



VALIDATION REPORT

SAMDAL WIND POWER PROJECT IN REPUBLIC OF KOREA

REPORT No. 2009-9203

REVISION No. 01

DET NORSKE VERITAS



VALIDATION REPORT

Date of first issue: 2010-02-20		ConCert Project No.: PRJC-144499-2009-CCS-KOR
Recommended for approval Hendrik Brinks	Approved by Michael Lehmann	Organisational unit: DNV Climate Change and Environmental Services
Client: Hanshin Energy Co., Ltd.		Client ref.: Mr. Hyung-seuk Kim

DNV Climate Change and Environmental Services

Veritasveien 1,
1322 HØVIK, Norway
Tel: +47 67 57 99 00
Fax: +47 67 57 99 11
http://www.dnv.com
Org. No: NO 945 748 931 MVA

Summary:

Project Name: Samdal Wind Power project

Country: Republic of Korea

Methodology: ACM0002

Version: 11

GHG reducing Measure/Technology: Grid-connected electricity generation from wind energy

ER estimate: 54 276 tCO₂e per year (average)

Size

☒ Large Scale

☐ Small Scale

Validation Phases:

☒ Desk Review

☒ Follow up interviews

☒ Resolution of outstanding issues

Validation Status

☐ Corrective Actions Requested

☐ Clarifications Requested

☒ Full Approval and submission for registration

☐ Rejected

In summary, it is DNV's opinion that the project activity "Samdal Wind Power project" in Republic of Korea, as described in the PDD, version 5 of 28 January 2011, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002, version 11. Hence DNV requests the registration of the project as a CDM project activity.

Report No.: 2009-9203		Subject Group: Environment
Report title: Samdal Wind Power Project in Republic of Korea		
Work carried out by: Seung Hyun Kwak, Zhang Xiaojun Johnsen		
Work verified by: Felipe Lacerda Antunes (final) Zhiang(Walter) Tang (draft)		
Date of this revision: 2011-03-28	Rev. No.: 01	Number of pages: 30

Indexing terms

Key words

Climate Change

Kyoto Protocol

Validation

Clean Development Mechanism

- ☒ No distribution without permission from the client or responsible organisational unit
- ☐ free distribution within DNV after 3 years
- ☐ Strictly confidential
- ☐ Unrestricted distribution

© 2009 Det Norske Veritas AS

All rights reserved. This publication or parts thereof may not be reproduced or transmitted in any form or by any means, including photocopying or recording, without the prior written consent of Det Norske Veritas AS.



<i>Table of Content</i>	<i>Page</i>
1 EXECUTIVE SUMMARY – VALIDATION OPINION	1
2 INTRODUCTION	2
2.1 Objective	2
2.2 Scope	2
3 METHODOLOGY	3
3.1 Desk review of the project design documentation	3
3.2 Follow-up interviews with project stakeholders	7
3.3 Resolution of outstanding issues	8
3.4 Internal quality control	11
3.5 Validation team	11
4 VALIDATION FINDINGS	12
4.1 Participation requirements	12
4.2 Project design	12
4.3 Application of selected baseline and monitoring methodology	13
4.4 Project boundary	14
4.5 Baseline identification	14
4.6 Additionality	15
4.7 Monitoring	24
4.8 Algorithms and/or formulae used to determine emission reductions	26
4.9 Environmental impacts	29
4.10 Comments by local stakeholders	29
4.11 Comments by Parties, stakeholders and NGOs	30
Appendix A Validation Protocol	
Appendix B Curricula vitae of the validation team members	



Abbreviations

AEEI	The Advance Examination of the Environmental Impact
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CER	Certified Emission Reduction(s)
CFSR	Construction Feasibility Study Report
CH ₄	Methane
CL	Clarification request
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
DNV	Det Norske Veritas
DNA	Designated National Authority
EF	Emission Factor
EIA	Environmental Impact Assessment
FAR	Forward Action Request
GCV	Gross Calorific Value
GHG	Greenhouse gas(es)
IPCC	Intergovernmental Panel on Climate Change
KEMCO	Korea Energy Management Corporation
KEPCO	Korea Electric Power Corporation
KIER	Korea Institute of Energy Research
KOSPO	Korea South Power Corporation
KPX	Korea Power Exchange
LoA	Letter of approval
MOCIE	Ministry of Commerce, Industry and Economy (Currently, Ministry of Knowledge Economy)
MOKE	Ministry of Knowledge Economy (Formerly, Ministry of Commerce, Industry and Economy)
MOLEG	Ministry of Government Legislation
MP	Monitoring Plan
N ₂ O	Nitrous oxide
NGO	Non-governmental Organisation
ODA	Official Development Assistance
OM	Operating Margin
PDD	Project Design Document
PFL	Plant Load Factor
SMP	System Marginal Price
tCO ₂ e	Tonnes of CO ₂ equivalents
UNFCCC	United Nations Framework Convention on Climate Change
GWP	Global Warming Potential



1 EXECUTIVE SUMMARY – VALIDATION OPINION

Det Norske Veritas Certification AS (DNV) has performed a validation of the project activity “Samdal Wind Power project” in Republic of Korea. The validation was performed on the basis of UNFCCC criteria for the Clean Development Mechanism and host Party 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 Party is Republic of Korea and the Annex I Party is not identified until the validation conclusion is made. The host party fulfils the participation criteria and have approved the project and authorized the project participants Hanshin Energy Co, Ltd.. The DNA from Republic of Korea confirmed that the project assists in achieving sustainable development.

The project correctly applies the baseline and monitoring methodology ACM0002, version 11 “Consolidated baseline & monitoring methodology for grid connected electricity generation from renewable sources”.

By generating renewable energy which will displace electricity in the grid in Republic of Korea, the project results in reductions of CO₂ emissions that are real, measurable and give long-term benefit 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 54 276 tCO_{2e} per year over the selected 10 year fixed crediting period. The emission reduction forecast has been checked and it is deemed likely that the stated amount is achieved given that the underlying assumptions do not change.

The monitoring plan provides for the monitoring of the project’s emission reductions. The monitoring arrangements described in the monitoring plan are feasible within the project design and it is DNV’s opinion that the project participants are able to implement the monitoring plan.

In summary, it is DNV’s opinion that the project activity “Samdal Wind Power project” in Republic of Korea, as described in the PDD, version 5 dated 28 January 2011, meets all relevant UNFCCC requirements for the CDM and all relevant host Party criteria and correctly applies the baseline and monitoring methodology ACM0002, version 11. Hence, DNV requests the registration of the project as a CDM project activity.

Beijing and Oslo, 2011-03-28

*Zhang Xiaojun
Johnsen.*

Xiaojun Johnsen Zhang
CDM Validator
DNV Beijing

Michael Lehmann

Michael Lehmann
Director of Services and Technologies
Det Norske Veritas Certification AS



2 INTRODUCTION

Hanshin Energy Co., Ltd. has commissioned Det Norske Veritas Certification AS (DNV) to perform a validation of the “Samdal Wind Power project” in Republic of Korea (hereafter called “the project”). This report summarises the findings of the validation of the project, performed 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, and the subsequent decisions by the CDM Executive Board.

2.1 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).

2.2 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, and the relevant decisions by the CDM Executive Board, including the approved baseline and monitoring methodology ACM0002 (version 11). The validation was based on the recommendations in the Validation and Verification Manual /27/

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.



3 METHODOLOGY

The validation consisted of the following three phases:

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

The following sections outline each step in more detail.

3.1 Desk review of the project design documentation

The following tables list the documentation that was reviewed during the validation.

3.1.1 Documentation provided by the project participants

- /1/ Hanshin Energy Co., Ltd.: *CDM-PDD for project activity "Samdal Wind Power project" in Republic of Korea*, Version 1 dated 16 June 2008 and Version 5 dated 28 January 2011
- /2/ Evergreen Test Office Co. Ltd., *The Advance Examination of the Environmental Impact*, March 2007
- /3/ Korea Institute of Energy Research(KIER), *Construction Feasibility Study Report*, November 2006
- /4/ Hanshin Energy Co., Ltd. *Calculation sheet of OM, BM and CM*
- /5/ VESTAS, *General specification V90 3.0MW VCRS*, 18 October 2006
- /6/ Hanshin Energy Co., Ltd, *Minute of Board Meeting*, 19 December 2006.
- /7/ Hanshin Energy Co., Ltd, *Stakeholder meeting minutes*, 20 August 2007 / 27 July 2007
- /8/ YeongJu Wind Tech Corporation, *Property Lease Agreement(Land lease)*, 5 August 2005
- /9/ Hanshin Energy Co., Ltd./Namhai Construction Co., Ltd./YeongJu Wind Tech Corporation, *Joint Venture Agreement*, 21 December 2006
- /10/ Hanshin Energy Co., Ltd./Vestas Korea Wind Technology Co., Ltd, *Wind Turbine Purchasing Agreement*, 29 December 2007
- /11/ Hanshin Energy Co., Ltd./ECOYE, *Consulting Service Agreement*, 9 February 2009
- /12/ Hanshin Energy Co., Ltd., *Hotel Purchasing Agreement*, 11 February 2009
- /13/ Hanshin Energy Co., Ltd, *DM Project Monitoring Procedure (HSD-004, Rev. 0)*, 20 September 2009
- /14/ Seochang Electric Communication Co., Ltd., *Procedure for operation and maintenance for Energy suppliers and Consumers / KPX Revenue Meter*.
- /15/ YeongJu Wind Tech Corporation & Union of Samdal-Ri Co-ranch, *Property Lease Agreement*, 5 August, 2005.
- /16/ Hanshin Energy Co., Ltd. & Union of Samdal-Ri Co-ranch, *Property Lease Agreement*,



1 September 2008.

- /17/ Hanshin Energy Co., Ltd./Vestas Korea Wind Technology Co., Ltd, General Conditions for Maintenance, Service and Availability Agreement (MSA Agreement), 29 December 2007
- /18/ Hanshin Energy Co., LTD/LG International Corp., CDM Consulting Contract, 1 October 2007
- /19/ Hanshin Energy Co., Ltd., Bank transaction records, February 2008 ~ 27 October 2009
- /20/ Hanshin Energy Co., Ltd., Jeju Samdal Wind Power Plant Construction Contract, 2 October 2008
- /21/ Hanshin Energy Co., Ltd., Investment analysis in MS Excel spreadsheet dated 12 July 2010.
- /22/ Jeju Self-governing Provincial Government, Permit of implementation of wind power project, 28 February 2008
- /23/ Jeju Self-governing Provincial Government, Permit of ,modified implementation of wind power project, 23 June 2008
- /24/ Hanshin Energy Co., Ltd & Namhae Construction Co., Ltd, Construction work contract, 13 October 2008
- /25/ Kookmin Bank, Letter regarding the confirmation of project bank loan interest, 1 February 2011

3.1.2 Letters of approval

- /26/ Korea Ministry of Knowledge Economy on behalf of DNA of Republic of Korea: Approval letter of CDM Project dated 3 December 2009

3.1.3 Methodologies, tools and other guidance by the CDM Executive Board

- /27/ CDM Executive Board: *Validation and Verification Manual*, version 1.2
- /28/ CDM Executive Board: *Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources*, ACM0002, version 11
- /29/ CDM Executive Board: *Tool for the demonstration and assessment of additionality*, Version 5.2.
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-01-v5.2.pdf>
- /30/ CDM Executive Board: *Tool to calculate the emission factor for an electricity system*, version 2
<http://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-07-v2.pdf>
- /31/ CDM Executive Board: *Guidance on the Assessment of Investment Analysis*, Version2
http://cdm.unfccc.int/EB/041/eb41_repan45.pdf
- /32/ CDM Executive Board: *Guidelines for the reporting and validating of plant load factors* Version 1



- http://cdm.unfccc.int/EB/048/eb48_repan11.pdf
- /33/ CDM Executive Board: *Clarifications on the treatment of National and/or Sectoral policies and regulations (paragraph 45(e) of the CDM Modalities and Procedures) in determining a baseline scenario*
- <http://cdm.unfccc.int/EB/016/eb16repan3.pdf>
- /34/ CDM Executive Board: *Clarification on the consideration of national and/or sectoral policies and circumstances in baseline scenarios, Version02.*
- http://cdm.unfccc.int/EB/022/eb22_repan3.pdf
- /35/ CDM Executive Board: *Glossary of CDM Terms, Version 04*
- http://cdm.unfccc.int/Reference/Guidclarif/glos_CDM_v04.pdf
- /36/ CDM Executive Board: *Guidelines on the demonstration and assessment of prior consideration of the CDM, Version03*
- http://cdm.unfccc.int/Reference/Guidclarif/reg/reg_guid04.pdf

3.1.4 Documentation used by DNV to validate / cross-check the information provided by the project participants

- /37/ Korea Ministry of Commerce, Industry and Economy (MOCIE), Generation of electric power margined the volunteer system improvement in addition to RPS system connection plan (2004-N-PS04-04), 31 March 2006
- /38/ Korea Power Exchange (KPX), Regulation on electricity market operation, April 2008
- /39/ Korea Ministry of Government Legislation (MOLEG), Act on measurement, 18 March 2009
- <http://www.moleg.go.kr/>
- /40/ Korea Electric Power Corporation (KEPCO), Statistics of Electric Power in Korea 2006, 2007, 2008
- <http://www.kepc.co.kr/eng/>
- /41/ Korea Power Exchange (KPX), Status of 2008 Power Generation Facilities.
- <http://epsis.kpx.or.kr/epsis/htdocs/EKDO/EKDO001L1.jsp>
- /42/ IPCC, 2006 IPCC Guidelines on National GHG Inventories,
- http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf
- /43/ Korea Ministry of Government Legislation (MOLEG), Act on the development, use and promotion of new and renewable energy, 21 May 2009
- <http://www.moleg.go.kr/>
- /44/ Korea Ministry of Government Legislation (MOLEG), Framework Act on Environmental Policy, 23 March 2008
- <http://www.moleg.go.kr/>



- /45/ Korea Ministry of Government Legislation (MOLEG), Act on Environmental Impact Assessment, 28 March 2008 (Formerly Act on Environmental, Traffic and Disaster Impact Assessment)
<http://www.moleg.go.kr/>
- /46/ Korea Power Exchange (KPX) Jeju Branch, The statistics of yearly electricity generation in Jeju island.
www.kpxj.or.kr
- /47/ New & Renewable Energy Center of Korea Energy Management Corporation, Guideline on New & Renewable Energy Business
<http://www.energy.or.kr/>
- /48/ Korea Power Exchange(KPX), Electric Power Statistics Information System (EPSIS)
<http://www.kpx.or.kr/epsis/>
- /49/ Bank of Korea, Economic Statistics System (ECOS)
<http://ecos.bok.or.kr/>
- /50/ Korea Ministry of Government Legislation (MOLEG), Corporate Tax Act,
<http://www.moleg.go.kr/>
- /51/ Korea Ministry of Government Legislation (MOLEG), Residence Tax Act,
<http://www.moleg.go.kr/>
- /52/ IEC, IEC 61400-1 Wind turbines – Part 1: Design requirements
- /53/ Korea Ministry of Knowledge Economy (MOKE), Brief of Renewable Portfolio Standard, November 2009
- /54/ New & Renewable Energy Center of Korea Energy Management Corporation, '2008 New & Renewable Energy Statistics
<http://www.energy.or.kr/>
- /55/ Korea Power Exchange(KPX), Yr 2008 Status of Power generation Facility, June 2008
- /56/ Korea Ministry of Commerce, Industry and Economy (MOCIE), Guideline on the standard price of electricity generated with new and renewable source energy Notification No.2006-89, 30 August 2006
- /57/ Korea Energy Management Corporation (KEMCO), 2008 Renewable Energy White Paper, February. 2009
www.energy.or.kr
- /58/ Korea Ministry of Government Legislation (MOLEG), Act on Electricity Business,
<http://www.moleg.go.kr/>
- /59/ Korea Ministry of Environment, 2007 Nation-wide Waste Generation Status, 2008
- /60/ Korea Ministry of Construction and Transportation (Currently Ministry of Land, Transport and Maritime affairs), Summary of River and water course in Korea, 2007



- /61/ Korea Power Exchange (KPX), Status of 2007 Power Generation Facilities.
- /62/ Korea Financial Investment Association, Bond Information Service (www.kofiabond.or.kr)

Main changes between the version published for the 30 days stakeholder commenting period and the final version submitted for registration;

- Changes related to the CARs and CLs identified in the DNV's draft validation report and related to proposed text as per EB40/41 Guidelines on financial analysis, project starting date and CDM consideration.
- Project participant has changed. LG International Corp. is no longer participating in the project. The current participant in the project is Hanshin Energy Co., Ltd.
- Grid electricity emission factor has changed.

3.2 Follow-up interviews with project stakeholders

The site visit was made on 3 July 2009 by Seung Hyun Kwak of the validation team. The validation team visited the Jeju Special Self-governing provincial office in order to investigate the position of local government over the project. It was checked with the officials whether the necessary permits were acquired by the project participants and any public complaints were received regarding the project. The validation team found out that the local government was promoting the development of renewable energy unless a project causes significant environmental or cultural impacts and the project was supported in line with the policy. The proper permits were issued out to the project participants.

Then the project site was visited where the wind turbines were being installed. The specification of the turbines indicated in the PDD was confirmed with the name plates. Required actions by the permit and the Advance Examination of the Environmental Impact were found to be taken properly during the construction work. The representative of local stakeholder was invited to the project site and interviewed by the validation team after the purpose of the visit was explained.

The validation made another visit to the head office of the project participant in Seoul on 14 July 2009. Mainly baseline determination and additionality were checked and confirmed during the visit.

A phone interview was made with the government officer on 22 March 2010. The LoA was confirmed as authentic.

Table below provides the information regarding the issues discussed during the site visits;

	Date	Name	Organization	Topic
/63/	2009-July-03	Rimtaig LEE	Hanshin Energy Co., Ltd	Project Design and Technology
	2009-July-14	Hyung Seuk KIM		Operation and Maintenance
		Tae Sup CHUNG		



		Hong Shik YEO		Baseline determination
		Dai Hyun		Additionality
		CHANG		Monitoring plan
				Environmental impacts
				Stakeholder consultation process
/64/	2009-July-03	Ki Seok CHO	Jeju Special Self-Governing Province	Sustainable development
				Stakeholder consultation
				Environmental impacts
				Legal compliance
/65/	2009-July-03	Jinyong KIM	Ecoeye, Co, Ltd.	Applicability of the methodology
		Hyungsoon CHOI	(Consultant)	Baseline determination
		Miyoung JEONG		Additionality
		Ajin LEE		Calculation of Emission Reduction
				Project approval from the host country
/66/	2009-July-03	Han Jin KANG	Former Head of Samdal-Ri Village	Stakeholder consultation
				Environmental impact
				Sustainable development
/67/	2010-March-22	Hyojung SONG	Ministry of Knowledge Economy	Letter of Approval
/68/	2011-February-07	Sang Yong CHO	Kookmin Bank	Investment analysis (Benchmark, risk premium)

3.3 Resolution of outstanding issues

The objective of this phase of the validation is to resolve any outstanding issues which need be clarified prior to DNV's positive conclusion on the project design. In order to ensure transparency a validation protocol was customised for the project. The protocol shows in a transparent manner the 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 four tables. The different columns in these tables are described in the figure below. The completed validation protocol for the project activity in Republic of Korea is enclosed in Appendix A to this report.

A corrective action request (CAR) is raised if one of the following occurs:

- (a) The project participants have made mistakes that will influence the ability of the project activity to achieve real, measurable additional emission reductions;
- (b) The CDM requirements have not been met;
- (c) There is a risk that emission reductions cannot be monitored or calculated.

A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met.

A forward action request (FAR) is raised during validation to highlight issues related to project implementation that require review during the first verification of the project activity. FARs shall not relate to the CDM requirements for registration.

**Validation Protocol Table 1: Mandatory Requirements for CDM Project Activities**

Requirement	Reference	Conclusion
<i>The requirements the project must meet.</i>	<i>Gives reference to the legislation or agreement where the requirement is found.</i>	<i>This is either acceptable based on evidence provided (OK) or a corrective action request (CAR) if a requirement is not met.</i>

Validation Protocol Table 2: Requirement Checklist

Checklist question	Reference	Means of verification (MoV)	Assessment by DNV	Draft and/or Final Conclusion
<i>The various requirements in Table 1 are linked to checklist questions the project should meet. The checklist is organised in different sections, following the logic of the CDM-PDD</i>	<i>Gives reference to documents where the answer to the checklist question or item is found.</i>	<i>Means of verification (MoV) are document review (DR), interview (I) or any other follow-up actions (e.g., on site visit and telephone or email interviews) and cross-checking (CC) with available information relating to projects or technologies similar to the proposed CDM project activity under validation.</i>	<i>The discussion on how the conclusion is arrived at and the conclusion on the compliance with the checklist question so far.</i>	<i>OK is used if the information and evidence provided is adequate to demonstrate compliance with CDM requirements. A corrective action request (CAR) is raised when project participants have made mistakes, the CDM requirements have not been met or there is a risk that emission reductions cannot be monitored or calculated. A clarification request (CL) is raised if information is insufficient or not clear enough to determine whether the applicable CDM requirements have been met. A forward action request (FAR) during validation is raised to highlight issues related to project implementation that require review during the first verification of the project activity.</i>

Validation Protocol Table 3: Resolution of Corrective Action and Clarification Requests

Corrective action and/or clarification requests	Ref. to checklist question in table 2	Response by project participants	Validation conclusion
<i>The CARs and/or CLs raised in Table 2 are repeated here.</i>	<i>Reference to the checklist question number in Table 2 where the CAR or CL is explained.</i>	<i>The responses given by the project participants to address the CARs and/or CLs.</i>	<i>The validation team's assessment and final conclusions of the CARs and/or CLs.</i>

Validation Protocol Table 4: Forward Action Requests

Forward action request	Ref. to checklist question in table 2	Response by project participants
<i>The FARs raised in Table 2 are repeated here.</i>	<i>Reference to the checklist question number in Table 2 where the FAR is explained.</i>	<i>Response by project participants on how forward action request will be addressed prior to first verification.</i>

Figure 1: Validation protocol tables



3.4 Internal quality control

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

3.5 Validation team

<i>Role</i>	<i>Last Name</i>	<i>First Name</i>	<i>Country</i>	<i>Type of involvement</i>						
				Administrative	Desk review	Site visit / Interviews	Reporting	Supervision of work	Technical review	Sectoral competence
Project manager	Kwak	Seung Hyun	Republic of Korea	✓						
Technical team leader (CDM validator)	Zhang	Xiaojun Johnsen	P.R. China		✓		✓	✓		✓
GHG auditor	Kwak	Seung Hyun	Republic of Korea		✓	✓	✓			
Technical reviewer (draft)	Tang	Zhiang (Walter)	P.R.China						✓	✓
Technical reviewer	Antunes	Felipe	Brazil						✓	✓

The qualification of each individual validation team member is detailed in Appendix B to this report.



4 VALIDATION FINDINGS

The findings of the validation are stated in the following sections. 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.

The final validation findings relate to the project design as documented and described in the PDD, version 5 dated 28 January 2011.

4.1 Participation requirements

The project participant is Hanshin Energy Co., Ltd. of Republic of Korea. When the validation work for the proposed project was commissioned to DNV first in 2008, two organisations were project participants. During the site visit, it was found out that LG International Corp. was no longer participating in the project. The current participant in the project is Hanshin Energy Co., Ltd. The valid list of the project participants is updated in the PDD properly. The validation contract with LG International Corp. was mutually terminated and a new validation contract with Hanshin Energy Co., Ltd. was established.

The host Party Republic of Korea meets all relevant participation requirements. No participating Annex I Party is yet identified. The host Party has ratified the Kyoto Protocol and established a DNA as per the participating requirements for CDM under the Kyoto Protocol.

The letter of approval (LoA) was received from the project participants.

The LoA /26/ was issued by Ministry of Knowledge Economy on behalf of DNA of Republic of Korea on 3 December 2009, authorizing Hanshin Energy Co., Ltd of host Party as project participant and confirming that the project assists in achieving sustainable development. The LoA /26/ with the reference No. 2009-22 contains the required statements as follows: -

- The host Party, Republic of Korea has ratified the Kyoto Protocol
- The voluntary participation in the proposed project
- The project contributes to the sustainable development in Korea

It was confirmed by the officer responsible /26/ in Korea Ministry of Knowledge Economy on 22 April 2010 that the LoA /26/ issued on 3 December 2009 referred to the proposed CDM project. DNV considers the letters are in accordance with paragraphs 45- 48 of the VVM /27/.

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 Republic of Korea.

4.2 Project design

The proposed project is to build a wind power plant in Jeju Self-governing Province, Republic of Korea. The geographical coordinates of the wind farm is found to be north latitude 33°22' and east longitude 126°50'.

The project involves installation and operation of 11 wind turbines each with 3 MW unit capacities, manufactured by VESTAS. DNV has checked all parameters of the turbines from



PDD against the specification /5/ and written in Construction Feasibility Study Report (CFSR) /3/ and was able to confirm the consistency. The total installed capacity of proposed project activity is 33 MW. It is expected that the proposed project will supply approximately 88 948.4 MWh/yr of net electricity with a plant load factor (PLF; expressed as 'Net Utilization Rate' in CFSR) of 30.7% to the power grid, which is confirmed by DNV from the CFSR /3/. This estimation was based on the research conducted from 26 August 2005 to 25 August 2006, and was developed by Korea Institute of Energy Research (KIER; www.kier.re.kr). KIER was established based on the Act on establishment, operation and incubating the Government-funded Institute for science and technology field in August 1977. The main functions of KIER are Energy Technology Development, Deployment of Energy Technology and Policy Establishment of Energy Technology. KIER belongs to Korea Ministry of Knowledge Economy. CFSR /3/ is not required to be approved by the government in Korea. Therefore, state-owned institute or private company chosen by the PP carries out feasibility study. Since KIER is specialized in research on Energy and state-owned institute, DNV judged that the credibility of CFSR /3/ is considered high and this is in line with the Guidelines for the reporting and validating of plant load factors /32/.

The supplier of wind turbine has provided the trainings to the PP and further trainings on operation and maintenance will be provided according to Special Conditions for Maintenance, Service and Availability Agreement (MSA Agreement) /17/. The regular maintenance service is commissioned to the supplier, VESTAS. DNV checked the clause regarding the training as per MSA Agreement /17/.

Starting date has been considered as 29 December 2007 which corresponds to the date on which Wind Turbine Purchasing Agreement /10/ was signed. It was confirmed with a copy of the agreement /10/ provided by the PP.

The timeline of project implementation including change of a member of PPs and other major milestones is addressed under B.5. of the PDD. The details of revised permit from Jeju Self-Governing Provincial government are described in the PDD.

10 years of crediting period are chosen starting from 1 May 2011 or the registration date of this project, whichever is later. The chosen crediting starting date is deemed to be reasonable. The estimated annual emission reduction is 54 276 tCO₂e and total 542 760 tCO₂e during the 10 years crediting period /1/.

20 years of the operational lifetime is addressed in the PDD. The lifetime is based on the Construction Feasibility Study Report /3/. It is deemed reasonable for wind projects in Korea.

DNV considers the project description of the project contained in the PDD to be complete and accurate. The PDD complies with the relevant forms and guidance for completing the PDD.

4.3 Application of selected baseline and monitoring methodology

The project applies the approved consolidated baseline and monitoring methodology ACM0002 version 11, titled "Consolidated baseline methodology for grid-connected electricity generation from renewable source" /28/.

The methodology is justified as applicable to the proposed project since:

- The project is a wind farm project with the installed capacity of 33 MW, which has been confirmed from the CFSR /3/ and the wind turbine purchasing agreement /10/.



- The electricity from the project activity is proposed to be supplied to the grid operated by KEPCO, and information on the characteristics of the grid can be identified.
- The project is a new wind farm power plant and not involved switching from fossil fuels to renewable energy sources at the site of the project activity, as confirmed by the CFSR /3/

The assessment of the project's compliance with the applicability criteria of ACM0002 (version 11) are documented in detail in section B.2 of Table 2 in the validation protocol in Appendix A to this report.

4.4 Project boundary

The project's system boundary is the site of project activity and all the power plants connected physically to the electricity system of Korea Electric Power Corporation, which is the delineation of the only grid boundary in Korea. There are no significant transmission constraints between the power plants of the grid, nor with the proposed project. It is DNV's opinion that the project boundary of the proposed project is clearly defined. The selected sources and gases are justified for the project activity.

The emission sources and gases included in the project boundary are:

	<i>GHGs involved</i>	<i>Description</i>
<i>Baseline emissions</i>	CO ₂	CO ₂ emission from power plant connected to the power grid operated by KEPCO
<i>Project emissions</i>	N/A	Project emission is regarded as zero as the project is a renewable energy (wind source) project. No project emission contributing more than 1% of the emission reductions were identified
<i>Leakage</i>	N/A	There is no leakage that needs to be considered in applying this methodology.

The identified boundary and selected sources and gases are justified for the project activity. The validation of the project activity did not reveal other greenhouse gas emissions occurring within the proposed CDM project activity boundary as a result of the implementation of the proposed project activity which are expected to contribute more than 1% of the overall expected average annual emission reduction, which are not addressed by ACM0002 (version 11).

4.5 Baseline identification

Three alternative scenarios were considered in the PDD as mentioned in the approved methodology /28/.

- The proposed project itself, but not undertaken as a CDM project activity
- Construction of a power plant using other renewable energy, such as hydro power plants or biomass power generation with equivalent installed capacity or annual electricity generation.



- Equivalent electricity service provided by the Korea Electric Power Corporation

The alternatives were assessed and eliminated in accordance with the additionality tool /29/.

The baseline is in accordance with ACM0002 version 11 /28/: the electricity delivered to the grid by the project activity would otherwise have been generated by the operation of grid-connected power plants and by the addition of new generation sources, as reflected in the combined margin (CM), calculations described in the “Tool to calculate the emission factor for an electricity system”/30/.

The approved baseline methodology has been correctly applied to identify a complete list of realistic and credible baseline scenarios, and the identified baseline scenario most reasonably represents what would occur in the absence of the proposed CDM project activity.

All the assumption and data used by the project participants are listed in the PDD and/or supporting documents. All documentations relevant for establishing the baseline scenario were correctly quoted and interpreted in the PDD. Assumptions and data used in the identification of the baseline scenario are justified appropriately, supported by evidence and can be deemed reasonable. Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. DNV considers the chosen baseline is applicable and in line with the methodology ACM0002 version 11/28/. The application of the baseline methodology is transparent and conservative.

4.6 Additionality

The assessment of the project’s additionality was conducted in accordance with the “Tool for the demonstration and assessment of additionality” Version 5.2 /29/.

4.6.1 Evidence for prior CDM consideration and continuous actions to secure CDM status

The project starting date is defined as 29 December 2007 which is the date when the Wind Turbine Purchasing Agreement was signed with the supplier, VESTAS /10/. Land use contract /16/ was signed on 1 September 2008 and the construction work contract /24/ was signed on 13 October 2008. In DNV’s opinion, the project starting date of 29 December 2007 is correctly regarded as the earliest of financial commitments for the project activity

The starting date is prior to the date of publication of the PDD for global stakeholder consultation which was 2 July 2008. In December 2006, the legal entity of the project proponent, Hanshin Energy Co., Ltd., was established and the decision to proceed with CDM project was made by the board of directors of Hanshin Energy. Hanshin Energy commissioned the PDD writing to LG International Corp. who was a project participant in October 2007 (LG International Corp. decided to stop the participation in the project later in 2008). The CFSR /3/ was prepared by KIER in November 2006. In the CFSR, the project developer was suggested to consider CDM benefit. Hanshin Energy’s Board meeting minutes /6/ dated on 19 December 2006 indicated the decision of investment in the proposed project was based on the CDM benefit. CDM was therefore seriously considered in the decision to proceed with the project activity.



Since, the validation started less than two years after the starting date, sufficient efforts to secure CDM status was demonstrated.

It is DNV's opinion that the proposed CDM project activity complies with the requirements of the latest version of the guidance on prior consideration of CDM.

4.6.2 Identification of alternatives to the project activity

Three alternatives to the project are indentified in the PDD:

- a) The proposed project itself, but not undertaken as a CDM project activity;
- b) Construction of a power plants using other renewable energy, such as hydro plants or biomass power generation with equivalent installed capacity or annual electricity generation;
- c) Equivalent electricity service provided by the KEPCO.

The baseline scenario selection was appropriately assessed as below;

Alternative – a), The proposed project itself, but not undertaken as a CDM project activity:
Alternative – b), Construction of a power plant using other renewable energy, such as hydro plants or biomass power generation with equivalent installed capacity or annual electricity generation: The electricity supplied by the renewable energy in Korea contributed just 1% of the total electricity generated in Korea in 2008. The technology of renewable energy is not commonly applied because of low economic benefit /54/, and the proposed project area lacks water resources /2/ /60/ and biomass resources /59/. Thus, DNV was able to verify other renewable energy sources are either not available in the geographical area of the project or commercially available at present. It was also verified by DNV that the main business area of the project developer is the development of wind power generation sources /63/. The alternative b) is thus not a likely alternative.

Hence, only alternative – a) and alternative – c) will be discussed at next steps.

DNV considers the listed alternatives to be credible and complete.

4.6.3 Investment analysis

Choice of approach

As the project generates financial and economic benefits through the sales of electricity other than CDM related income and the alternative does not involve any investments, the choice of benchmark analysis is justified for conducting the investment analysis.

Benchmark selection

Project IRR has been selected as the financial indicator. It has been compared against the benchmark of 7.65%, which was derived from 4.65% government bond rate for 1 year maturity period increased by 3% risk premium.

The project participant has chosen the past one year average rates from the point when the board of directors decided to go on with the CDM project. Four government bonds rates were found available from the Bank of Korea /49/, namely government bond for one year maturity period, three years maturity period, five years maturity period and ten years maturity period. It was concluded that the government bond rate for one year maturity period was the most conservative.



Average of past 12 months (Dec. 2005~ Nov. 2006)	one year maturity	three years maturity	five years maturity	ten years maturity
Government bond rate (%)	4.65	4.85	5.00	5.21

Source: ecos.bok.or.kr

The project participant has applied a risk premium over the government bond rates, as described in the “Tool for the demonstration and assessment of additionality”, Version 5.2 /29/. The 3% of risk premium which is substantiated by the local bank is added to the government bond rate, 4.65%. Kookmin bank has confirmed that 3% spread added to the base interest rate for the project financing considering the risk in the wind power project in a letter /25/. DNV has interviewed the responsible in Kookmin bank /68/ in order to verify the authenticity of the letter and its statement /25/. The base interest rate based on the bank bond (Triple A 1 year maturity) derived from the website of Korea Financial Investment Association /62/ was compared to the government bond rate and confirmed to be higher than the government bond rate by 0.11% during the 12 month period from December 2005 to November 2006.

DNV was able to confirm this benchmark is suitable and conservative.

Input parameters

DNV has verified all the input values used for the IRR calculations. It has been observed that most of the input values such as total investment cost, operational life time, annual O&M cost, power generation capacity, and estimated PLF described as Capacity Factor in the PDD, estimated annual power generation are based on the Construction Feasibility Study Report (CFSR) /3/ with which the decision to proceeding with the CDM was made by the board. However the power tariff described as Purchased Electricity has been sourced from Korea Power Exchange, Electric Power Statistics Information System (www.kpx.or.kr/epsis) to reflect the real trends of power tariff fluctuation.

The construction feasibility study of the proposed project was prepared and issued to the project participant in November 2006. As per the construction feasibility study, the proposed project has a project IRR of 5.41% based on the assumed electricity tariff of KRW 107.29/kWh for the first 15 years of operation and KRW 95.9-104.05 afterwards till it reaches to 20th year. The main difference of IRR calculations done in the construction feasibility study from the one in the PDD is that CER income is added to the income created by electricity sales. Moreover, IRR analysis in the construction feasibility study considered loan interest and depreciation in the cash-out flow, which is not the appropriate in accordance with the investment analysis guidance /31/ and the IRR analysis in the PDD was thus corrected.

The EB 16th meeting Report, Annex 3 ‘Clarifications on the treatment of National and/or Sectoral policies and regulations (paragraph 45(e) of the CDM Modalities and Procedures) in determining a baseline scenario’ /34/ and further clarifications made on the EB 22nd meeting Report, Annex 3, ‘Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios’ /34/ explains “Type E-“ National and/or Sectoral policies or regulations that have been implemented since the adoption by the COP of the CDM M&P may not be taken into account in developing a baseline scenario.



In addition, Act on the development, use and promotion of new and renewable energy /43/ and Act on Electricity Business /58/ defines the Feed-In Tariff scheme in Korea to promote the new and renewable source of energy. These legislations are applied to the electricity generation by Photovoltaic, Wind, Hydro, Fuel cell and biogas. Based on these legislations, the government compensates by subsidy the difference between Standard Price for new and renewable energy announced by the government and System Marginal Price (SMP) at the electricity market.

The validation team has checked the standard price available at the time when the construction feasibility study was prepared and compared it to the investment analysis input values. According to the Guideline on New & Renewable Energy Business /47/ published by the New & Renewable Energy Centre of Korea Energy Management Corporation which is the state-owned organization, the standard price for electricity by wind power as of 11 October 2006 was announced to be KRW 107.29/kWh which was cited from 'Guideline on the standard price of electricity generated with new and renewable source energy' Notification No.2006-89 /56/ by Ministry of Commerce, Industry and Economy (Currently, Ministry of Knowledge Economy). KRW 107.29/kWh of the standard price was input for the calculation of project IRR in the Construction Feasibility Study Report. However since this policy was given in 2006, which is after November 2001, this can be considered an E- policy in line with above mentioned EB guidance.

The average System Marginal Price (SMP) of wind power paid during the past 1 year was investigated by DNV with the statistics made publicly available by Korea Power Exchange at its website /48/. The SMP of wind power was found as KRW 74.80 from December 2005 to November 2006 which is used for the input value for electricity tariff in the investment analysis.

Therefore, the PP has applied the past one year average of Wind power SMP paid out to the investment analysis by excluding the subsidy based on the EB's clarifications indicated above. DNV judges this approach it reasonable.

Furthermore, the input parameters used in the financial analysis were compared with the data reported for other wind CDM projects hosted by Republic of Korea and registered, regarding the investment cost per kW of installed capacity, plant load factor, percentage of O&M costs relative to total investment costs as shown in the following tables.

*Table 1. Comparison of investment cost per kW, plant load factor, percentage of O&M costs relative to total investment costs between wind power CDM projects in Republic of Korea.**

Project name	Reg. No.	Investment Cost (KRW/kW) [k means KRW 1 000]	Plant load factor	Depreciation (years)	Other cost (KRW/kW) [k means KRW 1 000]	Percentage of O&M Costs relative to total investment cost
Gangwon Wind Park Project	222	1614k	28% [†]	-	-	2.12%

* The table is constructed based on the PDD and investment analysis on the UNFCCC website.

[†] Indicated as Coefficient of utilization



VALIDATION REPORT

Youngduk Wind Park Project	290	1705k	27.9%	-	-	2.24%
K water Wind Power Plant Project in Bang-a muri	1170	2003k	23.9%	19	-	1.08%
Hangyeong second phase SS-wind power	1000	2291k	31.48%	-	-	-
Yeong Yang 61.5MW Wind Farm Project	1841	2235.5k	-	-	-	1%
Taegisan Wind Power Project	2302	2057.4k	-	20	-	2.26%
The proposed project	-	2373.2k	30.7%	20	6060.6k*	1%

(1) Total Static Investment:

It can be seen from the table above that the investment cost per installed capacity- kW of 2373.2k KRW for the proposed project is out of the range of the investment cost (1614K KRW/kW ~ 2235.4kKRW/kW). About 3% higher than Hangyeong second phase SS-wind power which is at the top end of the range.

The investment costs were further compared against the contracts. At the time of first financial commitment, wind turbine purchase contract /10/ was signed. According to the CFSR /3/, the costs for turbine and auxiliary components and installation cost take over 98.7% of total investment cost. DNV has cross checked the wind turbine purchase contract and installation contract. Compared to the estimated value in the CFSR /3/, the real costs of wind turbines procurements and installation /19//20/ are 9.7% higher than the value in the CFSR /3/, which indicates that the estimate cost of investment in the CFSR was reasonable at the time.

Hence, the static investment of the proposed project is reasonable.

(2) O&M Cost

It is stated in the CFSR /3/ that administration cost is included in O&M cost. The O&M costs for wind power projects may vary by site location, conditions for transportation, applied technology and number of turbines. As shown in the table above, the proposed project is decided to be in the lowest range of percentage of O&M costs relative to investment costs for similar wind power projects hosted in Republic of Korea, and this enables DNV to confirm that the O&M cost is reasonable.

Other Cost:

The PP indicated that KRW 200 Millions per annum for leasing the land was to be paid out to land owner. DNV cross-checked that this cost item was identified in the CFSR /3/. DNV can confirm with Property Lease Agreement between Hanshin Energy Co., Ltd. & Union of Samdal-Ri Co-ranch /15/ that shows rental rates indicated are slightly more expensive than the ones indicated in the PDD.

* Land leasing cost



Hence other cost is deemed reasonable.

(3) Annual Power Generation

The comparison showed that the annual load factor (30.7%) of the proposed project is in the higher range of the similar projects (23.9% ~ 31.48%) hosted in Republic of Korea, which is conservative. The validation team verified that the load factor of the proposed project is derived from the Construction Feasibility Study Report /3/ as required by Guidelines for the reporting and validation of plant load factors. /32/

(4) Power Tariff

The power tariff applied in the investment analysis was derived from Electric Power Statistics Information System operated by Korea Power Exchange (www.kpx.or.kr/epsis) /48/. The average value of one year before the CDM decision was made was applied.

Year	2005		2006										AVG
Month	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	
SMP (KRW)	75.35	80.34	80.33	82.15	84.45	82.42	80.49	70.43	63.80	65.99	65.45	66.37	74.80

DNV has acquired the data set from the system /48/ as indicated in the table above and compared it with the power tariff applied. It was confirmed that the power tariff was same.

(5) Taxes

According to the Corporate Tax Act /50/, the corporate tax amount on the income for each business year shall be the amount calculated by applying the tax rates to the tax base when the CFSR /3/ was issued and the decision was made to go with CDM.

Tax Base	Tax Rate
KRW100 000 000 or less	13/100 of tax base
More than KRW100 000 000	13 000 000 won + 25/100 of the amount in excess of 100 000 000 won

If the tax base is more than KRW 100Million, tax should be KRW 13 Million plus 25/100 of the amount in excess of KRW 100 000 000. The tax rate is correctly applied.

The 10% of residence tax rate is also applicable to amount of the corporate tax. However in the investment analysis, the residence tax is not applied, which is conservative.

The loan interest is considered in the calculation of income tax as per the guidelines on the assessment of investment analysis /31/.

DNV confirms that the corporate tax value as well as the residence tax value applied to this project is in compliant with the relevant legal requirements and reasonable.

20 years of the economic life time of the wind turbine installed in the proposed project are assumed with 0% of residual value in the CFSR /3/. It is indicated that 20 years are the design lifetime of the wind power system in the CFSR /3/. The design lifetime of the wind turbine was investigated with IEC 61400 /52/ and was confirmed. The depreciation period of 20 years under straight-line method for the proposed project is acceptable, compared with the depreciation period of 19 years and 20 years applied in the registered projects shown on the table 1.



In conclusion, based on our local and sectoral expertise, and database of publicly available information, DNV considers that the input values used in the financial analysis are reasonable and are adequately represent the economic situation of the project.

Calculation and conclusion

The IRR calculations for 20 years of operation were provided in a spreadsheet /21/. The calculation were verified and found to be consistent by DNV. The assumptions used in the calculations were deemed to be correct by DNV. The project IRR without CDM revenues is 3.82%, which confirms that the project in the absence of CDM benefits and compared to the benchmark of 7.65% is not financially attractive. With CER revenues, the project IRR increases to 5.97% and this is still below the benchmark /49/.

Sensitivity analysis

A sensitivity analysis has been carried out for parameters contributing more than 20% to revenues or costs to check the robustness of the financial analysis. Reasonable variations of the static investment, annual operational costs, and annual output delivered to the grid and electricity tariff were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correction.

DNV was able to verify that the project IRR would touch the benchmark only if the above mentioned parameters change by values as mentioned below;

Key Indicators	Variation of the parameter indicator needed to reach benchmark 7.65%
Static investment costs	-24.55%
Annual O&M cost	'0' O&M cost leads to an IRR of 5.31%
Electricity tariff	+34.3%
Annual output delivered to the grid	+34.3%

- 1) Static investment costs: DNV was able to confirm that 24.55% decrease in the investment costs is unlikely to happen as a large part of the total investment of the proposed project goes towards purchase and installation of electric equipments including wind turbines and transformers.

The investment cost per kW of installed capacity is compared to the registered CDM projects in Korea. It was turned out that about 3% higher than Hangeong second phase SS-wind power which is at the top end of the range. However the variation is still within 6% which is far less than 16.5%.

Furthermore, the actual costs paid to the suppliers were verified with the transaction records /19/ by DNV. It was confirmed that the actual costs paid were more than the budget.

Thus, the static total investment is not likely to decrease by more than 24.55%.

- 2) Annual O&M cost: The annual O&M cost consists of maintenance cost, material costs, salary/welfare and other costs according to the CFSR /3/. The economic indicators such as Gross National Product (GNP), Gross National Income (GNI),



Consumer Price Index (CPI) and Producer Price Index (PRI) show inclining trend of the Korean economy in recent years /49/. This implies that the price of materials and salaries of the employees are gradually increasing, which lead to gradual increase of annual O&M will cost. In the investment analysis, even changing O&M cost to '0' would end up with 5.31% of IRR which is still below the benchmark. This is unlikely to happen.

3) Electricity tariff:

By checking the registered wind power projects in Korea from the UNFCCC website, the applied power tariffs for the investment analysis were identified as below.

Project name	Reg. No.	Power Tariff applied	Data range analysed (http://epsis.kpx.or.kr/)
Gangwon Wind Park Project	222	Not available	-
Youngduk Wind Park Project	290	Not available	-
K water Wind Power Plant Project in Bang-a muri	1170	KRW107.29/kWh	Not identified
Hangyeong second phase SS-wind power	1000	KRW75.85/kWh	Sep. 2005 ~ Aug. 2006
Yeong Yang 61.5MW Wind Farm Project	1841	KRW81.5/kWh	Jan. 2007 ~ Aug. 2007
Taegisan Wind Power Project	2302	KRW75.69/kWh	Dec. 2005 ~ Nov. 2006
The proposed Project	-	KRW74.8/kWh	Nov. 2005 ~ Oct. 2006

Power tariffs used by four CDM projects including the proposed one were based on the historic data available from the website operated by Korea Power Exchange (KPX) /48/. Thus the difference of the power tariff between the projects is attributable to the data set the respective project referred to.

As for K water Wind Power Plant Project in Bang-a muri, KRW107.29/kWh of Power Tariff was applied which was a Standard price of electricity generated by wind power /56/ without taking into account "E-" policy as described in the EB 16th meeting Report, Annex 3 /34/. However the project proponent applied "E-" policy to the proposed project. Details are stated in the section 4.6.3 'Input parameters' of this report.

It was found out at the website of Korea Power Exchange (www.kpx.or.kr/epsis) /48/ that the average power tariff for wind power is KRW 81.71 during the period from November 2006 till October 2007 which is one year after from which the average power tariff applied to the investment analysis of the proposed project is derived. Although the inclining trend of the power tariff is projected, less than 10% of increase was made. Also historic trend was analysed. From November 2003 till October 2005, the power tariff was increased by about 8%. Thus drastic increase of power tariff by more than 34.3% is unlikely to happen.

- 4) Annual output delivered to the grid: According to the CFSR /3/, the annual output is estimated based on simulation result from the software (WAsP V8.3/WindPRO v2.5). The gross generation and plant load factor are 93 649 MWh/year and 32.4% respectively without loss. However by taking into account loss factors such as geographical factor, electricity loss and load loss which end up with 5%, net generation was estimated as 88 948 MWh/year with 30.7% of plant load factor. The



fluctuation of the plant load factor is within the range of other wind farms registered as CDM project. To meet the benchmark load factor should increase by 34.3%. Hence it is unlikely to happen.

The sensitivity analysis above shows that very unrealistic favourable circumstances would be needed for the IRR to reach the benchmark.

In conclusion, the investment analysis and sensitivity assessment have shown that the Project is unlikely to be a financially attractive option without the income from CERs sales.

4.6.4 Common practice analysis

The installed capacity of renewable energy has been increased since 2003 due to the Korean government policy to promote the new and renewable energy with Feed-In-Tariff introduced in 2002 /53/. However the installed capacity of wind power plants only contributes to less than 0.3% of total power generation capacity in Republic of Korea by the year 2007 /54/. No wind power plant with the respective wind turbine capacity of more than 1 MW was installed until 2003 /55/. The status of wind power plants installed in the host country is as follows /41/;

	Name of Wind Power plant	Installed capacity (1000 kW)	Nr. of wind turbine	Commercial operation started	Operator*	Remark
1	Wulreungdo Wind Power	0.6	0.6 X 1	Mar. 2000	Gyeongsanbuk-do Provincial government (Local government)	Off-grid
2	Pohang Wind Power	0.66	0.66 X	Aug. 2001	Gyeongsanbuk-do Provincial government (Local government)	-
3	Haengwon Wind Power	9.795	0.6 X 2 0.225 X 1 0.66 X 7 0.75 X 53	Aug. 2008	Jeju Self-governing Provincial government (Local government)	-
4	Hangyeong Wind Power # 1	6.0	1.5 X 4	Feb. 2004	Korea Southern Power Co. Ltd	
5	Hangyeong Wind Power # 2	15	3 X 5	Dec. 2007	Korea Southern Power Co. Ltd	CDM registered (1000)
6	Daeguanryeong Wind Power	2.64	0.66 X 4	Dec. 2004	Gangwon-do Provincial government (local government)	-
7	Maebongsan Wind Power	4.25	0.85 X 2 0.85 X 3	Dec. 2004 May 2006	Taebaek-Si City government (local government)	-
8	Youngduk Wind Power	39.6	1.65 X 7 1.65 X 17	Dec. 2004 Mar. 2005	Unison	CDM registered (290)
9	Gangwon Wind Power	98	2.0 X 14 2.0 X 35	Dec. 2005 Sep. 2006	Gangwon Wind Power Company	CDM registered (222)
10	Shinchang Wind Power	1.7	0.85 X 2	Mar. 2006	Jeju Self-governing Provincial government (Local government)	-

* Source: Status of 2007 Power Generation Facilities. /61/



11	Yangyang Wind Power	3.0	1.5 X 2	Jun. 2006	Korea Midland Power Co., Ltd	-
12	Hyosung Daegi Wind Power	2.75	2 X 2 0.75 X 1	Nov. 2007		-
13	Jeonbuk Gunsan Wind Power	7.9	0.75 X 6 0.85 X 4	Nov. 2002 Sep. 2003 Oct. 2004 Aug. 2007	Jeollabuk-do Provincial government (local government)	-

As of the end of 2007, the wind power plants with the installed capacity exceeding 15 MW are three. All of these projects are registered as a CDM project in UNFCCC due to the same financial unattractiveness as the proposed project activity. Hence all projects within a $\pm 50\%$ capacity range of the project are CDM projects.

DNV concluded that the proposed project is not common practice based on the above analysis.

In conclusion, it is deemed to sufficiently demonstrate that the project is not a likely baseline scenario, and that emission reductions resulting from the project are additional.

4.7 Monitoring

The project applies the approved monitoring methodology ACM0002 Version 11 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources” /28/. The selected monitoring methodology is applicable for the project activity as it involves grid-connected renewable power generation using wind energy.

The monitoring plan is in accordance with the monitoring methodology. The monitoring plan will give opportunity for real measurements of achieved emission reductions.

Monitoring of sustainable development indicators is not required by the Korean DNA. The environmental impacts are considered minor and will be monitored by the local government during the project lifetime.

The project monitoring plan is in compliance with the monitoring methodology ACM0002 (version 11).

It is DNV’s opinion, that the project participants are able to implement the monitoring plan.

4.7.1 Parameters determined ex-ante

“Tool to calculate the emission factor for an electricity system” /30/ is used to determine combined margin emission factor. Combined margin emission factor is determined *ex ante* based on the most recent information available when the PDD was published to invite Parties, stakeholders and NGOs. More detailed information is provided the section 4.8. The parameters are listed in the below table:

Data and Parameters	Unit	Value applied	Source of data used
Operating margin (OM)	tCO ₂ /MWh	0.7152	KEPCO, Statistics of Electric Power in Korea 2006, 2007, 2008 /40/
Build margin (BM)	tCO ₂ /MWh	0.3950	
Emission factor (CM)	tCO ₂ /MWh	0.6351	



4.7.2 Parameters monitored ex-post

The methodology requires for the wind power project monitoring the followings;

- Net electricity generation from the proposed project activity;
- Data needed to recalculate the operating margin emission factor, if needed, based on the choice of the method to determine the operating margin (OM), consistent with “Tool to calculate the emission factor an electricity system, Version 2”/30/;
- Data needed to recalculate the build margin (BM) emission factor, if needed, consistent with “Tool to calculate the emission factor for an electricity system, Version 2”/30/.

The electricity generated from the project will be measured by the meter with allowable error of $\pm 0.2\%$ which complies with Regulation on electricity market operation /38/. The measured data will be electronically transmitted to the Korea Power Exchange (KPX) on a daily basis. The data will be cross-verified against the sales invoice issued by KPX. The electricity supplied to KPX will be recorded monthly on project site. In addition, a back-up meter on the substation of the wind farm will be installed to measure and account the electricity generated by the proposed project. Although the allowable error, $\pm 0.5\%$ of the check meter is accepted as stipulated in Regulation on electricity market operation /38/, the PP will install the meter which has the same specification as the main meter with $\pm 0.2\%$ of the allowable error.

Table 2 Allowable error for electricity measuring meter (Source: Regulation on electricity market operation /38/)

Capacity of Power generation	Main meter	Check meter
More than 20 MW	Within $\pm 0.2\%$	Within $\pm 0.5\%$

The allowable error of the meters was checked by the validation team with "Procedure for operation and maintenance for Energy suppliers and Consumers" /14/ provided by the meter supplier via the PP.

When the measured data is found different from the one announced by KPX, the metering equipment will be inspected and corrective actions will be taken. Then the data approved by both the PP and KPX will be used for the CDM project.

DNV has confirmed that calibration intervals are in compliant with Regulation on electricity market operation /38/ which requires the measuring equipment to be calibrated every 3 years. The verification/recertification of the measuring equipment shall be conducted every 7 years according to Act on measurement /39/.

4.7.3 Management system and quality assurance

The PP has organised the management team for monitoring the emission reductions. The description on the authority and responsibility for project management, monitoring, measurement and reporting is addressed in B.7.2 of the PDD.

The project monitoring plan includes:

- Descriptions of monitoring equipment and calibration requirements in accordance with ‘Law on Measurement’ and ‘Regulation on Electricity Market’;
- Descriptions of monitoring electricity generated, monitoring variables, and data review;
- Procedure for emergency preparedness and response;



- Descriptions of management team and training.

Hanshin Energy Co., Ltd. has further developed a procedure, namely CDM Project Monitoring Procedure (HSD-004, Rev. 0) /13/ to ensure the proper monitoring. The main supplier, Vestas Korea Wind Technology Co., Ltd, will provide the trainings as required by Hanshin Energy Co., Ltd. to optimize the maintenance capability as per 'General Conditions for Maintenance, Service and Availability Agreement /17/. The relevant clause is confirmed by DNV. These will enable the project participant to monitor the emission reductions. The application of the monitoring methodology is transparent and DNV considers the project participants able to implement the monitoring plan.

4.8 Algorithms and/or formulae used to determine emission reductions

The emission reduction ER_y by the project activity during the crediting period is the difference between baseline emissions (BE_y), project emissions (PE_y) and emissions due to leakage (LE_y), as follows:

$$ER_y = BE_y - PE_y - LE_y$$

Where:

ER_y	Emission reductions in year y (tCO ₂ e/yr)
BE_y	Baseline emissions in year y (tCO ₂ e/yr) Product of the baseline emissions factor (EF _y in tCO ₂ /MWh) times the electricity supplied by the project activity to the grid (EG _y in tCO ₂ /MWh)
PE_y	Project emissions in year y (tCO ₂ e/yr) There are no emissions from the project which is a renewable energy project
LE_y	Leakage emissions in year y (tCO ₂ e/yr) No leakage has to be considered for the proposed project activity.

Identification of the relevant electricity system

The electricity generated by the project activity is to be supplied to the KEPCO grid which is the only grid in the host country. Thus project electricity system is defined as the KEPCO grid. The Jeju island where the proposed project is located is connected to the KEPCO grid with subsea cable. The statistics of yearly electricity generation in Jeju island shows that the electricity supply from the inland contributes 34.8% on 3 years weighted average (Year 2005~2007) of total electricity consumed in Jeju island while 65.2% were generated by the power plants in Jeju island /46/.

Only grid power plants are included in the Operating Margin (OM) calculation.

Operating Margin

For the calculation of the Operating Margin (OM) emission factor, the simple OM emission factor calculation method is selected because low cost must run projects constitute less than 50% of the total grid generation in average of the five most recent years and data for applying the dispatch data analysis are not available /40/.

The project participant has used *ex ante* option for data vintage. Thus no monitoring and recalculation of the emission factor during the crediting period is required. The validation team has confirmed that a 3-year-generation-weighted average, is used based on Year 2005 ~



2007 data which are the most recent data available at the time of submission of the PDD to DNV for validation. The data vintage chosen are provided in the Annex 3 of the PDD as well as in the spreadsheet of the emission factor calculation. The vintage data for the years 2005~2006 from Statistics of Electric Power in Korea 2006~2008 editions /40/ published by KEPCO are used for the Operating Margin.

The simple OM emission factor is calculated based on the net electricity generation and a CO₂ emission factor of each power unit which is the Option A as defined in Tool to calculate the emission factor for an electricity system version 02 /30/. The amount of fossil fuel consumed, the gross calorific value (GCV) and the electricity delivered to the grid are taken from the Statistics of Electric Power in Korea 2006~2008 editions /40/. The CO₂ emission factor of respective fossil fuel in the lower 95% confidence interval was selected from the IPCC 2006 Guidelines on National GHG Inventories /42/. The GCV is converted to net calorific value (NCV) by applying conversion factors indicated in the IPCC 2006 Guidelines on National GHG Inventories /42/. The validation team has confirmed that the vintage data are correctly applied and calculation of the Operating Margin (OM) Emission Factor is correct.

The project participants considered the difference between the emission factor that refers to the group of existing power plants in the main land whose current electricity generation would be affected by the proposed project activity and the emission factor that refers to the group of existing power plant in the island should be reflected into the calculation of the Operating Margin (OM) Emission Factor. According to the statistic /46/, 3 years weighted average 34.8% of electricity is supplied to the Jeju island via subsea cable installed under the sea between the Jeju island and the main land of Korea to meet the electricity demand in Jeju island due to the shortage of electricity supply from the power plants being operated within the Jeju island as described above. The power plants in the Jeju island are connected to the grid in the Jeju island. The grid in the Jeju island is connected to the main land grid via subsea cable. Therefore the grid in the Jeju island is regarded as a part of the KEPCO grid, however the electricity generated in the Jeju island is not delivered to the main land due to the shortage of the supply within Jeju Island. The same approach was applied to the registered CDM Project, Hangeong second SS-wind Power Project (UNFCCC No.1000) hosted by the Jeju Island. The project participant has applied 34.8% to the OM and 65.2% to the Jeju island OM as follows;

Operating Margin = 0.6814 tCO₂/MWh (Main Land Operating Margin) * 34.8% + 0.7331 tCO₂/MWh (Jeju Island Operating Margin) * 65.2%

The OM emission factor is calculated to be 0.7152 tCO₂/MWh /4/.

Validation has also requested to develop the OM based on one grid approach in which the electricity system in Jeju island is the part of the main land grid as per Tool to calculate the emission factor for an electricity system, version 2 /31/. In this approach, the operating margin is calculated as follows;

Operating Margin = 0.6819 tCO₂/MWh (Operating Margin for Main Land and Jeju Island)

The project proponent has chosen the conservative value which is 0.6819 tCO₂/MWh.

It is deemed to be an approach reasonable.

The sources and calculation have been verified by DNV.



Build Margin

For the calculation of the build margin (BM) emission factor, two sample groups of power units were compared. One is the set of five power units that have been built most recently which generated 34 MWh, another is the set of power capacity additions in the KEPCO grid that comprise 20% of the system generation and that have been built most recently which generated 78 004 323 MWh. The latter sample group is chosen.

Option 1 for data vintage data was chosen. Thus no monitoring and recalculation of the emission factor during the first crediting period is required. The validation team has confirmed that year 2005 ~ 2007 data /40/ was used to calculate the BM emission factor, which are the most recent data available at the time of submission of the PDD to DNV for validation. The data vintage chosen are provided in the Annex 3 of the PDD as well as in the spreadsheet of the emission factor calculation. The vintage data for the years 2005~2006 from Statistics of Electric Power in Korea 2006~2008 editions /40/ published by KEPCO are used for the Build Margin.

BM was calculated as 0.3950 tCO₂/MWh which was verified by the emission factor calculation spreadsheet provided by the project participant /4/.

Calculation of the combined margin emission factor

The weights ω_{OM} and ω_{BM} are selected as 0.75 and 0.25, respectively, as stipulated for wind project by Tool to calculate the emission factor for an electricity system, version 02 /30/. The combined margin of 0.6351 tCO₂/MWh is fixed *ex ante* for the entire first crediting period.

Baseline emission

The annual electricity delivered to the KEPCO grid is expected to be 88 948 MWh /3/. The expected annual baseline emission of the project is 54 276 tCO₂e /1/. The baseline emission estimate can be reproduced using the data and parameters provided in the PDD and supporting files submitted for registration. Data sources mentioned have been verified by DNV.

The calculation of GHG emission reductions is complete and transparent, and the data accuracy has been verified. No other project emission or leakage sources contributing more than 1% and not mentioned by the methodology have been found.

Based on the calculations and results presented in the sections above the implementation of the project activity will result in an average *ex-ante* estimation of emission reduction conservatively calculated to be 54 276 tCO₂e per year for the selected crediting period.

All assumptions and data used by the project participants are listed in the PDD and/or supporting documents, including their references and sources. All documentation used by the project participants as the basis for assumptions and source of data is correctly quoted and interpreted in the PDD. All values used in the PDD are considered reasonable in the context of the proposed CDM project activity. The baseline methodology has been applied correctly to calculate project emissions, baseline emissions, leakage and emission reductions. All estimates of the baseline, project and leakage emissions can be replicated using the data and parameter values provided in the PDD.



4.9 Environmental impacts

Act on the Environmental Impact Assessment in the Republic of Korea mandates conducting a separate Environmental Impact Assessment (EIA) for similar wind power plant project activities with the capacity of more than 100 MW. The proposed project does not fall under the category of EIA as set by the Act on Environmental Impact Assessment /45/. Instead, in accordance with Framework Act on Environmental Policy /44/, the Advance Examination of the Environmental Impact /2/ for the proposed project activity should be prepared and submitted to the local government so that the environmental impacts caused by the project can be taken into account when a project implementation permit is issued. The approval is not necessary from the government in case of the Advance Examination of the Environmental Impact according to the Framework Act on Environmental Policy /44/.

The Advance Examination of the Environmental Impact /2/ of the proposed project was submitted to the Jeju Self-Governing Provincial Government on 27 March 2007 for review. The Jeju Self-Governing Provincial Government acknowledged the submission and issued review opinions which should be integrated into the PP's environmental plan to mitigate the adverse impacts on the environment by official letter dated on 2 August 2007. The project participant has been implementing the measures and recording the actions taken as per the order of local government.

Brief summary of environmental impacts with the mitigation measures are provided in the section D of the PDD based on the Advance Examination of the Environmental Impact Report (AEEI).

No significant environmental impacts are expected from the proposed project activity.

4.10 Comments by local stakeholders

Hanshin Energy Co., Ltd has performed local stakeholder consultation through inviting local residents to comment on the project activity.

The validation team found out during the site visit that the project participant held two public hearings for the local residents and local government officials, one in Samdal-li on 1 September 2008, another in Seougeup-li on 23 July 2007. The presentations with regard to the project nature, construction schedule were provided to the local residents and the opinions of the residents were heard during the public hearings.

The official letters undersigned by the representative of local villages was issued to the project participant expressing the support of the project.

Validation team has interviewed a representative /66/ of the local stakeholder and the government officials of Jeju Self-governing Province /64/ to confirm the stakeholder consultation processes were properly carried out as described in the Part E of the PDD. Local residents near the project site are found supporting the project with the expectation that the wind power plant became tourist attraction. In the PDD, the project participant describes to buy the hotel and the adjacent land to resolve the complaint. During the site visit, the project participant confirmed that the hotel was already purchased. Validation team checked out the purchasing contract of the hotel. A summary of comments is provided and all comments /7/ have been verified by DNV. In conclusion, there is no negative opinion on this project.

DNV considers the local stakeholder consultation carried out adequately.



4.11 Comments by Parties, stakeholders and NGOs

The PDD, version 1 dated 18 June 2008, was made publicly available on the CDM website (<http://cdm.unfccc.int/Projects/Validation/DB/0LC5D12BDPGTX9AJ8HKGR CYRA2W6HU/view.html>) and Parties, stakeholders and NGOs were through the CDM website invited to provide comments during a 30 days period from 2 July 2008 to 31 July 2008.

No comments were received in this period.

- o0o -

APPENDIX A

CDM VALIDATION PROTOCOL

Table 1 Mandatory requirements for Clean Development Mechanism (CDM) project activities

Requirement	Reference	Conclusion
About Parties		
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 (Refer to Table 2, A3)
2. The project shall assist non-Annex I Parties in contributing to the ultimate objective of the UNFCCC.	Kyoto Protocol Art.12.2.	OK
3. The project shall have the written approval of voluntary participation from the designated national authority of each Party involved.	Kyoto Protocol Art. 12.5a, CDM Modalities and Procedures §40a	CAR-1 OK
4. 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, CDM Modalities and Procedures §40a	CAR-1 OK
5. 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 result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties.	Decision 17/CP.7, CDM Modalities and Procedures Appendix B, § 2	OK
6. Parties participating in the CDM shall designate a national authority for the CDM.	CDM Modalities and Procedures §29	OK
7. The host Party and the participating Annex I Party shall be a Party to the Kyoto Protocol.	CDM Modalities §30/31a	OK
8. The participating Annex I Party's assigned amount shall have been calculated and recorded.	CDM Modalities and Procedures §31b	N/A
9. 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	N/A
About additionality		
10. Reduction in GHG emissions shall be additional to any that would occur in the absence of the project activity, i.e. a CDM project activity is additional if	Kyoto Protocol Art. 12.5c,	OK

Requirement	Reference	Conclusion
anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity.	CDM Modalities and Procedures §43	
About forecast emission reductions and environmental impacts		
11. The emission reductions shall be real, measurable and give long-term benefits related to the mitigation of climate change.	Kyoto Protocol Art. 12.5b	OK
For large-scale projects only		
12. Documentation on the analysis of the environmental impacts of the project activity, including transboundary impacts, shall be submitted, and, if those impacts are considered significant by the project participants or the Host Party, an environmental impact assessment in accordance with procedures as required by the Host Party shall be carried out.	CDM Modalities and Procedures §37c	OK
About stakeholder involvement		
13. Comments by local stakeholders shall be invited, a summary of these provided and how due account was taken of any comments received.	CDM Modalities and Procedures §37b	OK
14. Parties, stakeholders and UNFCCC accredited NGOs shall 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.	CDM Modalities and Procedures §40	OK
Other		
15. The baseline and monitoring methodology shall be previously approved by the CDM Executive Board.	CDM Modalities and Procedures §37e	OK
16. A baseline shall be established on a project-specific basis, in a transparent manner and taking into account relevant national and/or sectoral policies and circumstances.	CDM Modalities and Procedures §45c,d	OK
17. The baseline methodology shall exclude to earn CERs for decreases in activity levels outside the project activity or due to force majeure.	CDM Modalities and Procedures §47	OK
18. Provisions for monitoring, verification and reporting shall be in accordance with the modalities described in the Marrakech Accords and relevant decisions of the COP/MOP.	CDM Modalities and Procedures §37f	OK

Table 2 Requirements checklist

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A General description of project activity						
A.1 Title of the project activity (VVM para 55-57)						
A.1.1	Does section A.1 of the PDD include a clearly identifiable project title, version number of the PDD and date of the PDD?	/1/	DR	<input checked="" type="checkbox"/> Clearly identifiable title of the project activity <input checked="" type="checkbox"/> Version number of the PDD is included <input checked="" type="checkbox"/> Date of the PDD is included.		OK
A.1.2	Is the PDD is in accordance with the applicable requirements for completing PDDs?	/1/	DR	<input checked="" type="checkbox"/> Yes <i>If no, list where the PDD is not in accordance:</i>		OK
A.2 Description of the project activity (VVM para 58-64 and VVM para 135 and 136 (a) & (c) for small-scale project activities, as applicable)						
A.2.1	How was the design of the project assessed?	/1/	DR I CC	<i>What type is the project?</i> <input type="checkbox"/> Project in existing facility or utilizing existing equipment(s) <input type="checkbox"/> Project is either a large scale project or a small scale project with emission reductions exceeding 15 000 tCO ₂ e per year. In this case, a site visit must be performed. <input type="checkbox"/> Project is a bundled small scale project, with each project in the bundle with emission reductions not exceeding 15,000 tCO ₂ e per year. In such case the number of physical site visits may be based on sampling, if the sampling size is appropriately justified through statistical		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>analysis.</p> <p><input type="checkbox"/> The project is an individual small scale project activity with emission reductions not exceeding 15 000 tCO₂e per year. In this case, DOE may not conduct a physical site visit as appropriate.</p> <p><input checked="" type="checkbox"/> Greenfield project</p> <p><i>How was the design of the project assessed?</i></p> <p><input checked="" type="checkbox"/> Physical site inspection</p> <p><input checked="" type="checkbox"/> Reviewing available designs and feasibility studies</p> <p><i>If a physical site inspection is not undertaken, justify why no site visit was undertaken:</i></p>		
A.2.2 If a greenfield project, describe the physical implementation of the project when the validation was commenced.	/1/	DR I	<p>The proposed project is a greenfield project. When the validation was commenced in 2008, the physical implementation of the proposed project was not implemented at the project site because the purchasing and lending the site land were not finalised yet by the time. The project site had been used as village ranch and there was no wind farm. Thus the proposed project is deemed to be a Greenfield project.</p> <p>The project is located at Samdal-li, in Jeju Self-governing Province, Republic of Korea (33°23'N of latitude and 126°52'E of longitude)</p> <p>Official name, address of the project location, geographical coordinates should be indicated correctly.</p>	CL1	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
A.2.3	If physical site visits were performed based on sampling (only applicable for bundled small scale projects, each with emission reductions not exceeding 15 000 tCO ₂ e per year), justify the sampling through a statistical analysis:	/1/	DR I	No sampling method was applied for the physical site visit since the wind turbines which were to be installed as described in the PDD were within the site boundary.		OK
A.2.4	Is the description of the proposed CDM project activity as contained in the PDD sufficiently covers all relevant elements, is accurate and that it provides the reader with a clear understanding of the nature of the proposed CDM project activity?	/1/	DR I CC	The PP has sufficiently described the proposed activity in the PDD.		OK
A.2.5	Does the project activity involve alteration of existing installations? If so, have the differences between pre-project and post-project activity been clearly described in the PDD?	/1/	DR I	No. The proposed project is a Greenfield project.		OK
A.2.6	Does the project design engineering reflect current good practices?	/1/ /5/ /63/	DR I	Yes, the project design engineering reflects current good practices. The project has a capacity of 33 MW wind turbine generators. The electricity generated from the turbines will be supplied to the grid of KEPCO.		OK
A.2.7	Would the technology result in a significantly better performance than any commonly used technologies in the host country? Is any transfer of technology from any Annex-I Party involved?	/1/ /5/ /63/	DR I	The proposed project involves the wind energy which is clean. The wind turbines supplied by VESTAS will be installed to generate the power. Many VESTAS wind turbines are already employed around the world. Thus the performance of power generation with those wind turbines is considered proven. The power generation in Korea much depends on the fossil fuel based power plant. If the project were not implemented, same amount of electricity would have otherwise generated by the power plants consuming the fossil fuels. That would lead the increase in the GHG emissions. The project activity would result in a significantly better performance in terms of preservation of		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			natural resources and prevention of pollution. Any transfer of technology from a Annex- I Party is not involved because the proposed project is a unilateral CDM.		
A.3 Participation requirements (VVM para 51-54, 125-127)					
A.3.1 Do all participating Parties fulfil the participation requirements as follows:		DR			OK
			<div>Republic of Korea (host) County X Country Y</div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div> <div> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div>		
A.3.2 Do the letters of approval meet the following requirements?	/1/ /26/ /68/	DR I	<p>The Republic of Korea is the participating Non-Annex I party. The project is being proceeded with an unilateral CDM project.</p> <p>Project participant from Republic of Korea is Hanshin Energy Co., Ltd. It was found out that during the site visits, LG International Corp. is no longer a member of the PPs. The valid name of the PPs should be indicated in the PDD.</p>	CAR-1	OK
			<div>Republic of Korea (host) County X Country Y</div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No NA NA </div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div> <div> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No </div>		
a) LoA confirms that Party has ratified the Kyoto Protocol			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
b) LoA confirms that participation is voluntary			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
c) The LoA confirms that the project contributes to the sustainable development of the host country?			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
d) The LoA refers to the precise project activity title in the PDD			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		
e) The LoA is unconditional with respect to (a) to (d) above			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
f) The LoA is issued by the respective Party's DNA g) The LoA was received directly by the DNA or the PP h) In case of doubt regarding the authenticity of the letter of approval, describe how it was verified that the letter of approval is authentic			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DNA <input checked="" type="checkbox"/> PP	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DNA <input type="checkbox"/> PP <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> DNA <input type="checkbox"/> PP		
				It was confirmed by the officer responsible in Korea Ministry of Knowledge Economy on 22 April 2010 that the LoA issued on 3 December 2009 referred to the proposed CDM project.		
A.3.3	Have all private/public project participants been authorized by an involved Party?	/1/ /26/ /63/	DR	Yes. The project participant, Hanshin Energy is authorized by DNA of Korea. Korean DNA has issued LoA to Hanshin Energy, which can be deemed to be authorized.		OK
A.4 Technical description of the project activity (VVM para 58-64)						
A.4.1	Is the project's location clearly defined?	/1/	DR	Yes. The project's location is clearly stated in the PDD.		OK
A.5 Public funding of the project activity						
A.5.1	In case public funding from Parties included in Annex I is used for the project activity, have these Parties provided an affirmation that such funding does not result in a diversion of official development assistance and is separate from and is not counted towards the financial obligations of these Parties?	/1/ /63/	DR I	The proposed project is being implemented as an Unilateral CDM. No Annex I party has been identified during the validation.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B Application of a baseline and monitoring methodology					
B.1 Methodology applied (VVM para 65-76 and VVM para 136 (b) for small-scale project activities, as applicable)					
B.1.1 Does the project apply an approved methodology and the correct and valid version thereof?	/1/ /28/	DR	Yes. The project has applied <i>Consolidated baseline and monitoring methodology for grid-connected electricity generation from renewable sources, ACM0002</i> , version 11. /28/		OK
B.1.2 If applicable, has any specific guidance provided by the CDM EB in respect to the applied methodology been considered?	/1/ /28/ /29/ /30/ /31/ /32/ /33/ /34/ /35/ /36/	DR CC	Yes. CDM EB's guidances are applied to demonstrate the additionality and meeting the requirements. The list of the guidances and tool provided by the CDM EB are list in 3.1.3 of this report.		OK
B.2 Applicability of methodology (and tools) (VVM para 65-76)					
B.2.1 How was it validated that project complies with the following applicability criteria: (a) installed a new power plant at a site where no renewable power plant was operated prior to the implementation of the project activity (Greenfield plant)?	/1/ /28/ /63/ /64/	DR I	The proposed project is a greenfield project. When the validation was commenced in 2008, the physical implementation of the proposed project was not implemented at the project site because the purchasing and lending the site land were not finalised yet by the time. The project site had been used as village ranch and there was no wind farm. DNV made a site visit in 2009 to check out		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				whether the claim of the Greenfield project was true. It was confirmed that there were nothing in the site. Thus the proposed project is deemed to be a Greenfield project.		
B.2.2	How was it validated that project complies with the following applicability criteria: (b) involve a capacity addition?	/1/ /28/ /63/ /64/	DR	This was confirmed during the site visit that the proposed project was the Greenfield project. N/A		OK
B.2.3	How was it validated that project complies with the following applicability criteria: (c) involve a retrofit of (an) existing plant(s)?	/1/ /28/ /63/ /64/	DR	This was confirmed during the site visit that the proposed project was the Greenfield project. N/A		OK
B.2.4	How was it validated that project complies with the following applicability criteria: (d) involve a replacement of (an) existing plant(s)?	/1/ /28/ /63/ /64/	DR	This was confirmed during the site visit that the proposed project was the Greenfield project. N/A		OK
B.2.5	How was it validated that project complies with the following applicability criteria: (e) switching from fossil fuels to renewable energy sources	/1/ /28/ /63/ /64/	DR	This was confirmed during the site visit that the proposed project was the Greenfield project. N/A		OK
B.2.6	Is the selected baseline one of the baseline(s) described in the methodology and this hence confirms the applicability of the methodology?	/1/ /28/ /63/ /64/	DR	Yes. The project activity is the installation of wind power plants as described in the approved methodology applied. The proposed project doesn't involve capacity addition, retrofit or replacement of a power plant at all. And project activity doesn't involve switching from fossil fuels to renewable energy source at the site of the project activity. Therefore, It is confirmed that the applicability condition of the methodology is met.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.3 Project boundary (VVM para 78-80)						
B.3.1	What are the project's system boundaries (components and facilities used to mitigate GHGs)? Are they clearly defined and in accordance with the methodology?	/1/ /63/	DR I	The project's system is comprised of 11 wind turbines where the electricity is generated. The generated electricity will be supplied to the power grid. The project components needs to be provided in A.2. of the PDD in detail.	CL 1	OK
B.3.2	Which GHG sources are identified for the project? Does the identified boundary cover all possible sources linked to the project activity? Give reference to documents considered to arrive at this conclusion.	/1/ /63/	DR I	According to the approved methodology, ACM0002, the emission sources and gases included in the project boundary are CO ₂ emission from power plant connected to the power grid operated by KEPCO. Project emission is regarded as zero as the project is a renewable energy (wind source) project. No project emission contributing more than 1% of the emission reductions were identified. There is no leakage that needs to be considered in applying this methodology. The identified boundary covers all possible sources linked to the project activity.		OK
B.3.3	Does the project involve other emissions sources not foreseen by the methodologies that may question the applicability of the methodology? Do these sources contribute with more than 1% of the estimated emission reductions of the project?	/1/ /63/	DR I	No. The proposed project is a renewable energy project utilizing the wind energy. Any other emissions sources which are not foreseen by the approved methodology are not involved.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.4 Baseline scenario determination (VVM para 81-88, 105-107) <i>Ensure that the evaluation of all alternatives provided in the PDD and required by the methodology and also possible alternatives/offshoots of alternatives are discussed. Check that all alternatives required to be considered by the methodology are included in the final PDD. If baseline alternatives required to be considered by the methodology are considered not applicable, please assess the justification for this.</i>					
B.4.1 Which baseline scenarios have been identified? Is the list of baseline scenarios complete?	/1/	DR	<p>Baseline scenario for the project activity is the generation of electricity. The project doesn't involve modification or retrofitting an existing power generation facility. The electricity generated by the project activity is supplied to the grid which would otherwise have been generated by grid-connected power plants and by new power sources.</p> <p>The emission sources and gases included in the project boundary should be indicated as described in the applied methodology.</p>	CL-2	OK
B.4.2 How have the other baseline scenarios been eliminated in order to determine the baseline?	/1/ /28/	DR I	<p>Other alternative scenarios are provided to demonstrate the additionality, however the reasons to exclude those alternatives are not properly addressed.</p> <p>Three alternatives to the project are finally identified and eliminated with proper justifications. DNV has assessed other baseline scenarios by cross-checking the justification provided by the PP against the information from</p>	CAR-2	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			the credible sources. DNV has concluded that the elimination of the alternative scenarios is reasonable.		
B.4.3 What is the baseline scenario?	/1/	DR	Baseline scenario for the project activity is the generation of electricity from the grid. The project doesn't involve modification or retrofitting an existing power generation facility. The electricity generated by the project activity is supplied to the grid which would otherwise have been generated by grid-connected power plants and by new power sources. The emission sources and gases included in the project boundary should be indicated as described in the applied methodology.	CL-2	OK
B.4.4 Is the determination of the baseline scenario in accordance with the guidance in the methodology?	/1/ /28/	DR	Yes. The baseline scenario of the proposed project is determined according to the methodology. The project activity is the installation of new grid-connected renewable power plants. The baseline scenario is that electricity delivered to the grid by the project activity would have otherwise been generated by the operation of grid-connected power plants and by the addition of new generation sources. The combined margin calculations are in accordance with the tool to calculate the emission factor for an electricity system as indicated in the methodology.		OK
B.4.5 Has the baseline scenario been determined using conservative assumptions where possible?	/1/ /28/	DR	The input values used for investment analysis shall be those which were valid and applicable at the time of the investment decision taken by the PP. Some input parameters are inconsistent with construction feasibility report such as estimated	CAR-5	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				electricity generation, operating period. Conservative assumption should be applied. Other alternative scenarios are provided to demonstrate the additionality, however the reasons to exclude those alternatives are not properly addressed.	CAR-2	
B.4.6	Does the baseline scenario sufficiently take into account relevant national and/or sectoral policies, macro-economic trends and political aspirations?	/1/ /28/ /33/	DR	The EB 16 th meeting Report, Annex 3 'Clarifications on the treatment of National and/or Sectoral policies and regulations (paragraph 45(e) of the CDM Modalities and Procedures) in determining a baseline scenario, and further clarifications made by the EB on the EB 22 nd meeting Report, Annex 3, 'Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios' explains "Type E- National and/or Sectoral policies or regulations that have been implemented since the adoption by the COP of the CDM M&P may not be taken into account in developing a baseline scenario. The PP shall describe in detail how the above decision is associated with the relevant regulation such as Act on the development, use and promotion of new and renewable energy and how the decision affects in the baseline scenario of the proposed project.	CL-3	OK
B.4.7	Is the baseline scenario determination compatible with the available data and are all literature and sources clearly referenced?	/1/ /3/ /6/ /28/	DR	The board meeting minutes dated on 19 December 2006 indicated that based on the investment analysis given in the construction feasibility report issued in November 2006, the decision of investment in the proposed project was made. The construction feasibility report	CAR-3	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				shows the estimated net electricity generation will be 88 948 MWh. The PP should clarify where 82 388.4MWh/yr of the electricity supply to the grid in the PDD is derived from.		
B.4.8	Is the baseline determination adequately documented in the PDD? <ul style="list-style-type: none"> All assumptions and data used by the project participants are listed in the PDD and related document to be submitted for registration. The data are properly referenced. All documentation is relevant as well as correctly quoted and interpreted. Assumptions and data can be deemed reasonable Relevant national and/or sectoral policies and circumstances are considered and listed in the PDD. The methodology has been correctly applied to identify what would occurred in the absence of the proposed CDM project activity 	/1/	DR	Yes. The baseline determination is adequately documented in the PDD.		OK
B.5 Additionality determination (VVM para 94-121 and VVM para 137 for small-scale project activities, as applicable)						
B.5.1	What approach/tool does the project use to assess additionality? Is this in line with the methodology?	/1/ /28/ /29/	DR	The additionality of the project is assessed according to ‘Tool for the demonstration of additionality Version5’. However, as per ACM0002, the latest approved version of “Tool for the demonstration of additionality” need to be applied. The baseline alternatives considered should include those proposed in the methodology. And	CAR-4 CL-4	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				justification in detail on how the alternatives comply with the relevant laws and regulation should be provided.		
B.5.2	Have the regulatory requirements correctly been taken into account to evaluate the project activity and the alternatives?	/1/ /29/	DR	Yes. The applicable regulatory requirements were considered for both the project activity and the alternatives.		OK
B.5.3	Is sufficient evidence provided to support the relevance of the arguments made?	/1/ /3/ /6/ /18/ /26/	DR	Sufficient evidence that used to demonstrate the additionality should be provided. DNV was provided the sufficient evidence by the PP to demonstrate the additionality of the project.	CAR-2 CAR-5	OK
B.5.4	What is the project additionality mainly based on (Investment analysis or barrier analysis)?	/1/ /29/	DR	The additionality of the proposed project is based on investment analysis. Barrier analysis is skipped in the proposed project.		OK
Prior consideration of CDM (VVM para 98-103)						
B.5.5	What is the evidence for serious consideration of CDM prior to the time of decision to proceed with the project activity?	/1/ /6/ /29/	DR	Starting date of operation is stated provided under section C.1.1 in the PDD. The starting date of a CDM project activity is defined as 'the earliest date at which either the implementation or construction or real action of a project activity begins' in the 'Glossary of CDM Terms Version03'. The PP should provide the starting date as per the 'Glossary of CDM Terms'. The timeline of project implementation including change of a member of PPs should be addressed under B.5. of the PDD. The board meeting minutes dated on 19 December 2006 indicated the decision of investment in the proposed project was made based on the CDM benefit.	CL-5	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.6	If the starting date is after 2 August 2008 and before the global stakeholder consultation, has the DNA and UNFCCC confirmed that the project participants have informed in writing of the project's intention to seek CDM status?	/1/ /3/ /6/ /29/	DR	Not applicable. The starting date of the proposed project is before 2 August 2008.		OK
Continuous efforts to secure CDM status (only to be completed if starting date is before 2 August 2008)						
B.5.7	What initiatives were taken by the project participants from the starting date of the project activity to the start of validation in parallel with the physical implementation of the project activity?	/1/ /3/ /6/ /10/ /18/ /26/	DR	Since the starting date, the PP has proceeded with the further actions such as leasing the land to host the wind turbines, changing the CDM consultant and kicking off the contraction work. The relevant document evidences were checked by DNV and on-site visit was made by validation team. The continuous actions were confirmed as described in the PDD.		OK
B.5.8	When did the construction of the project activity start?	/1/	DR	The construction work started from 2 February 2009.		OK
B.5.9	When was the project commissioned?	/1/	DR	The proposed project was commissioned on 9 September 2009.		OK
B.5.10	Does the timeline of the project confirm that continuous actions in parallel with the implementation were taken to secure CDM status?	/1/ /3/ /6/ /10/ /18/ /26/	DR	Since the starting date of the proposed project (29 December 2007 when the wind turbine purchasing agreement was signed), the continuous actions to secure CDM status have been taken by the PP. DNV has reviewed and checked the evidences and was able to confirm that continuing and real actions were taken to secure CDM status for the proposed project in parallel with it implementation.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
Investment analysis (VVM para 108-114) <i>The list of questions below must be adjusted to the parameters in the investment analysis relevant to the project under validation.</i>					
B.5.11 Does the project activity or any of the remaining alternatives generate revenues apart from CDM? Is this reflected in the PDD?	/1/ /25/	DR	The proposed project generates revenue by supplying the electricity generated by the project to the grid operator, KEPCO via KPX. The revenue apart from trading of CERs is considered in the investment analysis in the PDD.		OK
B.5.12 Do any of the alternatives to the project activity involve investment? Is this reflected in the PDD?	/1/	DR	Three alternatives to the proposed project are proposed. a) The proposed project, but not undertaken as a CDM b) Construction of other types of renewable energy power plant c) Equivalent electricity service by KEPCO. As for the case b and c, the investment analysis is not involved.		OK
B.5.13 Is the choice of benchmark analysis, investment comparison or simple cost analysis correct?	/1/	DR	Benchmark analysis was chosen for the investment analysis. Since the proposed project generates the revenue, simple cost analysis can not be accepted. It is impossible to get the Investment for alternatives. Thus investment analysis can not be conducted. Benchmark analysis is deemed appropriate.		OK
B.5.14 Is the benchmark/discount rate the latest available at the time of decision?	/1/ /3/ /25/ /31/ /46/	DR	PP has selected Project IRR to compare with the government bond rate which was available when the board of directors decided to go with CDM project. The government bond rate was sought from the web site of Bank of Korea. The government bond rate is increased by the risk		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/49/ /50/ /51/ /56/ /58/		premium substantiated by the letter from the local bank expert. The benchmark chosen by the PP deemed proper.		
B.5.15 What is the financial indicator? Is it on equity/project basis? Before/after tax? Is the financial indicator in correspondence with the benchmark?	/1/ /3/ /31/ /43/ /46/ /48/ /49/ /50/ /51/ /56/ /58/	DR	Project IRR is chosen as the financial indicator. It is calculated on after- tax basis. The project IRR is correspondence with the benchmark of the government bond rate. The approach that the PP was taken is in accordance with EB's guidance.		OK
B.5.16 Are the underlying assumptions appropriate, e.g. what is considered as waste in the baseline is considered to have zero value?	/1/ /3/ /31/ /43/ /46/ /48/ /49/ /50/ /51/ /56/ /58/	DR	The proposed project generates revenue by supplying the electricity generated by the project to the grid operator, KEPCO via KPX. The revenue apart from trading of CERs is considered in the investment analysis in the PDD.		OK
B.5.17 Does the income tax calculation take depreciation into account? Is the depreciation year in accordance with normal	/1/ /3/	DR	The income tax calculation takes depreciation into account. PP has applied straightline method		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
accounting practice in the host country?	/31/ /43/ /46/ /48/ /49/ /50/ /51/ /56/ /58/		as for the depreciation. The method is in accordance with the accounting practice in Republic of Korea, the host country.		
B.5.18 Is the time period of the investment analysis and operating time of the project realistic? Has salvage value been taken into account? Is working capital returned in the last year of operation?	/1/ /3/ /31/ /43/ /46/ /48/ /49/ /50/ /51/ /52/ /56/ /58/	DR	20 years of the economic life time of the wind turbine installed in the proposed project are assumed with 0% of residual value in the CFSR. It is indicated that 20 years are the design lifetime of the wind power system in the CFSR. The design lifetime of the wind turbine was investigated with IEC 61400 and was confirmed.		OK
B.5.19 When a feasibility study report or similar approved by the government is used as the basis for the investment analysis: Can it be confirmed that the values used in the PDD are fully consistent with the FSR and is the period of time between finalization of the FSR and the investment decision adequate?	/1/ /3/	DR	The approval of a feasibility study report by the government is not required in Korea. Korea Institute of Energy Research which belongs to Korea Ministry of Knowledge Economy wrote Construction Feasibility Study Report /3/ Since Korea Institute of Energy Research is specialized in research on Energy and state-owned institute, the CFSR is deemed credible. All the values from		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>CFSR were used for the investment analysis except power tariff. The power tariff was sourced from KPX to reflect the real trends of power tariff fluctuation. The construction feasibility study of the proposed project was prepared and issued to the PP in November 2006. As per the construction feasibility study, the proposed project was financially attractive with a project IRR of 5.41% based on the assumed electricity tariff of KRW 107.29/kWh. According to the EB's clarification, "Type E-" National and/or Sectoral policies or regulations that have been implemented since the adoption by the COP of the CDM M&P may not be taken into account in developing a baseline scenario.</p> <p>Korean government compensates by subsidy the difference between Standard Price for new and renewable energy announced by the government and System Marginal Price (SMP) at the electricity market, based on the legislation. Validation team has checked the standard price available at the time when the construction feasibility study was prepared and compared it to the investment analysis input values. According the Guideline on New & Renewable Energy Business published by the New & Renewable Energy Centre of Korea Energy Management Corporation which is the state-owned organization, the standard price for electricity by wind power as of 11 October 2006 was announced to be KRW 107.29/kWh which was cited from 'Guideline on the standard price of electricity generated with new and renewable</p>		

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>source energy' Notification No.2006-89 by Ministry of Commerce, Industry and Economy (Currently, Ministry of Knowledge Economy). KRW107.29/kWh of the standard price was input for the calculation of project IRR in the Construction Feasibility Study Report.</p> <p>The average System Marginal Price (SMP) of wind power paid during the past 1 year was investigated by DNV with the statistics made publicly available by Korea Power Exchange at its website. The SMP of wind power was found as KRW 74.80 from December 2005 to November 2006 which is used for the input value for electricity tariff in the investment analysis.</p> <p>Therefore, the PP has applied the past 1 year average of Wind power SMP paid out to the investment analysis by excluding the subsidy based on the EB's clarifications indicated above. DNV judges this approach it reasonable.</p>		
B.5.20 How was the amount of output (e.g. sales of electricity) assessed?	/1/ /3/	DR	<p><input type="checkbox"/> The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project activity for implementation approval</p> <p><input checked="" type="checkbox"/> The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company)</p> <p><input type="checkbox"/> Other approach.</p> <p>30.7% of Plant Load Factor(expressed as 'Net Utilization Rate' in CFSR /3/) was cross checked against CFSR which was written by Korea</p>		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			Institute of Energy Research. Korea Institute of Energy Research is the organization belonging to Korea Ministry of Knowledge Economy. Feasibility Study Report is not required to be approved by the government. Since Korea Institute of Energy Research is specialized in research on Energy and state-owned institute, DNV judged that the credibility of CFSR is considered high.		
B.5.21 How was the output price (e.g. electricity price) assessed? Were the data available and valid at the time of decision?	/1/ /3/ /31/ /48/	DR	<input checked="" type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The power tariff applied in the investment analysis was derived from Electric Power Statistics Information System operated by Korea Power Exchange (www.kpx.or.kr/episis) DNV has acquired the data set from the system and compared those with the power tariff applied in the PDD. It was confirmed same. By checking the registered six wind power project in Korea from the UNFCCC website the applied power tariffs, it was found that the power tariffs used by four CDM projects including the proposed project were based on the historic data available from the website operated by Korea Power Exchange. Power tariffs of other two projects were not available from the PDDs. The difference of the power tariffs between projects is attributable to the data set the respective project		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				referred to. DNV confirmed that the power tariff applied in the investment analysis is appropriate.		
B.5.22	How were the investment costs assessed? Were the data available and valid at the time of decision?	/1/ /3/ /31/ /48/	DR	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements, contracts and annual financial reports related to the project and the project participants The investment costs of the proposed project were cross checked against the six projects registered in Korea. The investment cost per installed capacity-kW for the proposed project is out of the range. About 3% higher than the project at the top end of the range. The investment costs were further compared against the purchase contract /10/ and CFSR /3/. The costs for turbine and auxiliary components and installation cost take over 98.7% of total investment cost according to /3/.		OK
B.5.23	How were the O&M costs assessed? Were the data available and valid at the time of decision?	/1/ /3/ /31/ /48/	DR	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The O&M costs for wind power projects may vary by site location, conditions for transportation, applied technology and number of turbines. According to the comparison analysis with other registered projects, the proposed		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			project is deemed to be in the lowest range of percentage of O&M costs relative to investment costs for similar wind power projects hosted in Republic of Korea, and this enables DNV to confirm that the O&M cost is reasonable.		
B.5.24 Describe the assessment of the other input parameters. Were the data available and valid at the time of decision?	/1/ /3/ /31/ /48/	DR	<input type="checkbox"/> Cross-check against third-party or publicly available sources (e.g. invoices or price indices) <input checked="" type="checkbox"/> Review of feasibility reports, public announcements and annual financial reports related to the project and the project participants The PP indicated that KRW 200 Millions per annum for leasing the land was to be paid out to land owner. DNV cross-checked that this cost item was identified in the CFSR /3/ And DNV can confirm with Property Lease Agreement between Hanshin Energy Co., Ltd. & Union of Samdal-Ri Co-ranch /15/ that shows rental rates indicated are slightly more expensive than the one indicated in the PDD. Hence other cost is deemed reasonable		OK
B.5.25 Was the financial calculation spreadsheet verified and found to be correct?	/1/ /3/ /31/ /48/	DR	Loan interest should be taken into account when the corporate tax is calculated according to the guideline. However loan interest is not considered in the corporate tax calculation. DNV has verified the financial calculation spreadsheet and found that it was correct.	CAR-5	OK
B.5.26 Sensitivity analysis: Have the key parameters contributing to more than 20% of the revenue/costs during operating or implementation been identified? Has possible correlation	/1/ /3/ /19/	DR	A sensitivity analysis has been carried out for parameters contributing more than 20% to revenues or costs to check the robustness of the		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
between the parameters been considered?		/31/ /48/		financial analysis. Reasonable variations of the static investment, annual operational costs, and annual output delivered to the grid and electricity tariff were checked by calculating the variation necessary to reach the benchmark and then discussing the likelihood for that to happen. None of the parameters in the sensitivity analysis are considered to have any significant positive correction.		
B.5.27	Sensitivity analysis: Is the range of variations is reasonable in the project context?	/1/ /3/ /19/ /31/ /48/	DR CC	DNV verified with how big variation the project IRR would touch the benchmark. The variations of the key indicators are more than $\pm 10\%$ range.		OK
B.5.28	Have the key parameters been varied to reach the benchmark and the likelihood of this to happen been justified to be small?	/1/ /3/ /19/ /31/ /48/	DR CC	The actual costs paid to the suppliers were verified with the transaction records. It was confirmed that the actual costs paid exceeds the budget. Even changing O&M cost to '0' would end up with 5.31% of IRR which is still below the benchmark. Historic trend of power tariff was investigated. It was concluded that drastic increase of power tariff by more than 15% is unlikely to happen whilst the variation with which the indicator reaches benchmark is +34.3%. According to CFSR The gross generation and plant load factor are 93 649MWh/year and 32.4% respectively without loss. However by taking into account loss factors such as geographical factor, electricity loss and load loss which end up with 5%, net generation was estimated as 88 948 MWh/year with 30.7% of plant load factor. The fluctuation of the plant		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			load factor is within the range of other wind farms registered as CDM project. And to meet the benchmark annual output delivered to the grid should increase by 34.3%. Hence it is unlikely to happen. The sensitivity analysis shows that very unrealistic favourable circumstances would be needed for the IRR to reach the benchmark.		
Barrier analysis (VVM para 115-118)					
B.5.29 Are the barriers identified complimentary to a potential investment analysis? Does the barrier have a clear impact on the financial returns so that it can be assessed in an investment analysis? Each barrier is discussed separately.	/1/	DR	Not applicable.		OK
B.5.30 How were the <u>investment barriers</u> assessed to be real? Are the investment barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.31 How does CDM alleviate the investment barriers?	/1/	DR	Not applicable.		OK
B.5.32 Is the project activity prevented by the investment barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.33 How were the <u>technological barriers</u> assessed to be real? Are the technological barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.34 How does CDM alleviate the technological barriers?	/1/	DR	Not applicable.		OK
B.5.35 Is the project activity prevented by the technological barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.36 How were the <u>barriers due to prevailing practise</u> assessed to be real? Are the barriers due to prevailing practise substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.5.37	How does CDM alleviate the barriers due to prevailing practise?	/1/	DR	Not applicable.		OK
B.5.38	Is the project activity prevented by the barriers due to prevailing practise and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
B.5.39	How were the <u>other barriers</u> assessed to be real? Are the other barriers substantiated by a source independent of the project participants?	/1/	DR	Not applicable.		OK
B.5.40	How does CDM alleviate the other barriers?	/1/	DR	Not applicable.		OK
B.5.41	Is the project activity prevented by the other barriers and at least one of the possible alternatives to the project activity is feasible under the same circumstances?	/1/	DR	Not applicable.		OK
Common practice analysis (VVM para 119-121)						
B.5.42	What is the geographical scope of the common practice analysis? Is this justified?	/1/ /47/ /54/	DR	The common practices in the host country are analysed and the data and information published by the state-owned company are used for the analysis. It deemed reasonable.		OK
B.5.43	What is the scope of technology and size (e.g. capacity of power plant) for the common practice analysis and how has this been justified?	/1/ /47/ /54/	DR	Since the renewable energy including the wind farm is not commonly used source of energy in the host country. The PP has used the energy statistics covering all wind power plants in the host country and the all wind farm projects registered in UNFCCC.		OK
B.5.44	What is the data source(s) used for the common practice analysis?	/1/ /40/ /47/ /54/	DR	Further justification should be given with the concrete and credible evidence on common practice analysis. - Government policies on the promotion the renewable energy, Wind power plant data from Korea Energy Management Corporation (Evidence required)	CL-6	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>- No analysis is made on similar activities. Essential distinctions between the proposed project and similar activities should be clearly explained.</p> <p>The PP has used the statistics of Electricity power in Korea published in May 2008 by KEPCO which is the only grid operator in the host country and New & Renewable energy supply statistics 2008 published by KEMCO which is the state-owned company.</p> <p>In addition, the statistics developed by the PP with the information in UNFCCC website is also used for the analysis.</p>		
B.5.45 How many similar non-CDM-projects exist in the region within the scope?	/1/ /40/ /47/ /54/	DR	<p>The New & Renewable energy supply statistics 2008 presents that the installed capacity of the wind farm in the host country by year. Thus the PP demonstrated proportion of installed capacity of wind power among the total capacity of all types.</p> <p>DNV has further checked out 'the status of Power generation facility 2008' published by KPX. 191.895 MW of wind power out of 343.182 MW of renewable energy sources is indicated as of 2007. Thirteen wind power plants with the installed capacity are indicated in 'the status of Power generation facility 2008'. There are only three projects whose capacity is beyond 10MW in terms of installed capacity, and those three projects are registered as CDM projects. One is Gangwon wind park project with 98MW capacity and another is Youngduk wind park project with 39.6 MW capacity and the other is Hangyeong</p>		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			wind power with 15 MW capacity. Apart from those three projects, nine non-CDM-projects remain as of 2007. The installed capacity of the rest nine projects are between 600kW and 9.7MW. The operators of 6 wind power plants are local governments.		
B.5.46 How were possible essential distinctions between the project activity and similar activities assessed?	/1/ /40/ /47/ /54/	DR	Since there were not many wind farm projects in the host country and similar projects were all registered CDM projects, the PP has explained the status of wind farm projects in Korea and listed the projects over MW level.		OK
B.5.47 What is the conclusion of the common practice analysis?	/1/ /40/ /47/ /54/	DR	As the statistics published by the credible sources and the analysis done by the PP show, the proposed project is not commonly conducted in the host country.		OK
Conclusion					
B.5.48 What is the conclusion with regard to the additionality of the project activity?	/1/ /3/ /31/ /40/ /43/ /47/ /48/ /50/ /51/ /52/ /54/ /56/ /58/	DR	In conclusion, it is deemed to sufficiently demonstrate that the project is not a likely baseline scenario, and that emission reductions resulting from the project are additional.		OK

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6 Calculations of GHG emission reductions					
Data and parameters that are available at validation and that are not monitored (VVM para 199-203)					
B.6.1 How was the EF _y verified?	/1/ /4/ /40/ /41/	DR	The calculation done in MS Excel spreadsheet was verified by DNV. It was confirmed the method was correctly applied as described in the Tool /30/.		OK
B.6.2 How was the EF _{OM,y} verified?	/1/ /4/ /40/ /41/	DR	DNV has cross-checked the input data against Statistics of Electric Power in Korea for Year 2006, 2007 and 2008 published by Korea Electric Power Corporation (KEPCO). /40/ It was confirmed correct. The calculation done in MS Excel spreadsheet was verified by DNV. It was confirmed the method was correctly applied as described in the Tool /30/.		OK
B.6.3 How was the EF _{BM,y} verified?	/1/ /4/ /40/ /41/	DR	DNV has cross-checked the input data against Statistics of Electric Power in Korea for Year 2006, 2007 and 2008 published by Korea Electric Power Corporation (KEPCO) /40/ and Status of 2008 Power Generation Facilities published by KPX /41/. It was confirmed correct. The calculation done in MS Excel spreadsheet was verified by DNV. It was confirmed the method was correctly applied as described in the Tool /30/.		OK
B.6.4 How was the FC _{i,m,y} verified?	/1/ /4/ /40/ /41/	DR	DNV has cross-checked the input data against Statistics of Electric Power in Korea for Year 2006, 2007 and 2008 published by Korea Electric Power Corporation (KEPCO) /40/. It confirmed correct.		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
B.6.5 How was the $NCV_{i,v}$ verified?	/1/ /4/ /40/ /41/ /42/	DR	DNV has cross-checked the input data against Statistics of Electric Power in Korea for Year 2006, 2007 and 2008 published by Korea Electric Power Corporation (KEPCO) /40/ and NCV conversion factor against 2006 IPCC Guidelines for National Greenhouse Gas Inventories /42/. It confirmed correct.		OK
B.6.6 How was the $EF_{CO_2,i,y}$ verified?	/1/ /4/ /40/ /41/ /42/	DR	DNV has cross-checked CO_2 emission factor of respective fossil fuel against 2006 IPCC Guidelines for National Greenhouse Gas Inventories /42/. It confirmed correct.		OK
Baseline emissions (VVM para 89-93)					
B.6.7 Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /28/	DR	The electricity supply of 82 388MWh per year to the grid is indicated in the PDD. However the construction feasibility report which the PP took into consideration when the investment decision was made shows the estimated net electricity generation will be 88 948 MWh. The PP should clarify where 82 388.4MWh/yr of the electricity supply to the grid in the PDD is derived from. Estimated baseline emissions are inconsistent within the PDD. 46 253 tCO ₂ p.a under B.6.3 is estimated, however 53 611 tCO ₂ p.a. of ex-ante estimation is indicated. The PP should clarify the point.	CAR-3	OK
B.6.8 Have conservative assumptions been used when calculating the baseline emissions?	/1/ /3/ /4/ /28/	DR	The construction feasibility study report (November 2006) developed by Korea Institute of Energy Research estimated 88 948MWh/yr of net electricity generation by Samdal Wind park, whilst the electricity supply of 82 388MWh per	CAR-6	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/40/		<p>year to the grid is indicated in the PDD . The board meeting minutes (Refer to B.3.4) indicates that the investment decision was made based on the construction feasibility study report.</p> <p>Clarification on developing electricity emission factors should properly be provided.</p> <ul style="list-style-type: none"> - A project boundary should be clearly identified for the purpose of determining the electricity emission factors.(The PP should clarify why OM and BM emissions factor of Jeju Island grid will be monitored instead of the emissions factors of KEPCO grid) - Clarification needs to be provided on that domestic coal supported by government fund is classified as a must-run generation. - Inconsistency of values used for OM calculation from the source data is found. Recalculation is required. - As for the simple OM, it should be indicated in the PDD which option will be taken either Ex Ante or Ex Post. - Clarification needs to be provided if calorific Value of fossil fuel used to calculate the emission factors is Net Calorific value or Gross Calorific Value. - Wrong document(ACM0002) is referenced for the description of OM, BM calculation. - Page 16 of PDD, clarification should be provided on the statement that the capacity of fossil fuel based power plant is expected not 		

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				to be fluctuated during crediting period(2009~2019). - Input values used for BM calculation are not accurate as compared to the statistics of electric power (source data) i.g.Younggwang #5 Electricity generation in 2006 is indicated as 7 681 293MWh, however it is 8 144 410MWh in the statistics of electric power.		
B.6.9	Are uncertainties in the baseline emission estimates properly addressed?	/1/ /28/	DR	Uncertainties in the baseline emission estimates are described by indicating the data uncertainty and input value uncertainty in the PDD. Uncertainty level of metering equipment is meeting the legal requirements in the host country.		OK
Project emissions (VVM para 89-93)						
B.6.10	Are the calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /28/	DR	Project emission is considered Zero in line with the applied methodology ACM0002.		OK
B.6.11	Have conservative assumptions been used when calculating the project emissions?	/1/ /28/	DR	Refer to B.6.8		OK
B.6.12	Are uncertainties in the project emission estimates properly addressed?	/1/ /28/	DR	Refer to B.6.8		OK
Leakage (VVM para 89-93)						
B.6.13	Are the leakage calculations documented according to the approved methodology and in a complete and transparent manner?	/1/ /28/	DR	No significant leakage is foreseen as a result of the project. All the equipments for the wind power plant are new and not transferred from another activity. This was confirmed during the site visit and follow-up interview.		OK
B.6.14	Have conservative assumptions been used when calculating the leakage emissions?	/1/ /28/	DR	<i>Refer to B.6.11</i>		OK
B.6.15	Are uncertainties in the leakage emission estimates properly	/1/	DR	<i>Refer to B.6.11</i>		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
addressed?	/28/				
Emission Reductions (VVM para 89-93)					
B.6.16 Algorithms and/or formulae used to determine emission reductions: <ul style="list-style-type: none"> • All assumptions and data used by the project participants are listed in the PDD and related document submitted for registration. The data are properly referenced • All documentation is correctly quoted and interpreted. • All values used can be deemed reasonable in the context of the project activity • The methodology has been correctly applied to calculate the emission reductions and this can be replicated by the data provided in the PDD and supporting files to be submitted for registration. 	/1/ /28/	DR	Algorithms and formulae used to calculate the emission reductions were found consistent with the methodology /28/.		OK
B.7 Monitoring plan (VVM para 122-124)					
Data and parameters monitored					
B.7.1 Do the means of monitoring described in the plan comply with the requirements of the methodology?	/1/ /28/	DR	The project applies the approved baseline methodology, ACM0002 version 7 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. ACM0002 version 7 is not valid anymore. The active version shall be applied by the project.	CAR-4	OK
B.7.2 Does the monitoring plan contains all necessary parameters, and are they clearly described?	/1/ /28/ /58/	DR CC	Detailed plan and procedures should be provided considering the following points; <ul style="list-style-type: none"> - The location where the monitoring equipment is installed should be addressed in the PDD. - It was found out that during the site visit, the record of the amount of electricity supplied to the grid will be kept by KPX. The PP should 	CAR-7	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			<p>clearly describe how to keep the record of the electricity amount supplied to the grid.</p> <ul style="list-style-type: none"> - It is described in the PDD that all data will be archived electronically, and backed up regularly. The PP should state where the data to be used for claiming CERs is kept (at KPX premise or the PP's premise), who is responsible for the record keeping, how the data is saved (automatically or electronic files containing aggregated data set by manual job). Detailed back-up procedure should be provided as well (frequency, back-up data storage, etc) - The description on the authority and responsibility for project management, monitoring, measurement and reporting should be addressed in the PDD. - Legal requirements on 7 years of meter certification period and calibration frequency should be provided. (B.7.2) - Monitoring parameter 'ERy' in page 19 of the PDD is not consistent with the description. It is not clear why CO₂ emission factor of the Jeju Island grid is to be calculated instead of the emission factor of KEPCO grid. Clarification should be provided. - Contingency plan should be provided in the PDD in case the monitoring equipment is broke-down or malfunctioned. 	<p>CAR-8</p> <p>CL-7</p>	

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				Four monitoring parameters are proposed. Clarifications are raised to those parameters. In addition, clarification should be provided on how the electricity consumed for starting the operation and during the emergency will be treated. The PP should describe whether EGy means net amount of electricity generated and supplied to the grid.		
B.7.3	In case parameters are measured, is the measurement equipment described? Describe each relevant parameter.	/1/ /14/ /28/	DR CC	Relevant registrations are identified in the PDD, 'Law regarding measurement' and 'Act on operation of electricity market' in Annex 4 Monitoring Plan. The details of regulatory requirement should be addressed. Details of the measurement equipment should be provided whose specification should at least meet the requirements of relevant registration.	CL-8	OK
B.7.4	In case parameters are measured, is the measurement accuracy addressed and deemed appropriate? Describe each relevant parameter.	/1/ /14/ /28/ /58/	DR	±0.2% of accuracy level for the measurement equipment is addressed in B.7.1. of the PDD which meets the regulatory requirement for the monitoring equipment measuring the amount of electricity supplied to the grid. Contingency plan should be provided in the PDD to deal with break-down or malfunction of the monitoring equipment.	CAR-8	OK
B.7.5	In case parameters are measured, are the requirements for maintenance and calibration of measurement equipment described and deemed appropriate? Describe each relevant parameter.	/1/ /14/ /28/ /58/	DR CC	The procedure is identified in the PDD. The relevant legal requirements for certification and calibration should be provided.	CL-8	OK
B.7.6	Is the monitoring frequency adequate for all monitoring parameters? Describe each parameter.	/1/	DR	It is stated in the PDD that the baseline data is to be measured automatically by the meters and	CAR-7	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
		/14/ /28/ /58/	CC	transferred to the Project Central Control system simultaneously. However during the site visit the PP failed to clearly explain how the data set is saved (automatically or electronic files containing aggregated data set by manual job). Clarification is raised to the point.		
B.7.7	Is the recording frequency adequate for all monitoring parameters? Describe each parameter.	/1/ /14/ /28/ /58/	DR CC	Detailed procedure should be developed and provided.	CAR-7	OK
Ability of project participants to implement monitoring plan						
B.7.8	How has it been assessed that the monitoring arrangements described in the monitoring plan are feasible within the project design?	/1/ /28/	DR	<ul style="list-style-type: none"> - The location where the monitoring equipment is installed should be addressed in the PDD. - It was found out that during the site visit, the record of the amount of electricity supplied to the grid will be kept by KPX. The PP should clearly describe how to keep the record of the electricity amount supplied to the grid. 	CAR-7	OK
B.7.9	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/ /28/		<p>It was found out that during the site visit, the record of the amount of electricity supplied to the grid will be kept by KPX. The PP should clearly describe how to keep the record of the electricity amount supplied to the grid.</p> <p>It is described in the PDD that all data will be archived electronically, and backed up regularly. The PP should state where the data to be used for claiming CERs is kept (at KPX premise or the PP's premise), who is responsible for the record keeping, how the data is saved (automatically or electronic files containing aggregated data set by</p>	CAR-7	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

[illegible]

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
			be later than the last issuance of CERs, the recording keeping period should be revised.		
Monitoring of sustainable development indicators/ environmental impacts					
B.7.12 Is the monitoring of sustainable development indicators/ environmental impacts warranted by legislation in the host country?	/1/ /28/	DR	The Project falls into the projects group subject to the advance examination of the environmental impact by Framework Act on Environmental Policy. No sustainable development indicators are warranted by legislation.		OK
B.7.13 Does the monitoring plan provide for the collection and archiving of relevant data concerning environmental, social and economic impacts?	/1/ /28/ /44/ /45/	DR CC	The mitigation actions against the environmental impacts provided by the Advance Examination of the Environmental Impact should be taken and relevant actions taken should be reported as necessary. The monitoring plan should state how to manage the relevant data in accordance with the act.	CL4	OK
B.7.14 Are the sustainable development indicators in line with stated national priorities in the host country?	/1/ /28/	DR	No sustainable development indicators are applicable to the proposed project		OK
C Duration of the project activity / crediting period					
C.1.1 Start date of project activity (VVM para 99-100, 104)					
C.1.2 How has the starting date of the project activity been determined? What are the dates of the first contracts for the project activity? When was the first construction activity?	/1/ /28/ /35/	DR	Starting date of operation is stated under section C.1.1 in the PDD. The starting date of a CDM project activity is defined as 'the earliest date at which either the implementation or construction or real action of a project activity begins' in the 'Glossary of CDM Terms Version03'. The PP should provide the starting date as per the 'Glossary of CDM Terms'. The timeline of project implementation including	CL5	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				change of a member of PPs should be addressed under B.5. of the PDD. 20 years of the operational lifetime is addressed in page 21 of the PDD. The lifetime is based on the construction feasibility study report. However 16 years was applied for financial analysis in page 11 of the PDD, which is inconsistent. Clarification should be provided.	CAR-5	
C.1.3	Is the stated expected operational lifetime of the project activity reasonable?	/1/ /28/ /52/	DR CC	20 years of the expected operational lifetime is applied. According to IEC 61400-1 /52/ which is the international standard for Design requirements for Wind turbine states that the design lifetime for wind turbine classes shall be at least 20 years. The PP has applied the minimum lifetime of 20 years. It is deemed reasonable.		OK
C.1.4	Is the start date, the type (renewable/fixed) and the length of the crediting period clearly defined and reasonable?	/1/ /28/	DR	Crediting period is stated in the PDD to start from 1 March 2009 on which the project was supposed to begin operation. It was found out during the site visit that the actual operation would start from 1 August 2009. More plausible starting date of the crediting period should be provided, considering the validation period. The PP has chosen the fixed 10 years of crediting period.	CL-12	OK
D Environmental Impacts (VVM para 131-133 and VVM para 136 (d) for small-scale project activities, as applicable))						
D.1.1	Are there any host country requirements for an Environmental Impact Assessment (EIA), and if yes, is an EIA approved? Does the approval contain any conditions	/1/ /28/	DR I	The wind power plant which has the capacity of more than 100MW should go through the Environmental Impact Assessment in accordance	CL-13	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
that need monitoring?		/44/ /45/ /64/	CC	with Act on the Environmental Impact Assessment. The proposed project doesn't fall under the category of EIA as set by the Act. Instead, the advance examination of the environmental impact needs to be done according to Framework Act on Environmental Policy. The PP should clarify if the Advance examination of the environmental impact was approved.		
D.1.2	Does the project comply with environmental legislation in the host country?	/1/ /28/ /44/ /45/ /64/	DR I CC	Yes. The legal compliance was checked during the site visit. No infringement was found and the proposed actions in the advance examination of the environmental impact were taken to mitigate the adverse environmental impact under the level of legal requirement.		OK
D.1.3	Will the project create any adverse environmental effects?	/1/ /28/ /44/ /45/ /64/	DR I CC	The advance examination of the environmental impact identifies the environmental impacts caused by the proposed project. Countermeasures to reduce the impacts during the constructions as well as operation phases were discussed with the local government, which was confirmed with the report on the actions taken against opinions of the advance consultations about the examination of environmental impact. The report indicates the mitigation actions subject to opinions and actions to be taken at the next phase. The PP should address in D.2 of the PDD the mitigation measures as described in the advance examination of the environmental impact.	CL-14	OK
D.1.4	Have identified environmental impacts been addressed in the project design?	/1/ /28/ /44/ /45/	DR I CC	Yes. The identified environmental impacts were addressed in the project design. The PP summarised the environmental impacts on the PDD as identified in the advance examination of		OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question	Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
	/64/		environmental impact. The initial advance examination of the environmental impact was revised and ended up with version 3 dated in March 2008 as per the administrative order during the consultation with local government.		
D.1.5 Has an analysis of the environmental impacts of the project activity been sufficiently described?	/1/ /28/ /44/ /45/ /64/	DR I CC	Yes. The environmental impacts caused by the proposed project activity are described in the PDD, based on the advance examination of the environmental impact conducted by 3 rd party. It was reviewed by the validation team and confirmed consistent with the advance examination of the environmental impact.		OK
D.1.6 Are transboundary environmental impacts considered in the analysis?	/1/ /28/ /44/ /45/ /64/	DR I CC	Yes. Transboundary environmental impacts are identified and considered in the advance examination of the environmental impact, which are taken into consideration in the analysis.		OK
E Stakeholder Comments (VVM para 128-130)					
E.1.1 Have relevant stakeholders been consulted?	/1/ /66/	DR I	Three public consultations in 2005 are described in the PDD. The PP, Hanshin Energy was founded in December 2006. The PP should clarify project history based on timeline. Besides, the PP should clarify how the three consultations can be justified to consult with the local stakeholders before the decision of proceeding with CDM project was made by the PP. The validation team found out during the site visit that the PP held 2 public hearings for the local residents and local government officials. The official letters undersigned by the	CL-45	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Checklist Question		Ref	MoV	Assessment by DNV	Draft Concl.	Final Concl.
				representative of local villages was issued to the PP expressing the support of the proposed project. This course of actions taken should be addressed in the PDD.		
E.1.2	Have appropriate media been used to invite comments by local stakeholders?	/1/ /66/	DR I	Yes. Public hearings and newspaper were used to inform the local stakeholder of the proposed project and invite their comments. This course of actions should be addressed in the PDD.	CL-15	OK
E.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/ /66/	DR I	There is no regulation/law requiring a stakeholder consultation in Korea.		OK
E.1.4	Is a summary of the stakeholder comments received provided?	/1/ /16/ /66/	DR I	Yes. The summary of the stakeholder comments is provided in the PDD. There were objections to the project by an owner of hotel located near the project site. The validation team interviewed a representative of village during the site visit. The representative confirmed the stakeholder consultation process was conducted as addressed in the PDD. The project was welcome by the local stakeholders because of the expectation that the wind farm became tourist attraction.		OK
E.1.5	Has due account been taken of any stakeholder comments received?	/1/ /12/ /66/	DR I CC	The PDD described that the PP would buy the hotel and the adjacent land to resolve the complaint. The purchasing contract of the hotel should be provided to confirm the due account taken.	CL-16	OK

MoV = Means of Verification, DR= Document Review, I= Interview, CC= Cross-Checking

Table 3 Resolution of corrective action requests and clarification requests

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>CAR 1</p> <p>Letter of approval from the DNA of Republic of Korea is pending.</p> <p>The project is being implemented as the unilateral CDM project. The PP should clearly indicate that the project is an unilateral project in the PDD.</p> <p>It was found out during the site visits that LG International Corp. is no longer a member of the PPs. The valid name of the PPs should be indicated in the PDD.</p>	A.3.2	<p>Attached letter of approval from the DNA of Republic of Korea.</p> <p>The project is being implemented as the unilateral CDM project</p> <p>The PP is Hanshin Energy Co., Ltd.</p> <p>And LG international Corp. is not participants of this project anymore.</p>	<p>The LoA from the DNA of Republic of Korea is provided.</p> <p>The confirmation of voluntary participation from Republic of Korea for the proposed project activity has been addressed. The proposed project is being proceeded with as Unilateral CDM.</p> <p>The valid name of the PP and the indication of unilateral CDM are provided in A.3 of the PDD.</p> <p>Therefore CAR 1 is closed.</p>
<p>CAR 2</p> <p>Other alternative scenarios are provided to demonstrate the additionality, however the reasons to exclude those alternatives are not properly addressed.</p>	B.4.2 B.4.5 B.5.3	<p>Alternative scenarios are provided.</p> <p>And the reasons to exclude those alternative are properly addressed(refer to B. 5)</p>	<p>Three alternatives to the project are identified in the PDD:</p> <ul style="list-style-type: none"> - The proposed project itself, but not undertaken as a CDM project activity; - Construction of a power plants using other renewable energy, such as hydro plants or biomass power generation with equivalent installed capacity or annual electricity generation; - Equivalent electricity service provided by the KEPCO. <p>DNV considers the list of realistic and credible alternatives to be complete.</p> <p>The baseline scenario selection was appropriately assessed. Alternative – b),</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>Construction of a power plant using other renewable energy, such as hydro plants or biomass power generation with equivalent installed capacity or annual electricity generation: The electricity supplied by the renewable energy in Korea contributed just 1% of the total electricity generated in Korea in 2008. The technology of renewable energy is not commonly applied because of low economic benefit, and the proposed project area lacks water resources and biomass resources. Thus, DNV was able to verify other renewable energy sources are either not available in the geographical area of the project or commercially available at present. It was also verified by DNV that the main business area of the project developer is the development of wind power generation sources. The alternative b) is thus not a likely alternative.</p> <p>The reasons to exclude the alternative scenarios are properly addressed in the Section in B.5 of the PDD as per the requirement of “Tool for the demonstration and assessment of additionality” version 5.2. In conclusion, it is deemed to sufficiently demonstrate that the project is not a likely baseline scenario, and that emission reductions resulting from the project are additional.</p> <p>Therefore CAR 2 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>CAR 3</p> <p>The electricity supply of 82 388MWh per year to the grid is indicated in the PDD. However the construction feasibility report with which the PP took into consideration when the investment decision was made shows the estimated net electricity generation will be 88 948 MWh. The PP should clarify where 82 388.4MWh/yr of the electricity supply to the grid in the PDD is derived from.</p> <p>Estimated baseline emissions are inconsistent within the PDD. 46 253 tCO₂ p.a under B.6.3 is estimated, however 53 611 tCO₂ p.a. of ex-ante estimation is indicated. The PP should clarify the point.</p>	<p>B.4.7</p> <p>B.6.7</p>	<p>The net electricity supply of 88,948 MWh per year to the grid. (Feasibility Study Report of Wind Power (Korea Institute Energy Research,2006.11))</p> <p>The electricity supply of 82,388.4 MW/yr is not proper data.</p> <p>As a result, estimated baseline emissions are 56 490 tonCO₂/yr.</p>	<p>The PP has revised in the PDD the amount of the estimated net electricity generation which is to be supplied to the grid. 88 948 MWh from the CFSR is applied in the PDD and the investment analysis.</p> <p>Estimated baseline emissions are revised because the electricity supply to the grid and the emission factors are changed. 54 276 tCO₂ p.a. of ex-ante estimation is estimated.</p> <p>Therefore CAR 3 is closed.</p>
<p>CAR 4</p> <p>The project applies the approved baseline methodology, ACM0002 version 7 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”. ACM0002 version 7 is not valid any more. The active version shall be applied by the project.</p> <p>Applicability of the methodology to the proposed project needs to be reconfirmed in the final validation report in accordance with the valid version of ACM002.</p> <p>The additionality of the project is assessed according to ‘Tool for the demonstration of additionality Version5 as requested by the applied methodology ACM0002 Version7. However, as</p>	<p>B.5.1</p> <p>B.7.1</p>	<p>The project applies the approved baseline methodology, ACM0002 version 10 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”</p> <p>According to the requirements of the ACM0002 version 10 the project utilises the CDM consolidated “Tool for the demonstration and assessment of additionality” version 5.2, to demonstrate the additionality of the project</p>	<p>The valid version baseline methodology is applied which is ACM0002 version 11 “Consolidated baseline methodology for grid-connected electricity generation from renewable sources”.</p> <p>The proposed project is a grid-connected renewable power generation project which installs a new wind power plant at a site where no renewable power plant was operated prior to the implementation of the project activity. Thus the proposed project fulfills the applicability conditions as indicated in the applied methodology.</p> <p>DNV was able to verify that additionality of the proposed project was demonstrated in accordance with “Tool for the</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
per ACM0002, the latest approved version of “Tool for the demonstration of additionality” need to be applied.			demonstration and assessment of additionality” version 5.2. Therefore CAR 4 is closed.
<p>CAR 5</p> <p>Step 2. Investment Analysis</p> <p>Investment analysis should be in accordance with ‘Guidance on the Assessment of Investment Analysis, Version02’. The following points were found not consistent with the guideline.</p> <ul style="list-style-type: none"> - Input values that were valid and applicable at the time of investment decision taken should be used in the investment analysis, e.g. Capacity factor, Net electricity generation, O&M Cost, Electricity tariff, operating period - Determination of plant load factor should be described in the PDD in accordance with ‘Guidelines for the reporting and validating of plant load factors Version01’, EB 48th meeting report Annex 11. - 7% of discount rate, KOSPO’s the lowest internal investment limit standard is proposed as benchmark. Justification should be provided on how the proposed benchmark is applicable to the investment analysis to compare with project IRR. - Sensitivity analysis should show the percentage by which each of the variables would make the IRR increase or decrease to the benchmark. The explanation why the variation is not realistic for the input 	<p>B.4.5</p> <p>B.5.3</p> <p>C.1.2</p>	<p>Input values that were valid and applicable at the time of investment decision taken should be used in the investment analysis</p> <p>Plant load factor(capacity factor) is described in the PDD. (refer to Investment analysis of Section B.5)</p> <p>Rate of interest (6.38%) applied benchmark, rate of interest by local commercial lending rates.</p> <p>As a results of consider the sensitivity analysis, IRR is the equal with benchmark.</p> <ul style="list-style-type: none"> - when total investment cost decrease the -28.35% - when electricity supplied to grid 	<ul style="list-style-type: none"> - Input values were taken from the Construction Feasibility Study with which the investment decision was made. The values are confirmed to be consistent and correct. - The plant load factor determined by Korea Institute of Energy Research who issued the Construction Feasibility Study. - The PP withdrew 7% of discount rate and has applied the Government Bond Rate for one year maturity period increased by the risk premium as a benchmark. Bank of Korea provides the three different government bond rates which are one year maturity, three years maturity and ten years maturity. The bond with one year maturity period is confirmed as the most conservative value. The risk premium was

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>parameters of the financial analysis should be given in the PDD.</p> <p>Calculation sheet of investment analysis should be provided.</p> <p>20 years of the operational lifetime is addressed in page 21 of the PDD. The lifetime is based on the construction feasibility study report. However 16 years was applied for financial analysis in page 11 of the PDD, which is inconsistent.</p> <p>Loan interest should be taken into account when the corporate tax is calculated according to the guideline. However loan interest is not considered in the corporate tax calculation.</p>		<p>increase the +38.4%</p> <ul style="list-style-type: none"> - O&M cost is not arrived at benchmark. - Power tariff <p>Calculation sheet (ver. 03) of investment analysis is provided to DNV.</p> <p>The project will have the operational lifetime of 20 years. (Feasibility Study Report of Wind Power (Korea Institute Energy Research,2006.11))</p> <p>The calculation of corporate tax is revised by considering loan interest</p>	<p>substantiated by the local bank expert.</p> <ul style="list-style-type: none"> - Sensitivity analysis was revised as per the request. The investment cost, Electricity generation, Power tariff and O&M cost were analysed to show that the variations of the selected parameters are not likely to hit the benchmark. <p>Calculation sheet of investment analysis is provided to DNV. DNV has checked the analysis is correctly made.</p> <p>The PP has made a revision on the operational lifetime as per CFSR. 20 years of lifetime is applied to the investment analysis.</p> <p>The PP has recalculated the corporate tax by taking into account loan interest.</p> <p>Therefore CAR 5 is closed.</p>
<p>CAR 6</p> <p>Clarification on developing electricity emission factors should properly be provided.</p> <ul style="list-style-type: none"> - A project boundary should be clearly identified for the purpose of determining the electricity emission factors. (The PP should clarify why OM and BM emissions factor of Jeju Island grid will be monitored instead of the emissions factors of KEPCO grid) - Clarification needs to be provided on that domestic coal supported by government fund 	B.6.8	<p>For the baseline determination, project boundary is related to CO₂ emissions from power generation in a fossil fuel power plant replaced by this project activity. The spatial extent of the project boundary includes the project sites and all the power plants connected physically to the electricity system of Korea Electric Power Corporation (KEPCO).</p> <p>When the baseline is estimated for 'Renewable electricity generation for a grid', the definition of electricity grid (spatial, inter-grid electricity supply) is not</p>	<ul style="list-style-type: none"> - The PP indicated in Section B.4 of the PDD that the spatial extent of the project includes the project power plant and all power plants connected physically to the electricity system that the CDM project power plant is connected to. The grid operated by Korea Electric Power Corporation (KEPCO) is the only electricity system

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>is classified as a must-run generation.</p> <ul style="list-style-type: none"> - Inconsistency of values used for OM calculation from the source data is found. Recalculation is required. - As for the simple OM, it should be indicated in the PDD which option will be taken either Ex Ante or Ex Post. - Clarification needs to be provided if calorific Value of fossil fuel used to calculate the emission factors is Net Calorific value or Gross Calorific Value. - Wrong document (ACM0002) is referenced for the description of OM, BM calculation. - Page 16 of PDD, clarification should be provided on the statement that the capacity of fossil fuel based power plant is expected not to be fluctuated during crediting period (2009~2019). - Input values used for BM calculation are not accurate as compared to the statistics of electric power (source data) i.g. Younggwang #5 Electricity generation in 2006 is indicated as 7 681 293MWh, however it is 8 144 410MWh in the statistics of electric power. 		<p>clear such as the case of Jeju Special self-governing province (only for the electricity supply). Generation electricity in Jeju special self-governing province is not enough to supply Jeju Special self-governing province, so that to use interconnection tie from inland.</p> <p>OM EF and BM EF is used statistical data of KEMCO.</p> <p>OM EF is combined OM EF from inland and OM EF from Jeju special self-governing province.</p> <p>BM EF is only used Jeju special self-governing province statistical data of KEMCO.</p> <p>Data relating to domestic coal supported by government fund is provided to DNV. (attachment 2)</p> <p>Simple OM is taking Ex-ante option.</p> <p>According to KEMCO statistic methods, calorific value of fossil fuel used to calculate the emission factor is Gross Caloric value</p> <p>Applied for baseline emission</p> <p>The description of OM, BM calculation is modified.</p> <p>To calculate the Emission reduction, methodological tool “Tool to calculate the emission factor for an electricity system</p>	<p>in Korea. The KEPCO grid is taken into account for the calculation of emission factors.</p> <ul style="list-style-type: none"> - The PP indicated in the section B.6.1 of the PDD that ex ante option was taken. - Net Calorific Value of the fossil fuels used was applied to calculate the emission factor. It was confirmed with the calculation sheet in a MS Excel spreadsheet and the statistic of Electric power in Korea issued by KEPCO. - Wrong reference is corrected. “Tool to calculate the emission factor for an electricity system (Version 2) is referenced. - The statement in the PDD Version 1 published for global stakeholder consultation is taken out by the PP from the final version of the PDD. - Calculation of emission factors including OM and BM were cross-checked with source data and confirmed as correct. <p>Therefore CAR 6 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
		(ver. 2)'' will be used. Input values used for BM calculation is modified.	
<p>CAR 7</p> <p>Detailed plan and procedures should be provided considering the following points;</p> <ul style="list-style-type: none"> - The location where the monitoring equipment is installed should be addressed in the PDD. - It was found out that during the site visit, the record of the amount of electricity supplied to the grid will be kept by KPX. The PP should clearly describe how to keep the record of the electricity amount supplied to the grid. - It is described in the PDD that all data will be archived electronically, and backed up regularly. The PP should state where the data to be used for claiming CERs is kept (at KPX premise or the PP's premise), who is responsible for the record keeping, how the data is saved (automatically or electronic files containing aggregated data set by manual job). Detailed back-up procedure should be provided as well (frequency, back-up data storage, etc) - The description on the authority and responsibility for project management, monitoring, measurement and reporting should be addressed in the PDD. - Legal requirements on 7 years of meter certification period and calibration frequency 	<p>B.7.2</p> <p>B.7.6</p> <p>B.7.7</p> <p>B.7.8</p> <p>B.7.9</p> <p>B.10</p>	<p>Monitoring plan will comply with the company rule. (<i>Procedure management of CDM project monitoring</i>)</p> <p>The company rule provided DNV. (attachment 3)</p> <p>The monitoring equipment is installed in accordance with 'Act on operation of electricity market'</p> <p>Aggregated data will be transferred to KPX (Korea Power Exchange) daily. If the variables between the one recorded by the PP and another kept by KPX, the data of kept by KPX is applied. Data will be aggregated weekly, monthly and yearly. According to ACM0002 (version 10), back-up data is not need to anymore.</p> <p>PP addressed about monitoring plan, Quality control (QC), quality assurance (QA) procedures, authority and responsible for project management in the PDD (B.7.2)</p> <p>Quality control (QC), quality assurance (QA) procedures is involved the following:</p> <ol style="list-style-type: none"> 1. <i>Monitoring equipment</i> 2. <i>Monitoring of amount of electricity</i> 	<ul style="list-style-type: none"> - The location of the meter is correctly indicated in the revised PDD. The measuring equipment is to be installed at the substation in the project site. - The PP addressed that measured amount of electricity was to be transmitted to the KPX, which is in compliant with 'Regulation on operation of Electricity Market'. It is stated in the revised PDD that the data will be collected from the KPX on a regular basis. The supplied electricity will be measured and transmitted to both KPX and the Project simultaneously according to the PP's internal procedure (HSD-004 Clause 5.3.2). The record will be kept at the site. The PP has developed the Procedure (HSD-004) to ensure that the monitoring activity complies with the methodology and the statements in the PDD. - Plant manager & plant safety manager are responsible for the record keeping. Data will be controlled at site as per the procedure provided in the section B.7.2

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>should be provided. (B.7.2)</p> <ul style="list-style-type: none"> - Monitoring parameter 'ER_y' in page 19 of the PDD is not consistent with the description. It is not clear why CO₂ emission factor of the Jeju Island grid is to be calculated instead of the emission factor of KEPCO grid. Clarification should be provided. 		<p><i>3. Management of monitoring and electricity safety</i></p> <p>Legal requirements on 7 years of meter certification period and calibration frequency in accordance with Act on operation of electricity market 7.3.8</p> <p>ER_y is modified.</p> <p>When the baseline is estimated for 'Renewable electricity generation for a grid', the definition of electricity grid (spatial, inter-grid electricity supply) is not clear such as the case of Jeju Special self-governing province (only for the electricity supply). Generation electricity in Jeju special self-governing province is not enough to supply Jeju Special self-governing province, so that to use interconnection tie from inland.</p>	<p>of the PDD.</p> <ul style="list-style-type: none"> - Every 3 years and 6 months the meter should be tested. 7 years of calibration interval is confirmed with 'Regulation on operation of Electricity Market'. <p>Therefore CAR 7 is closed.</p>
<p>CAR 8</p> <p>Procedures shall be further developed;</p> <ul style="list-style-type: none"> - Procedure for data review - Procedure for emergency preparedness and response (Contingency plan) - Procedure for corrective and preventive actions - Procedure for training addressing the subject associated with the CDM Project, training record keeping, training frequency. 	B.7.4	<p>Monitoring plan will comply with the company rule. (<i>Procedure management of CDM project monitoring</i>)</p> <p>The company rule provided DNV. (attachment 3)</p>	<ul style="list-style-type: none"> - The PP's internal procedure, 'Monitoring procedure(HSD-004)' document is provided and the relevant clauses are cited in the revised PDD. - The data are to be compared with the one of KPX. If any inconsistency is found, the main cause is to be investigated with KPX. The corrective actions developed based on the investigation result will be taken afterwards. - In case of the malfunction or a break

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			<p>down of the measuring equipment, the data measured by comparator will be used.</p> <p>- Training procedures are addressed in both the 'Monitoring procedure (HSD-004)' and the revised PDD. The wind turbine supplier will provide the trainings as per the MSA agreement.</p> <p>Therefore CAR 8 is closed.</p>
<p>CL 1</p> <p>The proposed project is located at Samdal-li, in Jeju Self-governing Province, Republic of Korea (33°23'E of latitude and 126°52'N of longitude)</p> <p>Address of the project location and geographical coordinates should be indicated correctly.</p> <p>The project component needs to be provided in A.2 of the PDD in detail.</p>	<p>A.2.2</p> <p>B.3.1</p>	<p>The proposed project is located at Samdal-ri, Seondan-eup, Seogwipo-si, jeju special self-governing province, the republic of Korea.(33°22'N, 126°50'E).</p>	<p>The PP corrected the address of the project location and the geographical coordinates in the revised PDD.</p> <p>The description on the project components is added in the Section A.2 of the PDD. .</p> <p>The actions taken are deemed correct.</p> <p>Therefore CL 1 is closed.</p>
<p>CL 2</p> <p>The baseline scenario for the project activity is the generation of electricity from the grid. The project doesn't involve modification or retrofitting an existing power generation facility. The electricity generated by the project activity is supplied to the grid which would otherwise have been generated by grid-connected power plants and by new power sources.</p> <p>The emission sources and gases included in the project boundary should be indicated as described in the applied methodology.</p>	<p>B.4.1</p> <p>B.4.3</p>	<p>Modification or retrofitting an existing power generation facility is not appropriate the baseline scenario for the project activity.</p> <p>The emission source and gases included in the project boundary addressed in the applied methodology.</p>	<p>The PP has identified emission sources within the project boundary in the section B.3 of the PDD as per the approved methodology ACM0002. This deems reasonable.</p> <p>Therefore CL 2 is closed.</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
CL 3 The EB 16 th meeting Report, Annex 3 ‘Clarifications on the treatment of National and/or Sectoral policies and regulations (paragraph 45(e) of the CDM Modalities and Procedures) in determining a baseline scenario, and further clarifications made by the EB on the EB 22 nd meeting Report, Annex 3, ‘Clarifications on the consideration of national and/or sectoral policies and circumstances in baseline scenarios’ explains “Type E-‘ National and/or Sectoral policies or regulations that have been implemented since the adoption by the COP of the CDM M&P may not be taken into account in developing a baseline scenario. The PP shall describe in detail in the PDD how the above decision is associated with the relevant regulation such as Act on the development, use and promotion of new and renewable energy and how the decision affects in the baseline scenario of the proposed project.	B.4.6	‘Alternative Energy Development Promotion Act amended on March, 2002.’ : Alternative Energy Development Promotion Act amended in March, 2002, the Ministry of Knowledge and Economy(MKE), Industry and Energy of Korean Government issued the Public Notice N0.2003-61 on October 9, 2003 and its amendment No. 2004-104 on October 19, 2004 which compensates the renewable energy electricity generation projects for the difference between the standard price applicable for the electricity generated using the alternative energy and the system marginal price of the grid promote such kinds of electricity generation.	Act on the development, use and promotion of new and renewable energy and Act on Electricity Business defines the Feed-In Tariff scheme in Korea to promote the new and renewable source of energy. These legislations are applied to the electricity generation by Photovoltaic, Wind, Hydro, Fuel cell and biogas. Based on these legislations, the government compensates by subsidy the difference between Standard Price for new and renewable energy announced by the government and System Marginal Price (SMP) at the electricity market. The PP has added the description of the scheme in the Section B.5 of the PDD. It is found correct. Therefore CL 3 is closed.
CL 4 The baseline alternatives considered should include those proposed in the methodology. And justification in detail on how the alternatives comply with the relevant laws and regulation should be provided.	B.5.1	The alternative scenario is considered in the PDD. In Korea there is no mandatory role or restriction at present for displacing the fossil fuel based power plants with renewable energies like wind power generation.	Three alternative scenarios which comply with the relevant laws and regulations are identified in the Section B.5 of the PDD. It deems reasonable. Therefore CL 4 is closed.
CL 5 Starting date of operation is stated under section C.1.1 in the PDD. The starting date of a CDM project activity is defined as ‘the earliest date at	B.5.5 C.1.2	Starting date of operation is changed 29.12.2007(Contract of supply for wind power generation (Vestas Korea corporation/Hanshin Energy corporation))	The PP has revised the starting date as 29 December 2007 when the wind turbine purchase agreement was signed with the supplier, which is the date on which the

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>which either the implementation or construction or real action of a project activity begins' in the 'Glossary of CDM Terms Version 03'. The PP should provide the starting date as per the 'Glossary of CDM Terms.</p> <p>The timeline of project implementation including change of a member of PPs should be addressed under B.5. of the PDD.</p>		<p>The timeline of project implementation including change of a member of PPs is addressed in the PDD.</p>	<p>PP has made the first commitment of expenditures related to the implementation of the project activity. The proposed starting date satisfies the definition in the Glossary of CDM Terms Version 03, 'real action of a project activity begins'.</p> <p>Continuing and real actions such as contracting the CDM Consulting service, acquiring the relevant permits from the local government and contracting the land leasing were taken to secure CDM status for the project in parallel.</p> <p>The timeline of the project implementation is provided in the Section B.5 of the PDD. DNV verified the evidences proving the activities indicated in the timeline. The PP's statement is correct and the real actions to implement the projects were considered to be taken.</p> <p>Therefore CL 5 is closed.</p>
<p>CL 6</p> <p>Further justification should be given with the concrete and credible evidence on common practice analysis.</p> <ul style="list-style-type: none"> - Government policies on the promotion the renewable energy, Wind power plant data from Korea Energy Management Corporation (Evidence required) 	B.5.4	<p>Due to implementation of Government polices to promote the renewable energy(2002, MKE) and the development of renewable energy technology, at the end of 2003 several wind power plants started to be installed and operated in the Republic of Korea(Renewable energy supply statistic, 2008). According to this policy, Table B-6 shows that the wind power</p>	<p>The PP has provided the evidence document showing that the government of host country promoted to develop the renewable energy. The PP has analyzed the statistics published by the state-owned companies. The data derived from UNFCCC website were also used to demonstrate the common practice in the</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
- No analysis is made on similar activities. Essential distinctions between the proposed project and similar activities should be clearly explained.		facility increases immediately since 2004.	host country. Therefore CL 6 is closed.
CL 7 EGy of monitoring parameter under B.7.1 in the PDD is stated as Electricity supplied to the grid by the project. The PP should describe how the net electricity generation can be measured in the PDD. (How the electricity consumed for starting the operation and during the emergency will be treated. EGy means net amount of electricity generated and supplied to the grid)	B.7.2	The data (the net electricity generation) is “total electricity generation” minus “consumption of electricity”(This data is electricity generated except electricity consumed in the plant and electricity imported for the project activity.) (refer to B.7.1 Data and parameters monitored _EG _{facility,y})	The PP has stated in the PDD that the net amount of electricity supplied to the grid will be monitored. The net electricity supply will be measured with the electricity meter. Therefore CL 7 is closed.
CL 8 Relevant legislations are identified in the PDD, ‘Law Regarding measurement’ and ‘Act on operation of electricity market’ in Annex 4 Monitoring Plan. The details of regulatory requirement should be addressed. Details of the measurement equipment should be provided whose specification should at least meet the requirements of relevant registration.	B.7.3 B.7.5	According to the “Act on operation of electricity market (2009.1.1)” 4.1.1. The meters shall be installed measurement point. 7.1.5. Allowable error of the export and import meter is $\pm 0.2\%$. 7.3.8. The meters shall be authorized through the due formal certifying process (the valid period for the authorized certification: 7 years.) 7.3.1. The meters shall be calibrated when they are installed, and re-calibrated every three years six months(\pm six months) after the installation	The details are added into the section B.7.2 of the PDD. The legal requirements were confirmed by the validation team. The measuring equipment which has allowable error of $\pm 0.2\%$. is installed at the substation in the project site. Calibration interval is indicated in the PDD. These are deemed appropriate. Therefore CL 8 is closed.
CL 9	B.7.10	PP is contracted MAS (Maintenance, Service and Availability agreement) with	The training subjects are provided in the Section B.7.2 of the PDD. These will

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>The supplier of wind turbine has provided the trainings to the PP. As the installation is complete and commercial operation starts, further training will be provided to the PP. The PP has signed regular maintenance service with VESTAS. The regular maintenance will be carried out by VESTAS.</p> <p>Training courses to be taken by the person responsible for monitoring is identified in Annex 4 Monitoring Plan of the PDD. Further to these trainings, details of the training and the maintenance service that will be provided by VESTAS should be addressed in the PDD.</p>		<p>VESTAS.</p> <p>The person in charge for monitoring and electricity safety shall attend the monitoring courses regularly.</p> <p>Initial training for employees in site will be provided by the equipment supplier. If there are additional employees or changes of operating manual, VESTAS will be responsible for training them. VESTAS will undergo training for operation of monitoring system, emergency preparedness and management of data following operating manual. Training will include an organized course of theoretical and practical components.</p>	<p>include the operation of monitoring system, emergency preparedness and data management. The PP has developed a procedure identified as HSD004. It was confirmed with the procedure that the site safety manager would establish the training plan on a monthly basis and report the result to the site manager.</p> <p>Therefore CL 9 is closed.</p>
<p>CL 10</p> <p>It is indicated in the PDD that monitoring records will be kept for the full crediting period. However the records should be kept at least for 2 years after the end of the last crediting period. The clarification should be provided in the PDD with regard to the data keeping, especially if the last CERs are issued after the end of crediting period.</p>	B.7.11	PDD is modified. (Data will be kept for two years after the last issuance of CERs for this project activity.)	<p>The PP has revised the PDD properly. It is indicated in the Section b.7.1 that Data will be kept for two years after the last issuance of CERs.</p> <p>Therefore CL 10 is closed.</p>
<p>CL 11</p> <p>The mitigation actions against the environmental impacts provided by the Advance Examination of the Environmental Impact should be taken and relevant actions taken should be reported as necessary. The monitoring plan should state how to manage the relevant data in accordance with the act.</p>	B.7.13	This is described in the PDD. (refer to Section E.3)	The PP has summarised the actions to prevent the adverse environmental impacts in the revised PDD in accordance with the Advance Examination of the Environmental Impact Report. DNV was able to confirm with the Advance Examination of the Environmental Impact Report that no significant environmental issues were

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
			identified. The PP has stated in the section D.S of the revised PDD that constant monitoring will be made according to the Advance Examination of the Environmental Impact and any critical issues will be reported and discussed with the local government which complies with the legal requirements. DNV considers these are appropriate. Therefore CL 11 is closed.
CL 12 Crediting period is stated in the PDD to start from the day of operation or on the date of registration of the CDM project, whichever is later. The project activity is expected to be in operation from 1 August 2009. More plausible starting date of the crediting period should be provided, considering the validation.	C.1.4	The project operation is supposed to start on September. 1 st , 2009. The crediting period will start day or on the date of registrations of the CDM project activity, whichever is later.	The crediting period is revised indicating that the crediting period will be the start day or on the date of registrations of the CDM project activity, whichever is later. Since the operation of the project has begun on 1 September 2009, the crediting period will start on 1 May 2001 or the date of registration of the CDM project activity, which ever is later. It is deemed reasonable. Therefore CL 12 is closed.
CL 13 The wind power plant which has the capacity of more than 100 MW should go through the environmental impact assessment by Act on the Environmental Impact Assessment as for wind power plant. The proposed project doesn't fall under the category of EIA as set by the Act. Instead, in accordance with Framework Act on Environmental Policy, the advance examination of the environmental impact for the proposed project	D.1.1	This project should go through "the advance examination of the environmental impact" by Environmental Policy Act.(No. 25) and Enforcement Ordinance.(No. 7) The PP is conducted the advance examination of the environmental impact. And addressed in D.1 of the PDD. The results of the advance examination of the environmental impact was approved,	The interview was made with the officer in Jeju Self-governing province. The standalone approval process does not exist as for the advance examination of the environmental impact, however acceptable level of the report and monitoring plan should be submitted to get the permit to start the construction work. Validation team checked the approval letter issued by the local government which permits the PP to

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
<p>activity was carried out.</p> <p>The PP should clarify if the advance examination of the environmental impact was approved.</p>		<p>this project could be approved.</p>	<p>commence the project.</p> <p>The project is deemed to go through the proper process and get permitted.</p> <p>Therefore CL 13 is closed.</p>
<p>CL 14</p> <p>The advance examination of the environmental impact identifies the environmental impacts caused by the proposed project. Countermeasures to reduce the impacts during the construction as well as operation phases were discussed with the local government, which was confirmed with the report on the actions taken against opinions of the advance consultations about the examination of environmental impact. The report indicates the mitigation actions subject to opinions and actions to be taken at the next phase.</p> <p>The PP should address in D.2. of the PDD the mitigation measures as described in the advance examination of the environmental impact</p>	D.1.3	<p>The PP is addressed in D.1 and D. 2 of the PDD the mitigation measures as described in the advance examination of the environmental impact.</p>	<p>The analysis of the environmental impacts is documented in the section D.1 and D.2 revised PDD. The impacts on the environment and countermeasures to be taken are identified in accordance with the advance examination of the environmental impact.</p> <p>It was confirmed that the descriptions in the PDD are properly reflecting the conclusions from the advanced examination of the environmental impact.</p> <p>Therefore CL 14 is closed.</p>
<p>CL 15</p> <p>Three public consultations in 2005 are described in the PDD. The PP, Hanshin Energy was founded in December 2006. The PP should clarify project history based on timeline. Besides, the PP should clarify how the three consultations can be justified to consult with the local stakeholders before the decision of proceeding with CDM project was made by the PP.</p> <p>The validation team found out during the site visit that the PP held two public hearings for the local</p>	E.1.1	<p>The PP is addressed project history in B.2 of the PDD.</p> <p>The PP held two public hearings for the local residents and local government officials during the site visit. The local residents say that the Project is a positive role in regional development. local government officials say that the Project has no problem with the procedure.</p>	<p>The PP has revised the public consultations section in the PDD. The public consultations conducted in 2005 were taken out from the PDD. The course of actions taken to get the local residents and the local government officers engaged in the public consultation are addressed in the Section E. of the PDD. The supporting statements from the local residents are also indicated.</p> <p>DNV has verified the relevant records and concluded that the descriptions in the PDD</p>

Corrective action and/ or clarification requests	Reference to Table 2	Response by project participants	Validation conclusion
residents and local government officials. The official letters undersigned by the representative of local villages was issued to the PP expressing the support of the project. This course of actions taken should be addressed in the PDD.			were transparent and correct. Therefore CL 15 is closed.
CL 16 The PDD describes that the PP would buy the hotel and the adjacent land to resolve the complaint. The purchasing contract of the hotel should be provided to confirm the due account taken.	E.1.5	The purchasing contract of the hotel is provided to DNV.	The purchasing contract was reviewed. DNV was able to confirm that the PP has bought the hotel to resolve the complaint from the local stakeholder as described in the PDD. Therefore CL 16 is closed.

Table 4 Forward action requests

Forward action request	Reference to Table 2	Response by project participants
Not applicable		

- o0o -

APPENDIX B

CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS



CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Xiaojun Johnsen Zhang: holds a Master Degree in Metallurgical Physical Chemistry and obtained his MBA in project management. Also he majored in Chemistry, which involves organic, inorganic, structure and analysis chemistry as bachelor degree. He has an overall experience of 26 years. Prior to joining DNV, Johnsen had an overall experience of 4 years in glass manufacturing industry covering production, energy efficiency improvement and commissioning. Later on he gained combined experience of more than 15 years in the iron and steel industry, while he worked as researcher and management personnel in Central Iron and Steel Institute, the sector covering the refractory, iron & steel, waste heat recovery, solid waste disposal, waste fuel treatment, waste energy efficiency and relevant environmental affairs. His experience also covers the fields of environmental management, resource conservation and cleaner production in various manufacturing and metallurgical industries. He has also gained the experience in Management System Audits such as ISO 9001, ISO 14001 standards in various industrial sectors for more than 3 years for industrial plants.

For financial analysis and investment, he has gained the relevant knowledge through his MBA course; and through the feasibility case study in the iron and steel sector while he worked as management personnel, he gradually gained concerted experience in cost accounting, financial analysis and investment input parameter assessment.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV in China.

His qualification, industrial and investment experience and experience in CDM demonstrate him sufficient sectoral competence in “Glass”, “Iron and Steel” and “Energy Generation from Renewable Energy Sources”.



CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Seung Hyun Kwak: holds a Bachelor Degree in Environmental Engineering and MBA. Having an overall experience of around 14 years. Prior to joining DNV, He worked around 8 years in the construction industry covering of HSE (Health, Safety and Environment) management. And he has spent 6 years in the management system and GHG auditing (Corporate GHG Emissions Verification) in the various industries.

For financial analysis and investment, he has gained the relevant knowledge through his MBA course;

He has experience of more than 3 years in validation and verification of CDM projects in the Republic of Korea.



CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Zhiang Walter Tang: holds a Bachelor Degree in Thermodynamic Engineering and a Master Degree in Business Administration. Having an overall experience of around twelve years. Prior to joining DNV, having around 5 years in the field of power industry covering of consulting and engineering for thermal power, wind power, hydropower and solar energy projects. His experience also covers the field of space industry for thermal design, the energy analysis and thermal control for about 4 years.

He has gained the relevant financial and investment knowledge through his courses in MBA. He has applied his financial and investment knowledge in his consulting work for the power industry, such as investment risk analysis, financial accounting, investment parameters assessment, etc.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV both in China and abroad.

His qualification, industrial experience and experience in CDM demonstrate his sufficient sectoral competence in “Energy Generation from Renewable Energy Sources”.



CURRICULA VITAE OF THE VALIDATION TEAM MEMBERS

Felipe Antunes: holds a Master's Degree in Production Engineering (Quality) and a Post Graduate Diploma in Environmental Management and Industrial Waste Management and Treatment. Possesses an International experience of more than 10 years in the field of quality and environmental auditing, working two years as the responsible of the QMS of Rede Metrológica RS and since 1999 as a QMS and EMS auditor in DNV.

He has experience of more than 3 years in validation and verification of numerous CDM projects in DNV, both in South America & abroad. He has also been actively involved in Management System Audits such as ISO 9001, ISO 140001 and OHSAS 18001 standards in various industrial sectors for more than 10 years in DNV.

His qualification and experience in CDM demonstrate him sufficient sectoral competence in energy generation from renewable energy sources, waste handling and disposal, and animal waste management.