The average of the OM and BM emission factors calculated is the EF<sub>y</sub>, baseline emission factor. The combined emission factor is 0.6214 ton CO<sub>2</sub> /MWh.

The carbon emission factors of the different fossil fuels have been calculated based on the IPCC Guidelines 1996.

### 3.7 Environmental Impacts

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. No adverse environmental effects are envisaged.

### 3.8 Comments by Local Stakeholders

The relevant stakeholders have been informed about the project through local newspapers and the annual report of Kwater. The project did not receive any adverse comments. The local stakeholder approval is also required for issuance of project approvals. The project approvals were verified during the validation and found to be in order.

## 4 COMMENTS BY PARTIES, STAKEHOLDERS AND NGOS

The PDD /1/ was made publicly available on DNV's climate change website ([www.dnv.com/certification/climatechange](http://www.dnv.com/certification/climatechange)) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 27-04-2006 to 26-05-2006.

No comments were received.



## 5 VALIDATION OPINION

*Det Norske Veritas Certification Ltd. (DNV) has performed a validation of the “Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” in the Republic of Korea. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host country criteria, as well as criteria given to provide for consistent project operations, monitoring and reporting.*

*The review of the project design documentation and the subsequent follow-up interviews have provided DNV with sufficient evidence to determine the fulfilment of stated criteria.*

*The host country is Republic of Korea. No Annex I country has been identified yet. Republic of Korea fulfils the participation criteria and the DNA of Republic of Korea has confirmed that the project assists in achieving sustainable development.*

*Having an installed capacity of less than 15 MW, the project is eligible as type I small-scale CDM project activity.*

*The project correctly applies the simplified baseline and monitoring methodology AMS-I.D.*

*By generating renewable energy which will displace grid electricity, the project results in reductions of CO<sub>2</sub> emissions that are real, measurable and give long-term benefits to the mitigation of climate change. It is demonstrated that the project is not a likely baseline scenario. Emission reductions attributable to the project are hence additional to any that would occur in the absence of the project activity.*

*The total emission reductions from the project are estimated to be on the average 8 697 tCO<sub>2</sub>e per year over the selected 7 year crediting period. The emission reduction forecast has been checked and is deemed likely that the state amount is achieved given that the underlying assumptions do not change.*

*Adequate training and monitoring procedures have been implemented.*

*In summary, it is DNV’s opinion that the project, as described in the project design document of 2006-11-24 (Version 5), meets all relevant UNFCCC requirements for the CDM, is eligible as category I.D small-scale CDM project activity and correctly applies the approved simplified baseline and monitoring methodology AMS-I.D. Hence, DNV requests the registration of the “Korea Water Resources Corporation (Kwater) Small-Scale Hydroelectric Power Plants II Project” as a CDM project activity.*



## REFERENCES

*Documents provided by the project proponent that relate directly to the project:*

- /1/ Project Design Document (PDD) for CDM Activity – *Korea water Resources Corporation (KWATER) small-scale hydroelectric power plants II project.*  
small hydro2\_PDD\_(060425)\_English.pdf (Version 1)  
PDD\_Small hydro II\_(0705).pdf (Version 2)  
PDD\_061103\_Eng.pdf (Version 3)  
SSCDM 2\_PDD\_(1109)\_Eng.pdf (Version 4)  
SSCDM 2\_PDD\_(1124)\_Eng.pdf (Version 5)
- /2/ *Excel Spreadsheets for calculation of the operating margin and build margin emission coefficient (Emission Factor Calculation Sheet\_english\_060425.xls, Emission Factor Calculation Sheet\_english\_061109.xls).*
- /3/ *Excel Spreadsheets for NPV Analysis(NPV Analysis\_060620\_Eng.xls, NPV Analysis\_061103\_Eng.xls, NPV Analysis\_061123\_Eng.xls)*
- /4/ *Excel Spreadsheets for power generation efficiency (generation efficiency\_061030.xls)*
- /5/ *Approval letter of electricity business for 4 sites and Approval letter of stream occupation for 2 sites*
- /6/ *Host country approval letter– – Issued by Government of the Republic of Korea, No. 2006-6, dated. 14 September 2006.*

*Background documents related to the design and/or methodologies employed in the design or other reference documents:*

- /7/ International Emission Trading Association (IETA) & the World Bank's Prototype Carbon Fund (PCF): *Validation and Verification Manual.* <http://www.vvmanual.info>
- /8/ Appendix B of the simplified modalities and procedures for small-scale CDM project activities: *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.* (Version 8, 03 March 2006); *Indicative simplified baseline and monitoring methodologies for selected small-scale CDM project activity categories.* (Version 9, 28 July 2006)
- /9/ Appendix C of the simplified modalities and procedures for small-scale CDM project activities: *Determining the occurrence of debundling.*
- /10/ Revised 1996 IPCC guidelines for national green house gas inventories – Reference Manual (Volume 3)

*Persons interviewed during the validation, or persons who contributed with other information that are not included in the documents listed above:*

- /11/ Interview on 7 June 2006



1. Mr. Duk Yun Ju, Assistant Manager, Seongnam regional office
2. Mr. Hyeong-Seok Lee, Assistant Manager, Energy Business Team, Head office.
3. Mr. Hyun-Soon Baik, Assistant Manager, Daecheong-dam office.
4. Mr. Changuk An, Consultant, Ecoeye Co., Ltd.

Interview on 8 June 2006

1. Mr. Young-Il Kim, Assistant Manager, Juam-dam office.
2. Mr. Pyung-Seok Seo, Mechanical Engineer, Juam-dam office.
3. Mr. Byeong-Kak Kim, Electrical Engineer, Juam-dam office.

/12/ Interview on 12 June 2006

1. Mr. Jeongchae Kim, Asst. Manager, Management Evaluation Team, KEPCO.

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## **APPENDIX A**

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### **VALIDATION PROTOCOL FOR SMALL-SCALE CDM PROJECT ACTIVITIES**

**Table 1 Mandatory Requirement for Small Scale Clean Development Mechanism (CDM) Project Activities**

Requirement	Reference	Conclusion	Cross Reference/ Comment
1. The project shall assist Parties included in Annex I in achieving compliance with part of their emission reduction commitment under Art. 3	Kyoto Protocol Art. 12.2	OK	Annex-I country has not been identified yet.
2. The project shall assist non-Annex I Parties in achieving sustainable development and shall have obtained confirmation by the host country thereof	Kyoto Protocol Art. 12.2, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	Table 2, Section A.3
3. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC	Kyoto Protocol Art. 12.2.	OK	Table 2, Section E.4.1
4. The project shall have the written approval of voluntary participation from the designated national authority of each party involved	Kyoto Protocol Art. 12.5a, Simplified Modalities and Procedures for Small Scale CDM Project Activities §23a	OK	
5. The emission reductions should be real, measurable and give long-term benefits related to the mitigation of climate change	Kyoto Protocol Art. 12.5b	OK	Table 2, Section E.1 to E.4
6. Reduction in GHG emissions must be additional to any that would occur in absence of the project activity, i.e. a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity	Kyoto Protocol Art. 12.5.c, Simplified Modalities and Procedures for Small Scale CDM Project Activities §26	OK	Table 2, Section B.2.1
7. In case public funding from Parties included in Annex I is used for the project activity, these Parties shall provide an affirmation that such funding does not	Decision 17/CP.7, CDM Modalities and Procedures Appendix B,	OK	Public funding is not involved in the project activity.



Requirement	Reference	Conclusion	Cross Reference/ Comment
result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	§ 2		
8. Parties participating in the CDM shall designate a national authority for the CDM	CDM Modalities and Procedures § 29	OK	The CDM Review Committee, Office of the Prime Minister is the DNA of The Republic of Korea.
9. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol	CDM Modalities and Procedures § 30, 31b	OK	The Republic of Korea ratified the Kyoto Protocol on 08-11-2002.
10. The participating Annex I Party's assigned amount shall have been calculated and recorded	CDM Modalities and Procedures §31b	Not applicable	Annex-I country has not been identified yet.
11. The participating Annex I Party shall have in place a national system for estimating GHG emissions and a national registry in accordance with Kyoto Protocol Article 5 and 7	CDM Modalities and Procedures §31b	Not applicable	Annex-I country has not been identified yet.
12. The proposed project activity shall meet the eligibility criteria for small scale CDM project activities set out in § 6 (c) of the Marrakesh Accords and shall not be a debundled component of a larger project activity	Simplified Modalities and Procedures for Small Scale CDM Project Activities §12a,c	OK	Table 2, Section A.1
13. The project design document shall conform with the Small Scale CDM Project Design Document format	Simplified Modalities and Procedures for Small Scale CDM Project Activities, Appendix A	OK	
14. The proposed project activity shall confirm to one of the project categories defined for small scale CDM project activities and uses the simplified baseline and	Simplified Modalities and Procedures for Small Scale CDM Project	OK	Table 2, Section A.1.3, B and D

Requirement	Reference	Conclusion	Cross Reference/ Comment
monitoring methodology for that project category	Activities §22e		
15. Comments by local stakeholders are invited, and a summary of these provided	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22b	OK	Table 2, Section G
16. If required by the host country, an analysis of the environmental impacts of the project activity is carried out and documented	Simplified Modalities and Procedures for Small Scale CDM Project Activities §22c	OK	Table 2, Section F
17. Parties, stakeholders and UNFCCC accredited NGOs have been invited to comment on the validation requirements and comments have been made publicly available	Simplified Modalities and Procedures for Small Scale CDM Project Activities §23b,c,d	OK	The PDD was up for comments from 27-04-2006 to 26-05-2006 on the website <a href="http://www.dnv.com/certification/climatechange/">www.dnv.com/certification/climatechange/</a> . <u>No comments were received.</u>

**Table 2 Requirements Checklist**

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<b>A. Project Description</b> The project design is assessed.					
<b>A.1. Small scale project activity</b> It is assess whether the project qualifies as small scale CDM project activity.					
A.1.1. Does the project qualify as a small scale CDM project activity as defined in paragraph 6 (c) of decision 17/CP.7 on the modalities and procedures for the CDM?	/1/	DR I	The project involves grid connected electricity generation from hydro resources. The installed capacity is about 2.33 MW which is less than the stipulated 15 MW. Hence the project qualifies as type I-D small scale project.		OK
A.1.2. The small scale project activity is not a debundled component of a larger project activity?	/1/	DR I	The project activity is not a de-bundled activity of a larger project since there are no other projects with the same project participant within 1 km of the project boundary. There is another registered project with the same project participant in the same category. However the sum of the installed capacities of the two projects amount to ~6 MW. Hence the project activity is not a de-bundled component of a large scale project.		OK
A.1.3. Does proposed project activity confirm to one of the project categories defined for small scale CDM project activities?	/1/	DR	The project being a grid-connected hydro-electricity generation project with total installed capacity of about 2.33 MW; it conforms to category I.D of small scale project activities.		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<b>A.2. Project Design</b> Validation of project design focuses on the choice of technology and the design documentation of the project.					
A.2.1. Are the project's spatial (geographical) boundaries clearly defined?	/1/	DR I	Yes, the project is distributed in 4 locations, namely Seongnam, Dalbang, Juam and Daechyeong in the Republic of Korea.		OK
A.2.2. Are the project's system (components and facilities used to mitigate GHG's) boundaries clearly defined?	/1/	DR	Yes, the project's system boundaries include the power generation facilities in the 4 locations and the KEPCO grid to which the power is exported. The components include the turbine, generator and the transformer, and for calculation of baseline emission factors the power plants generating and exporting to the grid are included in the boundary.		OK
A.2.3. Does the project design engineering reflect current good practices?	/1/	DR I	The project employs horizontal and vertical Francis turbines for power generation. This is the most applied technology for hydro power generation world-wide. However the PDD talks about some customisation in the generator to suit the project. The project proponent is requested to clarify what special modifications have been made to the generator.	<del>CL1</del>	OK
A.2.4. Will the project result in technology transfer to the host country?	/1/	DR	The project does not involve any technology transfer to the Republic of Korea.		OK
A.2.5. Does the project require extensive initial training and maintenance efforts in order to work as presumed during the project	/1/	DR	The project requires initial training for maintenance and monitoring. The project proponent has made plans for the		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
period? Does the project make provisions for meeting training and maintenance needs?			identification and provision of training of the personnel employed.		
<b>A.3. Contribution to Sustainable Development</b> The project's contribution to sustainable development is assessed					
A.3.1. Will the project create other environmental or social benefits than GHG emission reductions?	/1/	DR	The project being zero-emission power generation project, it will reduce local pollution level thus improving the quality of the local environment.		OK
A.3.2. Will the project create any adverse environmental or social effects?	/1/	DR I	Since the project activity aims at using the outflows from the existing dams or purification plants for generation of electricity and does not involve the construction of new dams, the project will not create any adverse environmental or social effects.		OK
A.3.3. Is the project in line with sustainable development policies of the host country?	/1/	DR	The project is likely to be in line with sustainable development policies of the host country (Korea). However, written confirmation that the project meets the host country specific CDM requirements and assists in achieving sustainable development has not been obtained yet. This has to be submitted to the validator.	<del>CAR-1</del>	OK
A.3.4. Is the project in line with relevant legislation and plans in the host country?	/1/	DR I	During interviews it was indicated that all 4 projects have permits for construction and operation of small-scale hydroelectricity power plants. But evidence of same was not available for verification. The project proponent is requested to provide the	<del>CL-2</del>	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			necessary permits or documents pertaining to the applications for permits.		
<b>B. Project Baseline</b> The validation of the project baseline establishes whether the selected baseline methodology is appropriate and whether the selected baseline represents a likely baseline scenario.	/1/				
<b>B.1. Baseline Methodology</b> It is assessed whether the project applies an appropriate baseline methodology.					
B.1.1. Is the selected baseline methodology in line with the baseline methodologies provided for the relevant project category?	/1/	DR	The project selects the approved small scale methodology AMS – I. D.		OK
B.1.2. Is the baseline methodology applicable to the project being considered?	/1/	DR	Yes, the project being a grid-connected renewable energy project, the selected methodology AMS – I.D is applicable.		OK
<b>B.2. Baseline Determination</b> It is assessed whether the project activity itself is not a likely baseline scenario and whether the selected baseline represents a likely baseline scenario.					
B.2.1. Is it demonstrated that the project activity itself is not a likely baseline scenario due to the existence of one or more of the following barriers: investment barriers, technology barriers, barriers due to prevailing practice or other barriers?	/1/	DR I	The additionality of the project has been demonstrated by a barrier analysis as well as a financial analysis. Investment has been selected as a barrier. However it is not clear from the PDD that if the Korean govt. has different policies to support small hydro	<del>CL-3</del>	OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			<p>electric projects why the investment is a barrier. Also it is not clear how the tariff for small hydro projects is different from other power generation projects.</p> <p>In the investment analysis the project proponent is requested to provide evidence of the investment. The operating &amp; maintenance cost for small hydro projects are usually lower. But the operating costs in the financial analysis seem very high. The project proponent is requested to justify the operating cost. The project proponent is also requested to provide information on the applied tax rate.</p>		
B.2.2. Is the application of the baseline methodology and the discussion and determination of the chosen baseline transparent and conservative?	/1/	DR I	<p>Yes, the baseline selection has been done in a conservative and transparent manner. Electricity generation from the power plants connected to the KEPCO grid has been taken as the baseline.</p> <p>The average of the approximate operating margin and build margin is used to determine the baseline.</p> <p>In calculation of the approximate operating margin emission coefficient, the generation from hydro, nuclear, low cost biomass and geothermal power plants have been excluded from the list of power plants as required by AMS-I.D.</p> <p>In the calculation of the build margin emission coefficient, the most recent capacity additions that contribute to 21.81% of the total generation have been used since 20% of the</p>		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			total generation was falling on part capacity. As per the forecast for electricity composition published by the Ministry of Commerce, Industry and Energy (MOCIE) the determination of the baseline emission coefficient and considering the ex-ante baseline emission coefficient for the first crediting period seems to be conservative, since the major capacity additions between 2005 and 2010 are expected to be fossil fuel based power plants.		
B.2.3. Are relevant national and/or sectoral policies and circumstances taken into account?	/1/	DR	Yes, relevant national and/or sectoral policies and circumstances have been taken into account.		OK
B.2.4. Is the baseline selection compatible with the available data?	/1/	DR I	Yes, the selected baseline is the electricity generation from the power plants connected to the KEPCO grid. All data required for calculating the baseline emissions are available from KEPCO.		OK
B.2.5. Does the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity?	/1/	DR I	Yes, considering all data drawn on the most recent years and forecast for electricity composition published by MOCIE, the selected baseline represent the most likely scenario describing what would have occurred in absence of the project activity.		OK
<b>C. Duration of the Project / Crediting Period</b> It is assessed whether the temporary boundaries of the project are clearly defined.					
C.1.1. Are the project's starting date and operational lifetime clearly defined?	/1/	DR I	Yes, the starting date of the project has been defined clearly as the commissioning date of		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-9



Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			each of the generating units. The lifetime of the project is 30 years.		
C.1.2. Is the assumed crediting time clearly defined (renewable crediting period of seven years with two possible renewals or fixed crediting period of 10 years with no renewal)?	/1/	DR	The project selects a twice renewable crediting period of 7 years starting from 01-06-2008.		OK
<b>D. Monitoring Plan</b> The monitoring plan review aims to establish whether all relevant project aspects deemed necessary to monitor and report reliable emission reductions are properly addressed.					
<b>D.1. Monitoring Methodology</b> It is assessed whether the project applies an appropriate monitoring methodology.					
D.1.1. Is the selected monitoring methodology in line with the monitoring methodologies provided for the relevant project category?	/1/	DR	The project selects the approved monitoring methodology AMS – I. D.		OK
D.1.2. Is the monitoring methodology applicable to the project being considered?	/1/	DR	Yes, the methodology is applicable to the project activity since it involves grid-connected electricity generation from hydro resources.		OK
D.1.3. Is the application of the monitoring methodology transparent?	/1/	DR	Yes, the monitoring methodology provides for collection of power generation data from the project and all other data required for calculating the emission factor of the KEPCO grid.		OK
D.1.4. Will the monitoring methodology give	/1/	DR	Yes, the monitoring methodology will give		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
opportunity for real measurements of achieved emission reductions?			opportunity for real measurement of the emission reductions.		
<b>D.2. Monitoring of Project Emissions</b> It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.2.1. 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/	DR	There are no emissions from the project activity.		OK
<b>D.3. Monitoring of Leakage</b> If applicable, it is assessed whether the monitoring plan provides for reliable and complete leakage data over time.					
D.3.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining leakage?	/1/	DR	There are no leakages from the project activity.		OK
<b>D.4. Monitoring of Baseline Emissions</b> It is established whether the monitoring plan provides for reliable and complete project emission data over time.					
D.4.1. Does the monitoring plan provide for the collection and archiving of all relevant data necessary for determining baseline emissions during the crediting period?	/1/	DR	The monitoring plan provides for the collection of data regarding power generation, fuel consumption and calorific value of different fuels used in the power		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			plants connected to the KEPCO grid in 2002, 2003 and 2004. These data are deemed sufficient to calculate the baseline emission factor.		
D.4.2. Is the choice of baseline indicators, in particular for baseline emissions, reasonable?	/1/	DR	CO <sub>2</sub> is the only indicator that needs to be accounted for and it has been considered.		OK
D.4.3. Will it be possible to monitor / measure the specified baseline indicators?	/1/	DR	Yes.		OK
D.4.4. Will the indicators give opportunity for real measurements of baseline emissions?	/1/	DR	Yes.		OK
<b>D.5. Project Management Planning</b> It is checked that project implementation is properly prepared for and that critical arrangements are addressed.					
D.5.1. Is the authority and responsibility of project management clearly described?	/1/	DR	Yes, the authority and responsibility of the project management has been described clearly. The responsibility lies with the electric power management department.		OK
D.5.2. Is the authority and responsibility for registration monitoring measurement and reporting clearly described?	/1/	DR	Yes the monitoring and reporting will be done by the management centre of each of the sites.		OK
D.5.3. Are procedures identified for training of monitoring personnel?	/1/	DR	Yes, procedures have been identified for training of monitoring personnel.		OK
D.5.4. Are procedures identified for emergency preparedness for cases where emergencies can cause unintended emissions?	/1/	DR	There are no emergencies that might lead to unintended emissions.		OK

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Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
D.5.5. Are procedures identified for calibration of monitoring equipment?	/1/	DR	Yes, the monitoring equipment will be calibrated every three years at least.		OK
D.5.6. Are procedures identified for maintenance of monitoring equipment and installations?	/1/	DR	Yes, maintenance procedures have been identified.		OK
D.5.7. Are procedures identified for monitoring, measurements and reporting?	/1/	DR	Yes, procedures for monitoring and reporting have been identified.		OK
D.5.8. Are procedures identified for day-to-day records handling (including what records to keep, storage area of records and how to process performance documentation)	/1/	DR	Yes, the amount of electricity transmitted to the grid shall be measured automatically by meters and the measured data will be simultaneously transferred to the central control system of small-scale hydroelectric power plant and Korea Power Exchange. The measured amount of electricity shall be collected daily, weekly, and monthly and will be archived electronically.		OK
D.5.9. Are procedures identified for dealing with possible monitoring data adjustments and uncertainties?	/1/	DR	The electricity generation and exported to the grid will be cross-checked with data from the Korea Power Exchange		OK
D.5.10. Are procedures identified for internal audits of GHG project compliance with operational requirements as applicable?	/1/	DR	Yes, the existing quality and environment management system has procedures for internal audit.		OK
D.5.11. Are procedures identified for project performance reviews?	/1/	DR	Yes, the existing quality and environment management system has procedures for performance reviews.		OK
D.5.12. Are procedures identified for corrective actions?	/1/	DR	Yes, procedures for corrective actions have been identified.		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<b>E. Calculation of GHG emission</b> 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.					
<b>E.1. Project GHG Emissions</b> The validation of ex-ante estimated project GHG emissions focuses on transparency and completeness of calculations.					
E.1.1. Are all aspects related to direct and indirect project emissions captured in the project design?	/1/	DR	There are no direct or indirect emissions from the project activity.		OK
<b>E.2. Leakage</b> It is assessed whether there leakage effects, i.e. change of emissions which occurs outside the project boundary and which are measurable and attributable to the project, have been properly assessed and estimated ex-ante.					
E.2.1. Are leakage calculation required for the selected project category and if yes, are the relevant leakage effects assessed?	/1/	DR	There are no leakages from the project activity.		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
<b>E.3. Baseline GHG Emissions</b> The validation of ex-ante estimated baseline GHG emissions focuses on transparency and completeness of calculations.					
E.3.1. Are the baseline emission boundaries clearly defined and do they sufficiently cover sources for baseline emissions?	/1/	DR	Yes the baseline emission boundaries include the four hydro power generation facilities and the KEPCO grid.		OK
E.3.2. Are all aspects related to direct and indirect baseline emissions captured in the project design?	/1/	DR	Yes, the direct emissions from the baseline are related to the electricity generation from the project and the emission factor of the KEPCO grid. This has been captured in the project design.		OK
E.3.3. Have all relevant greenhouse gases and sources been evaluated?	/1/	DR	CO <sub>2</sub> is the only GHG that need to be accounted for and it has been evaluated.		OK
E.3.4. Do the methodologies for calculating baseline emissions comply with existing good practice?	/1/	DR	Yes.		OK
E.3.5. Are the calculations documented in a complete and transparent manner?	/1/	DR	Yes.		OK
E.3.6. Have conservative assumptions been used?	/1/	DR	Yes, conservative assumptions have been used. Local calorific value data have been used and all other data regarding power generation and fuel consumption have been obtained from KEPCO data. The emission factor has been calculated as a combination of approximate operating margin and build margin according to AMS-I.D.		OK
E.3.7. Are uncertainties in the baseline emissions	/1/	DR	The only uncertainty in the baseline emission estimates arise from the power generation	<del>CL4</del>	OK

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Page A-15

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
estimates properly addressed?		I	efficiency of the hydro-electric plants. The project proponent is requested to justify the power generation estimates given in the PDD. The power generation efficiency of 75% for a hydro power plant seems to be very high.		
<b>E.4. Emission Reductions</b> Validation of ex-ante estimated emission reductions.					
E.4.1. Will the project result in fewer GHG emissions than the baseline case?	/1/	DR	Yes, The project will result in emission reductions of about 8 697 t CO <sub>2</sub> per annum.		OK
<b>F. Environmental Impacts</b> It is assessed whether environmental impacts of the project are sufficiently addressed.					
F.1.1. Does host country legislation require an analysis of the environmental impacts of the project activity?	/1/	DR	No, 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 hydroelectric power projects.		OK
F.1.2. Does the project comply with environmental legislation in the host country?	/1/	DR I	During interviews it was indicated that all four projects have already obtained or applied for permits for construction or/and operation of small-scale hydroelectricity power plants. But evidence of these permits was not available for verification. The project proponent is requested to provide the necessary permits or documents pertaining to the applications for permits.	<del>CL2</del>	OK
F.1.3. Will the project create any adverse	/1/	DR	There are no adverse environmental effects		OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

Page A-16

Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
environmental effects?			envisaged due to the project.		
F.1.4. Have environmental impacts been identified and addressed in the PDD?	/1/	DR	There are no adverse environmental effects associated with the project,		OK
<b>G. Comments by Local Stakeholder</b> Validation of the local stakeholder consultation process.					
G.1.1. Have relevant stakeholders been consulted?	/1/	DR I	The stakeholders for this project are people from the local community, the Korea Power Exchange, KEPCO, the downstream residents and the related government offices. Approval letters have been acquired from these stakeholders. Evidence of the same is requested for verification.	<del>CL-5</del>	OK
G.1.2. Have appropriate media been used to invite comments by local stakeholders?	/1/	DR I	The news of three of the project sites have been published in a local newspaper. However the PDD is not clear about the other site. The project proponent is requested to clarify how stakeholder comments are solicited.	<del>CL-6</del>	OK
G.1.3. 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/	DR I	A stakeholder consultation process for this project is not required by the Korean DNA. However, the approval process of electricity business, stream occupation and row-line construction for small hydro power plant construction requires collection of stakeholders' comments.  All approval letters except stream occupation have been issued. The project proponent is requested to provide the letter of approvals for verification.	<del>CL-5</del>	OK

\* MoV = Means of Verification, DR= Document Review, I= Interview



Checklist Question	Ref.	MoV*	Comments	Draft Concl.	Final Concl.
			The approvals for stream occupation have not been issued yet since the projects are yet under construction.		
G.1.4. Is a summary of the comments received provided?	/1/	DR I	A summary of the comments received have not been included in the PDD since the project did not receive any adverse comment. However, the project proponent is requested to provide the evidence of the stakeholder consultation process to confirm this.	GL-5	OK
G.1.5. Has due account been taken of any comments received?	/1/	DR I	Since the project did not receive any adverse comment, no actions were necessary and hence a summary of due accounts taken have not been included in the PDD. However, the project proponent is requested to provide the evidence of the stakeholder consultation process to confirm this.	GL-5	OK

\* MoV = Means of Verification, DR= Document Review, I= Interview

**Table 3 Resolution of Corrective Action and Clarification Requests**

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CAR 1</p> <p>Written confirmation that the project meets the host country specific CDM requirements and assists in achieving sustainable development has not yet been obtained. This has to be submitted to the validator.</p>	A.3.3	<p>Received the DNA approval, dated September 14 2006.</p> <p>The evidence was submitted.</p>	<p>OK. The letter of approval from the Korean DNA has been submitted to the validator. CAR 1 is closed.</p>
<p>CL 1</p> <p>The PDD talks about some customisation in the generator to suit the project. The project proponent is requested to clarify what special modifications have been made to the generator.</p>	A.2.3	<p>The project proponent considered the water source conditions such as flow velocity and flow volume. Based on this information, there was small modification of the water turbine generator. It is reflected into PDD.</p>	<p>OK. The project proponent has made some marginal modifications in the generator design on the basis of the flow velocity and available water volume conditions. The water turbine is directly linked to the shaft thereby reducing complexity of the system. CL 1 is closed.</p>
<p>CL 2</p> <p>During interviews it was indicated that all 4 projects have permits for construction and operation of small-scale hydroelectricity power plants. But evidence of same was not available for verification. The project proponent is requested to provide the necessary permits or documents pertaining to the applications for permits.</p>	A.3.4	<p>The evidence of these permits was submitted - Approval letter of electricity business for 4 sites and Approval letter of stream occupation for 2 sites (Daecheong-dam, Juam-dam). Dalbang-dam will be located internal boundary of Kwater and Seongnam II does not use stream. So these dams do not have to get its approval letter of stream occupation.</p> <p>The evidence of these permits was submitted.</p>	<p>OK. The permits for construction and generation of electricity have been verified and found to be in order. CL 2 is closed.</p>
<p>CL 3</p> <p>The additionality of the project has been demonstrated by a barrier analysis as well as a</p>	B.2.1	<p>Korea Government has carried out the policy to support the small scale hydro power generation economically in order to activate the small hydro</p>	<p><b>NOT OK.</b> The figures in the PDD for the operating cost and corporation tax does not</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>financial analysis. Investment has been selected as a barrier. However it is not clear from the PDD that if the Korean govt. has different policies to support small hydro electric projects why the investment is a barrier. Also it is not clear how the tariff for small hydro projects is different from other power generation projects.</p> <p>In the investment analysis the project proponent is requested to provide evidence of the investment. The operating &amp; maintenance cost for small hydro projects are usually lower than presented here, as the operating costs in the financial analysis seem very high. The project proponent is requested to justify the operating costs. The project proponent is also requested to provide information on the applied tax rate.</p>		<p>power generation plant. A unit cost of fuel of oil heating power generation plant was adapted to small hydro power electricity. The explanation is reflected into PDD.</p> <p>The discount rate of Dalbang-dam, Juam-dam, Daechong-dam is 4.25 and the discount rate of Seongnam is 4.0.</p> <p>Insurance and Tax rate: 0.42% of total construction cost from the design report of each project. O&amp;M cost of Juam-dam is 2.9% of total construction cost and O&amp;M cost of Seongnam, Dalbang-dam and Daechong-dam is 2.0% from the design report of each project.</p>	<p>match with the figures in the excel sheet. The project proponent has deducted depreciation while calculating the NPV. However since depreciation is not actual cash-outflow it should be included in the NPV calculation after calculation of the tax component. The project proponent is requested to calculate the NPV for the project taking the depreciation into account. Also clarification is requested why separate discount rates have been considered for the different sites.</p>
<p><b>CL 3 (Continued)</b></p> <p>The figures in the PDD for the operating cost and corporation tax does not match with the figures in the excel sheet. The project proponent has deducted depreciation while calculating the NPV. However since depreciation is not actual cash-outflow it should be included in the NPV calculation after calculation of the tax component. The project proponent is requested to calculate the NPV for the project taking the depreciation into account. Also clarification is requested why separate discount rates have been considered for the different sites.</p>	B.2.1	<p>The project planning was conducted at different periods and the discount rate of that period is considered. Evidence submitted to DOE.</p> <p>The operating costs and tax figures have been modified in the PDD.</p> <p>The depreciation has been taken into account and the NPV calculations have been modified. However the NPV for the sites are still negative. The NPV calculations have been attached with the PDD.</p>	<p><b>OK.</b> The discount rates have been verified and the revised NPV calculations have been verified. The NPV calculations have been found to be correct. The calculation spreadsheets have been attached with the PDD. CL 3 is closed.</p>

Draft report corrective action requests and requests for clarification	Ref. to Table 2	Summary of project participants' response	Final conclusion
<p>CL 4</p> <p>The only uncertainty in the baseline emission estimates arise from the power generation efficiency of the hydro-electric plants. The project proponent is requested to justify the power generation estimates given in the PDD. The power generation efficiency of 75% for a hydro power plant seems to be very high.</p>	E.3.7	<p>The power generation efficiency was estimated based on previous data and the capacity of the generators that are installed by the project. According to their data, the efficiency is about 72%. The evidence was submitted.</p>	<p>OK. The power generation estimates were checked and it is likely that the project will generate the forecast electricity generation figures. CL 4 is closed. CL 4 is closed.</p>
<p>CL 5</p> <p>The stakeholders for this project are people from the local community, the Korea Power Exchange, KEPCO, the downstream residents and the related government offices. Approval letters have been acquired from these stakeholders. Evidence of the same is requested for verification.</p>	G.1.1 G.1.3 G.1.4	<p>According to local regulation, before receiving Approval letter of electricity business and Approval letter of stream occupation, stakeholders' comment should be considered. The approval letters were obtained after due consideration of the stakeholder comments</p> <p>The evidence of these permits was submitted.</p>	<p>OK. The relevant stakeholders have been consulted and their comments have been taken into account. CL 5 is closed.</p>
<p>CL 6</p> <p>The news of three of the project sites have been published in a local newspaper. However the PDD is not clear about one site. The project proponent is requested to clarify how stakeholder comments are solicited.</p>	G.1.2	<p>The Electimes has included contents about small hydro power plant of Dalbang dam, Daecheong dam and Juam dam. The sustainable report of Kwater is issued annually and opened to the public. Small hydro power plant of Dalbang dam, Daecheong dam, Juam dam and Seongnam II were mentioned on the 2005 sustainable report of Kwater. It is reflected into PDD.</p>	<p>OK. The stakeholders have been informed about the project activities in all the sites. CL 6 is closed.</p>

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## **APPENDIX B**

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### **CERTIFICATES OF COMPETENCE**



## CERTIFICATE OF COMPETENCE

### *Michael Lehmann*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	Yes
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1,2,3 & 9		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

**Einar Telnes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



# CERTIFICATE OF COMPETENCE

## *Einar Ternes*

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-CDMJ1-i1)

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	Yes
<b>CDM Verifier:</b>	Yes	<b>JI Verifier:</b>	Yes
<b>Industry Sector Expert for Sectoral Scope(s):</b>	Sectoral scope 1,2,3,6 & 10		
<b>Technical Reviewer for (group of) methodologies:</b>			
ACM0001, AM0002, AM0003, AM0010, AM0011, AM0012, AMS-III.G	Yes	AM0021	Yes
ACM002, AMS-I.A-D, AM0019, AM0026, AM0029	Yes	AM0023	Yes
ACM003, ACM0005, AM0033, AM0040	Yes	AM0024	Yes
ACM0004	Yes	AM0027	Yes
ACM0006, AM0007, AM0015, AM0036, AM0042	Yes	AM0028, AM0034	Yes
ACM0007	Yes	AM0030	Yes
ACM0008	Yes	AM0031	Yes
ACM0009, AM0008, AMS-III.B	Yes	AM0032	Yes
AM0006, AM0016, AMS-III.D	Yes	AM0035	Yes
AM0009, AM0037	Yes	AM0038	Yes
AM0013, AM0022, AM0025, AM00379, AMS-III.H, AMS-III.I	Yes	AM0041	Yes
AM0014	Yes	AM0034	Yes
AM0017	Yes	AMS-II.A-F	Yes
AM0018	Yes	AMS-III.A	Yes
AM0020	Yes	AMS-III.E, AMS-III.F	Yes

Høvik, 6 November 2006

**Einar Ternes**  
*Director, International Climate Change Services*

**Michael Lehmann**  
*Technical Director*



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## CERTIFICATE OF COMPETENCE

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***Soumik Biswas***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-  
CDMJ1-i1

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	Yes	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		

Høvik, 6 November 2006

Einar Telnes  
Director, International Climate Change Services

Michael Lehmann  
Technical Director

***Young-Keun Kim***

Qualification in accordance with DNV's Qualification scheme for CDM/JI (ICP-9-8-i1-  
CDMJ1-i1

<b>GHG Auditor:</b>	Yes		
<b>CDM Validator:</b>	--	<b>JI Validator:</b>	--
<b>CDM Verifier:</b>	--	<b>JI Verifier:</b>	--
<b>Industry Sector Expert for Sectoral Scope(s):</b>	--		

Høvik, 6 November 2006

Einar Telnes  
Director, International Climate Change Services

Michael Lehmann  
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