



**Validation report form for post-registration changes for
CDM project activities
(Version 02.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title and UNFCCC reference number of the project activity	Sihwa Tidal Power Plant CDM Project (0349)
Process track	<input type="checkbox"/> Prior approval <input type="checkbox"/> Issuance <input checked="" type="checkbox"/> Renewal of crediting period
Version number of the validation report on PRCs	4.0
Completion date of the validation report on PRCs	20/10/2018
Type(s) of PRCs	<input type="checkbox"/> Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines <input type="checkbox"/> Corrections <input type="checkbox"/> Changes to the start date of the crediting period <input type="checkbox"/> Inclusion of a monitoring plan <input checked="" type="checkbox"/> Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools <input type="checkbox"/> Changes to the project design <input type="checkbox"/> Changes specific to afforestation and reforestation project activities
Version number of PDD to which this report applies	4.0
Project participants	Korea Water Resources Corporation (K-water)
Host Party	Republic of Korea
Applied methodologies and standardized baselines	Methodology : ACM0002 – “Consolidated baseline methodology for grid-connected electricity generation from renewable sources.---version 17”
Mandatory sectoral scopes linked to the applied methodology	01
Conditional sectoral scopes linked to the applied methodologies	--
Name and UNFCCC reference number of the DOE	E-0005: TÜV SÜD South Asia Private Limited

**Name, position and signature of the
approver of the validation report on PRCs**



Milind Shende

Manager- Certification Body

TUV SUD South Asia

SECTION A. Executive summary

TÜV SÜD South Asia Pvt. Ltd. has performed the validation of renewal of crediting period of the aforementioned project activity "Sihwa Tidal Power CDM Project". The validation is based on the currently valid documentation of the United Nations Framework Convention on Climate Change (UNFCCC).

The validation process includes three phases:

- Desk review of documents;
- Follow-up interviews with the relevant personnel;
- Resolution of outstanding issues and the issuance of final inclusion report and opinion.

Sihwa Tidal Power Plant Project will generate electricity by utilizing the sea water when it is coming into Sihwa Lake which is an artificial lake made by the tide embankment. The plant is located in Jaggungarisum which is an island in Ansan-city, Gyeonggi Province, Korea. It is equipped with 10 turbine generators (25.4MW) of straight inflow bulb type to produce app. 254MW. This means that it will be expected to generate 552.7 GWh a year, and transmit the electricity of 507.629 GWh to the grid annually. The generated electricity will be transmitted to 'Korea Electric Power Corporation South Sihwa substation' which is 10.5 km's distance from the plant. The spatial extent of the project boundary includes the project site and all the power plants connected physically to the electricity system of Korea Electric Power Corporation (hereinafter referred to as KEPCO).

In the 2nd renewable crediting period, the emission factor has been calculated based on the statistics of electric power from 2014 to 2016 following the requirement of the applied methodology ACM0002 Version. 17. Validation of the post registration changes was done along with the renewal of crediting period validation, since there is a change in the calibration frequency of KWh meters in accordance with the National Regulations.

The Project Participant is Korea Water Resources Corporation (K-water). Location of the Project is Ansan-city, Gyeonggi Province, Republic of Korea, latitude of 37°18'46"N and longitude of 126°36'36"E. The project starting date was 31/12/2004 and the first renewable crediting period (7yrs) started on 01/07/2011. Second crediting period will be started from 01/07/2018.

1 Clarification Requests (CLs) and 1 Corrective Action Requests (CARs) were raised during the course of validation process of PRC for the renewable crediting period and have been successfully closed.

SECTION B. Validation team, technical reviewer and approver**B.1. Validation team member**

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)	Involvement in			
						Desk/document review	On-site inspection	Interview(s)	Validation findings
1.	Team Leader, Validator & Technical expert	IR	Murty	Eswar	TUV SUD South Asia Pvt Ltd	✓	✓	✓	✓
2.	Country Expert	EI	Yoon	Jung-Ho	TUV SUD Korea	✓	✓	✓	

B.2. Technical reviewer and approver of the validation report on PRCs

No.	Role	Type of resource	Last name	First name	Affiliation (e.g. name of central or other office of DOE or outsourced entity)
1.	Technical reviewer	IR	Dutta	Supratik ¹	TUV SUD South Asia Pvt Ltd
2	Technical reviewer	EI	Meesa	Srikanth	TUV SUD South Asia Pvt Ltd
2.	Approver	IR	Shende	Milind	TUV SUD South Asia Pvt Ltd

SECTION C. Means of validation**C.1. Desk/document review**

The information presented in the PDD on the technical design has been assessed for accuracy and completeness using standard auditing techniques including:

- (a) Document review including
 - A review of data and information;
 - Cross checks between information provided in the PDD and information from sources other than those used, the DOE's sectoral or local expertise. If necessary, independent background investigations were performed.
- (b) Follow-up actions including:
 - Interviews with relevant stakeholders in the host country, personnel with knowledge of the project design and implementation;
 - Cross checks between information provided by interviewed personnel (i.e. by checking sources or other interviews) to ensure that no relevant information has been omitted.
- (c) Reference to available information relating to projects or technologies similar to the proposed project activity under validation;

¹ Left the organization but was part of the initial request for registration

CDM-PRCV-FORM

The name of the project participant is Korea Water Resources Corporation (K-Water) is included in the request for renewal of crediting period is consistent with the name stated at UNFCCC website (<https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view>). The same has been validated by the DOE through UNFCCC website and final PDD.

In opinion of TÜV SÜD the project description, as included in the PDD, is accurate and complete; and it provides a correct understanding of the proposed project activity.

A complete list of all documents reviewed is attached as Appendix 3 to this report.

C.2. On-site inspection

Duration of on-site inspection: 31/01/2018- 01/02/2018				
No.	Activity performed on-site	Site location	Date	Team member
1.	Plant Visit to validate the project description, baseline, equipment, implementation and monitoring.	Sihwa Tidal Power plant, Ansan city, Korea	31/01/2018	Eswar Murty & Jung Ho Yoon
2	Validity of the original baseline-impact of new relevant national and/or sectoral policies and circumstances on the baseline, correctness of the application of the approved methodologies - EF values assessment	Plant office	31/01/2018	Eswar Murty & Jung Ho Yoon
3	Monitoring plan updates, Document review and check of all supporting documentation, ER calculations and PDD review.	Plant office	01/02/2018	Eswar Murty & Jung Ho Yoon

C.3. Interviews

No.	Interviewee			Date	Subject	Team member
	Last name	First name	Affiliation			
1.	Kim	Deog-je	K-water	31/01/2018	1. Validity of the original baseline-impact of new relevant national and/or sectoral policies and circumstances on the baseline, correctness of the application of the approved methodologies - EF values assessment 2. Monitoring plan updates, Document review and check of all supporting documentation, ER calculations and PDD review 3. Post registration changes	Eswar Murty & Jung Ho Yoon
2	Kim	Min Jin	K-water	31/01/2018	1. Validity of the original baseline-impact of new relevant national and/or sectoral policies and circumstances on the baseline, correctness of the application of the approved methodologies - EF values assessment 2. Monitoring plan updates, Document review and check of all supporting documentation, ER calculations and PDD review	Eswar Murty & Jung Ho Yoon
3	Han	Sang Woo	Consulting	01/02/2018	Monitoring plan updates, Document review and check of all supporting documentation, ER calculations and	Eswar Murty & Jung Ho Yoon

					PDD review	
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C.4. Sampling approach

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C.5. Clarification requests (CLs), corrective action requests (CARs) and forward action requests (FARs) raised

Areas of validation findings	No. of CL	No. of CAR	No. of FAR
Compliance with PDD form			
Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines			
Corrections			
Changes to the start date of the crediting period			
Inclusion of a monitoring plan			
Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools	1	1	
Changes to the project design			
Changes specific to afforestation and reforestation project activities			
Others (please specify)			
Total	1	1	

SECTION D. Validation findings**D.1. Compliance with PDD form**

Means of validation	NA
Findings	NA
Conclusion	NA

D.2. Temporary deviations from the registered monitoring plan, applied methodologies or applied standardized baselines

Means of validation	NA
Findings	NA
Conclusion	NA

D.3. Corrections

Means of validation	NA
Findings	NA
Conclusion	NA

D.4. Changes to the start date of the crediting period

Means of validation	NA
Findings	NA
Conclusion	NA

D.5. Inclusion of a monitoring plan

Means of validation	NA
Findings	NA
Conclusion	NA

D.6. Permanent changes to the registered monitoring plan, or permanent deviation of monitoring from the applied methodologies, standardized baselines, or other applied standards or tools

Means of validation	<p>The revised PDD was validated with respect to the post registration changes done to the registered monitoring plan.</p> <p>As per the registered PDD, the meters shall be calibrated when they are installed, and recalibrated every two years after the installation (The meters for electricity imported from the grid shall be calibrated every seven years according to the national law).</p> <p>However, in the revised PDD for the 2nd Crediting period, the calibration frequency is in accordance with the “Measures Act” 14661 dated September 2017 and “Rules on the operation of electricity market” December 2017. The updated organization chart also has been included for the monitoring structure.</p>
Findings	<p>CL1 and CAR 1 were raised with respect to the post registration changes.</p> <p>CL1 has been raised as there is some discrepancy observed with respect to the Calibration frequency of energy meters as per MR and the National Regulations. In response, PP has revised the monitoring plan of energy meters for exported and imported electricity to be calibrated properly in accordance with the national regulations; Measures Act or Rules on the Operation of the Electricity Market.</p> <p>CAR 1 has been raised since there is some discrepancy observed in the organization structure in the PDD and the PP document. The inconsistency was subsequently revised.</p>
Conclusion	TÜV SÜD confirms that the PP is able to implement the monitoring plan and the achieved emission reductions can be reported ex-post and verified

D.7. Changes to the project design

Means of validation	NA
Findings	NA
Conclusion	NA

D.8. Changes specific to afforestation and reforestation project activities

Means of validation	NA
Findings	NA
Conclusion	NA

SECTION E. Internal quality control

Internal quality control within the team is assured by means of a technical review process that takes place after the on-site assessment and after closure of findings. The internal quality control in the verification process is given by the final decision made by the Certification Body.

SECTION F. Validation opinion

TÜV SÜD has performed a validation of the post registration changes along with request for renewal of the crediting period of the aforementioned existing CDM project activity. Standard auditing techniques have been used for the validation process. The validation has been performed following the requirements of the latest version of the CDM VVS for PA version 1.0.

The review of the project design documentation, subsequent follow-up interviews, and further verification and validation of references have provided TÜV SÜD with sufficient evidence to determine the validity of the original baseline and to confirm that the estimated emission reductions are in line with the applied methodology. In our opinion, the project meets all relevant UNFCCC requirements and hence TÜV SÜD recommends the renewal of the crediting period of this project. Considering that the project is implemented as designed, the project is likely to achieve the estimated amount of annual emission reductions of 251,089 tCO₂e and a total estimated of 1,757,623 tCO₂e as specified within the final PDD version for the second crediting period. The findings raised during this validation have been closed satisfactorily.

The single purpose of this report is its use during the registration process as part of the CDM project cycle. Based on the work described in this report, nothing has come to our attention that causes us to believe that any project component or issue has not been covered by the validation process.

Appendix 1. Abbreviations

Abbreviations	Full texts
BM	Build Margin
CAR	Corrective Action Request
CDM	Clean Development Mechanism
CDM-EB	CDM Executive Board
CER	Certified Emission Reduction
CM	Combined Margin
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CO₂e	Carbon dioxide equivalent
K-water	Korea Water Resources Corporation
KEPCO	Korea Electric Power Corporation
KPX	Korea Power Exchange
CR / CL	Clarification Request
DNA	Designated National Authority
DOE	Designated Operational Entity
EF	Emission Factor
EIA / EA	Environmental Impact Assessment / Environmental Assessment
ER	Emission Reduction
FAR	Forward Action Request
GHG	Greenhouse Gas(es)
GWP	Global Warming Potential
IRL	Information Reference List
KP	Kyoto Protocol
MP	Monitoring Plan
MR	Monitoring Report
OM	Operational Margin
PCP	Project Cycle Procedure
PDD	Project Design Document
PP	Project Participant
PS	Project Standard
RCP	Renewable Crediting Period
TÜV SÜD	TÜV SÜD South Asia Pvt. Ltd
UNFCCC	United Nations Framework Convention on Climate Change
VVS	CDM Validation And Verification Standard for Project Activities

Appendix 2. Competence of team members and technical reviewers



South Asia

CERTIFICATE OF APPOINTMENT

Mr. Murty, Eswar fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	1.1, 1.2, 3.1, 4.1, 13.1					

Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
1.1_Thermal Energy Generation
1.2_Renewables
3.1_Energy demand
4.1_Cement and lime production
13.1_Solid waste and wastewater

This appointment is valid until 31.05.2019 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0031/009.

Date	Signature
01/06/2018	

IS-CMS-CB-POG-01/05, version 03

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CERTIFICATE OF APPOINTMENT

Mr. Meesa, Srikanth fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	1.2, 3.1, 7.1, 13.1					

Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
1.2_Renewables
3.1_Energy demand
7.1_Transport
13.1_Solid waste and wastewater

This appointment is valid until 31.05.2019 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0096/005.

Date	Signature
01/03/2018	

IS-CMS-CB-POG-01/05, version 03

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CERTIFICATE OF APPOINTMENT

Mr. Yoon, Jung-Ho fulfills the requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd to participate in audits.

Qualification applicable to					
Standard	CDM	GS	VCS	ISO-14064-1: 2006	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Qualification as						
Status	Validator	Verifier	ATL	Technical Reviewer	Financial Expert	Technical Expert
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TA (s)	5.1, 5.2, 11.1, 11.2					

Country Expertise						
Region	1	2	3	4	5	Other
	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Further countries						

Technical Area
5.1_Chemical Industry, 5.2_Caprolactam, nitric and adipic acid
11.1_Emissions of fluorinated gases, 11.2_Refrigerant gas production

This appointment is valid until 28.05.2018 and is bound by internal requirements of the Certification Body 'Environment and Energy' of TÜV SÜD South Asia Pvt Ltd.

In case of loss of validity of this certificate as per result of an assessment according to internal procedures or due to any other reason, it will be properly communicated to you.

Your Certificate has the internal reference no. CB-IND-CCP-0053/007.

Date	Signature
01/03/2017	

IS-CMS-CB-POG-01/05, version 03

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Appendix 3. Documents reviewed or referenced

No.	Author	Title	References to the document	Provider
1	UNFCCC	https://cdm.unfccc.int/Projects/DB/DNV-CUK1143710269.08/view Methodology ACM0002 version 17	Project web page	
2	UNFCCC	Registered PDD	Version 5.2 04/09/2014	
3	K-water	PDD for the 2 nd Crediting period	Version 04 20/09/2018	
4	K-water	Emission factor Calculations sheet	Version 04 20/09/2018	
5	K-water	Emission reduction Calculation sheet	Version 03 20/09/2018	
6		Measures Act No. 14661	Sep 2017	
7	Korea Power Exchange (KPX)	Rules on the operation of Electricity meter	Dec 2017	
8	Ministry of Environment	Guideline for the greenhouse gas and energy target management operation	01/01/2017	
9		Status of the Generation facility		
10	KEPCO	Sustainability Report	2016	
11	K-water	Commissioning Certificate of Sihwa Tidal Power Plant		
12	KEPCO	Statistics of Electric Power in Korea	2015-17	

Appendix 4. Clarification requests, corrective action requests and forward action requests

CL ID	01	Section no.		Date: 01/02/2018
Description of CL				
There is some discrepancy observed with respect to the Calibration frequency of energy meters as per MR and the National Regulations. PP is requested to clarify and revise the same in PDD.				
Project participant response				Date:
The monitoring plan of energy meters for exported and imported electricity was revised in the B.7.1 in PDD to be calibrated properly in accordance with the national regulations ; Measures Act or Rules on the Operation of the Electricity Market.				
Documentation provided by project participant				
The revised PDD was submitted to the DOE.				
DOE assessment				Date:
The “Measures Act” and “Rules on the Operation of the Electricity Market” latest documents were checked and confirmed by the DOE. The watt hour meters are to be calibrated in accordance with the mentioned national regulations. Hence the issue is closed.				

CAR ID	01	Section no.		Date: 01/02/2018
Description of CAR				
There is a mismatch of information with respect to the monitoring and organization structure as observed from the submitted document and PDD. PP is requested to revise the same.				
Project participant response				Date:
The monitoring organization structure and the department name in R&R were revised as per the latest reorganization of K-water.				
Documentation provided by project participant				
The revised PDD was submitted to the DOE..				
DOE assessment				Date:
The information has been revised in the PDD. Hence the issue is closed.				